Health Education

Interventions addressing the social determinants of teenage pregnancy

Adam Fletcher, Angela Harden, Ginny Brunton, Ann Oakley, Chris Bonell,

Interventions addressing the social determinants of teenage pregnancy

Adam Fletcher
Public and Environmental Health Research Unit, London School of Hygiene and Tropical Medicine, London, UK
Angela Harden, Ginny Brunton and Ann Oakley
EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, London, UK, and
Chris Bonell
Public and Environmental Health Research Unit, London School of Hygiene and Tropical Medicine, London, UK

Received 3 April 2007
Revised 13 May 2007
Accepted 13 May 2007

Abstract

Purpose – The limited evidence of effectiveness of existing teenage pregnancy strategies which focus on sex education, together with growing evidence that factors such as poor school ethos, disaffection, truancy, poor employment prospects and low expectations are associated with teenage pregnancy, has increased interest in interventions which target these "wider" social determinants. This paper aims to identify promising interventions and priorities for future research and to make recommendations for policy and practice in the UK.

Design/methodology/approach – This paper discusses the evidence regarding the potential of interventions which target determinants of teenage pregnancy relating to school disaffection and low expectations, drawing on recent systematic reviews and trials to consider future directions for research, policy and practice.

Findings – High-quality research evidence illustrates the potential of two approaches to address determinants of teenage pregnancy relating to disaffection and low expectations. These are school-ethos interventions, which aim to facilitate a positive and inclusive school-ethos, strengthen school relationships and reduce disaffection; and targeted, intensive youth work interventions, which aim to promote positive expectations, vocational readiness and self-esteem through vocational and life-skills education, volunteering and work experience.

Practical implications – Two forms of intervention which address key social determinants of teenage pregnancy – school-ethos interventions and targeted youth work interventions – require more attention from researchers and policy-makers.

Originality/value – This paper calls for a shift in the research and policy agenda. In addition to interventions that aim to address proximal, individual factors, such as sexual health-related knowledge, there should be a more complementary focus on socio-environmental as well as targeted individual-focused interventions aiming to address the wider social determinants of teenage pregnancy.

Keywords Schools, Age groups, Pregnancy, Social structure, Youth, Behaviour

Paper type General review

Health Education
Vol. 108 No. 1, 2008
pp. 29-39

0965-4283
DOI 10.1108/09654280810842111

Background

Reducing the incidence of pregnancies among young people aged under 18 years continues to be a government priority in the UK and elsewhere (DfES, 2004, 2006;

Holgate and Evans, 2006). Although teenage parenthood can be a positive experience (Wiggins *et al.*, 2006), it is associated with a wide range of subsequent adverse social and health outcomes (Ermisch, 2003; Pevalin, 2003) and these associations remain after adjusting for pre-existing social, economic and health problems (Berrington *et al.*, 2005). Teenage pregnancy is therefore often both a marker of social and economic disadvantage at a young age and a cause of further disadvantage, emotional and physical health problems.

Despite some recent reductions, teenage birth rates in the UK are the highest in western Europe (UNICEF, 2007). This could be explained in part by the relatively narrow focus of existing interventions. Sex education which aims to influence knowledge, attitudes, skills, and peer norms relating to sexual health is now standard practice in many countries including the UK. Although the implementation of sex education varies across schools, it is seen as a key strategy for the promotion of sexual health and attaining a reduction in rates of teenage pregnancies (DoH, 2001, 2004; DfES, 2006). However, while trials of sex-education programmes have reported some significant changes in students' knowledge, attitudes, skills and norms, there is little evidence that sex education can change behaviour or lead to a reduction in the rates of teenage pregnancies (Peersman *et al.*, 1996; DiCenso *et al.*, 2002; Wight *et al.*, 2002; Stephenson *et al.*, 2004; Henderson *et al.*, 2007). In other words, sex education may be necessary but not sufficient on its own for reducing the number of teenage pregnancies. Furthermore, increasing the availability of contraception or the emergency contraceptive pill does not always appear to lead to reductions in teenage pregnancies either (Glasier, 2006; Paton, 2006).

To bring about sustained behavioural changes it may be necessary to take a broader view of the causes of unplanned teenage pregnancy and how these might be addressed. There is accumulating evidence that poor school ethos, school disaffection, truancy, poor employment prospects and low expectations are associated with an increased risk of teenage pregnancy (SEU, 1999; DoH, 2001; Bonell *et al.*, 2005, 2007; Wiggins *et al.*, 2005). These factors may well be just as, if not more, important than what we might term the "proximal" factors, such as knowledge, attitudes, skills and norms relating to sexual behaviour and sexual health. While these "proximal" factors may act as the immediate influences on individuals' sexual behaviours, they may in turn be influenced by the "wider" social determinants listed above (Bonell *et al.*, 2005). For example, individuals' attitudes to the importance of avoiding early parenthood might be determined by expectations about their employment prospects, which may then relate to their attitudes to, and attendance at, school. It certainly appears that when teenagers have a reasonable expectation of inclusion in the opportunities and advantages of living in an economically advanced society they are more strongly motivated to avoid early parenthood (UNICEF, 2001). Although the UK teenage pregnancy and sexual health strategies acknowledge these wider social factors, the strategies propose relatively few interventions that address such wider social influences (SEU, 1999; DfES, 2006).

These wider social factors that place young people at risk of teenage pregnancy should be acknowledged and addressed by policies and practice designed to reduce teenage pregnancy rates and promote sexual health in the UK. This paper reviews and discusses the evidence for the potential of interventions which target determinants of teenage pregnancy relating to disaffection and low expectations, drawing on recent systematic reviews and trials to consider future directions for research, policy and

practice. The paper focuses on promising forms of intervention, which target these determinants of teenage pregnancy. First, we discuss links between the school environment and young people's health, and we describe promising interventions for reducing teenage pregnancy via promoting positive and inclusive school ethos. Second, we look at targeted, intensive youth work interventions which have been successful in reducing teenage pregnancy rates. Finally, we consider the implications for research, policy and practice in the UK arising from this evidence.

School-level influences on sexual health

After their family, the most important institution in the lives of most children and young people is their school. A longitudinal study of twelve secondary schools in London by Michael Rutter and his colleagues was the seminal study of "school effects" and found that institutional factors varied between schools and influenced young people's development even after pupil-level differences were adjusted for (Rutter *et al.*, 1979). In particular, it appeared to be the overall school ethos (in other words, its values and culture) which influenced pupil outcomes. School "ethos" refers to the institutional culture and, in particular, the extent of student engagement and the quality of teacher-student relationships in schools (Macbeath *et al.*, 1997). Rutter and colleagues' findings prompted new research to examine if these institution-level factors also influenced students' health outcomes (West, 2006).

Although still in its infancy, research into "school effects" on young people's health suggests that schools vary widely in terms of pupils' health profiles and, with regard to certain health outcomes, this is not explained merely by pupils' individual and family socio-demographic factors nor by neighbourhood effects (Sellstrom and Bremberg, 2006; West, 2006). Factors such as school size and ethos appear to exert an independent effect on some health outcomes (West *et al.*, 2004). Data from twenty-five Scottish secondary schools which took part in a randomised trial of a school sex-education programme (SHARE) highlighted considerable variations between schools in terms of the percentage of students who had sex at 16 (Henderson *et al.*, 2007). School-level socio-economic factors, such as students' family incomes, were predictive of these outcomes independently of individual and family socio-cultural factors (SHARE study, unpublished data). Although observational studies cannot eliminate the possibility of residual confounding by such factors as small-neighbourhood effects, unmeasured parental attitudes and baseline non-health behaviours which have not been adjusted for, there is nonetheless a powerful suggestion that the school environment itself is an important determinant of health outcomes, particularly substance misuse and sexual health (Bonell *et al.*, 2007).

Although individual-level studies cannot draw conclusions about school-level effects, these studies do indicate that students' poor school experiences are strongly correlated with risky health behaviours. They might also explain the mechanism of action through which school-level factors, such as poor ethos, influence sexual health outcomes. The American National Longitudinal Study of Adolescent Health, which surveyed 13,570 students in 80 schools, found that male and female high-school students (aged 15) who reported that they had worse relationships with teachers and did not "feel part of their school" were significantly more likely than others to have to had sex a year later and were less likely to use a condom (McNeely and Falci, 2004). This association was independent of associations with students' socioeconomic status,

gender or ethnicity. Cross-sectional analysis of data from this survey identified school "connectedness" as the only variable that was protective for every single risky health behaviour (Resnick *et al.*, 1997). Similarly, secondary analysis of data from a trial of sex education in England found that dislike of school was independently associated with teenage pregnancy (Bonell *et al.*, 2005).

Taken together, these observational studies suggest that young people's experiences at school influence their sexual behaviour. One possible mechanism might be that poor school ethos results in some students receiving less support and encouragement from teachers, becoming disaffected with school and having fewer positive expectations about future education and employment prospects. This might then lead some young people to be more willing to risk a pregnancy rather than prioritising contraception, and to consider sexual relationships and early parenthood as alternative markers of the transition to adulthood (Bonell *et al.*, 2005). Although these observational studies should be treated cautiously because they cannot completely eliminate confounding, this evidence of "school effects" and possible associated mechanisms from individual-level observational studies is supported by evidence from high-quality trials which enable better control of confounding, and which also indicate what might practically be done to improve school ethos and reduce disaffection among vulnerable young people in order to reduce teenage pregnancy rates.

Evidence from trials of school-ethos interventions

There is emerging evidence from high-quality randomised controlled trials which indicates that interventions which aim to change schools as institutions in order to strengthen teacher-pupil relationships, facilitate a positive and inclusive school ethos and increase students' participation, can exert effects on pupils' health behaviours including sexual behaviour outcomes (Bonell *et al.*, 2007).

The Gatehouse project in Australia used a whole-school programme based on attachment theory, which asserts that secure emotional bonds are necessary for healthy youth development (Patton *et al.*, 2003). The Gatehouse project promoted a positive school climate and delivered a curriculum promoting social and emotional wellbeing. The intervention made changes to the school environment by assessing baseline needs via a pupil survey and reviewing policies in order to identify priorities for action, establishing a school-based action team and implementing a programme of professional development and training for members of the "school community". To evaluate the project, 26 secondary schools were randomly allocated to intervention and comparison groups. The initial randomised controlled trial reported that the intervention was associated with non-significant positive effects on a broad range of health outcomes, but effects on sexual health outcomes were not reported (Bond *et al.*, 2004). However, follow-up of trends in health behaviours among subsequent cohorts in intervention and comparison schools indicated that a composite measure of risky health behaviour was 25 per cent lower in the former than the latter schools, and the intervention appeared to be associated with a statistically significant protective effect on the early initiation of sex (Patton *et al.*, 2006).

Flay and colleagues (Flay *et al.*, 2004) evaluated the Aban Aya youth project in Chicago high schools, another intervention which aimed to reduce students' risky health behaviours through school-level changes. The intervention involved: setting up a task-force involving staff, students, parents and local residents to examine and

amend school policies relating to young people's health, behaviour and to school ethos; developing links with community organisations and businesses; and training teachers to develop more interactive and culturally appropriate teaching methods. The overall aim was to "rebuild the village" within schools and enhance students' sense of belonging and social support. The intervention was evaluated via a cluster randomised trial involving 12 schools. Investigators found significant reductions in reports of recent sexual intercourse and significant increases in condom use among boys in intervention schools compared with controls. There were also significant benefits regarding other health and educational behaviours and the programme was most effective for those boys considered to be "high risk" (Segawa *et al.*, 2005). However, such benefits were not reported among girls, possibly because the changes did not address types of indirect aggressive behaviours, such as spreading rumours, and less physical forms of bullying which are more common among girls (Lagerspetz and Bjorkqvist, 1994).

The Seattle Social Development project evaluation provides further evidence that improving "bonding" and commitment to school is an effective means of promoting young people's sexual health (Hawkins *et al.*, 1999). This study also found a reduction in teenage pregnancy rates. The intervention is based on the "Social Development Model", which asserts that strong bonds to schools help to protect young people from problem behaviours (Catalano and Hawkins, 1996). Each year, as the children move through school, teachers receive in-service training on proactive classroom management, interactive teaching, and cooperative learning to strengthen school relationships and increase opportunities for active involvement. This study was not only its experimental design but also its long period of follow-up. The study randomly assigned schools to intervention and control groups. At age 21 students who received the intervention reported increased condom use and fewer sexual partners, sexually transmitted infections and pregnancies (Lonczak *et al.*, 2002). Students in the intervention group also reported higher levels of academic achievement, lower rates of substance misuse and less involvement in crime and anti-social behaviour (Hawkins *et al.*, 1999).

Evidence from trials of targeted youth work interventions

So far this paper has highlighted evidence to suggest that schools exert effects on the health of young people including sexual health, and we have speculated that the mechanism by which these effects occur may involve young people's attitudes to school and expectations about their future educational, employment and income prospects. We have also described the findings of several high quality intervention trials that show that promoting a positive and inclusive school ethos is one means of intervening to disrupt such a mechanism of influences. While interventions targeting whole institutions are one means of addressing the wider determinants of teenage pregnancy, another is to target those young people most at risk of school disaffection and lower expectations with the aim of disrupting the pathways via which young people enter into early parenthood.

Targeted, intensive youth projects which provide structured life-skills and vocational education, volunteering and social support for young people who are at "high risk" of teenage pregnancy and other problem behaviours, have been shown to be effective in modifying young people's behaviour, promoting safer sex and reducing teenage pregnancies. A systematic review of high-quality intervention studies aimed at tacking the social exclusion associated with unintended teenage pregnancy found that youth work programmes reduced by 45 per cent the number of young women reporting

a teenage pregnancy (Harden *et al.*, 2006). Some of the studies included in this review also found that young people participating in these programmes were more likely to finish high school and go onto further and higher education than those who do not. The youth work interventions included in this review were the Teen Outreach Programme, the Quantum Opportunities Programme and the Children's Aid Society (CAS)-Carrera programme, all from the USA. All these interventions targeted "high risk" teenagers.

The Teen Outreach Programme and the Quantum Opportunities Programme are examples of intensive youth work programmes in which young people "serve" their local community. In addition to educational support and life-skills training, these programmes provide opportunities for these young people to undertake voluntary work therefore allowing them to make a positive contribution and learn from these experiences. Experimental studies carried out to evaluate these programmes found that students who participated in these "serve and learn" programmes were more likely to finish high school and go onto further and higher education and were less likely to become pregnant than those who did not (Harden *et al.*, 2006). For instance, two evaluations, together involving nearly 4,000 students, of the Teen Outreach programme – which includes supervised community service, classroom discussion of service experiences and personal and social development classes – have found that young women who receive the intervention were less than half as likely to become pregnant compared to the control group (Allen *et al.*, 1997; Allen and Philliber, 2001). An experimental study of the Quantum Opportunities Programme, a programme for socially and economically disadvantaged young people which provides 250 hours of community service activities, reduced by 36 per cent the number of young people who had children by age 18 (Hahn *et al.*, 1994).

The CAS-Carrera programme is an on-going, intensive, multi-component youth development intervention programme for socially disadvantaged teenagers considered to be at high risk of teenage parenting (Philliber *et al.*, 2001). In 1997 12 sites across six cities in the USA recruited approximately 100 young people each and randomly allocated them to an intervention or control group. The intervention takes a holistic approach to empower young people, raise expectations and promote social and learning skills and included five different components: a "Job Club", which included work experience and careers advice; academic support, which included homework support and preparation for exams and higher education; sex education workshops; arts workshops; and sports. The programme operated outside of school five days a week during term-time and was supplemented by additional support during the summer holidays. Young women in the programme were significantly more likely than those in the control group to have successfully resisted pressure to have sex, to have used dual methods of contraception and – three years after entering the programme – they had significantly lower rates of pregnancy than control group young women (Philliber *et al.*, 2001).

In the UK, the Young People's Development Programme (YPDP), which is based on the CAS -Carrera programme, aims to improve long-term outcomes relating to sexual and other health and social outcomes by providing a holistic programme of education and support for 13-15 year-olds who are at risk of school exclusion, drug misuse and teenage pregnancy (Wiggins *et al.*, 2006). Like the CAS-Carrera programme the intervention involves multiple different components: educational support; volunteering, training and employment opportunities; arts and sports; life-skills education; mentoring; and health education and access to services. The programme has been evaluated by

comparing young people in the YPDP to those taking part in other forms of youth provision in similar demographic areas which also target disadvantaged young people. The interim findings provide some possible indications of early success: YPDP young people were more likely than those from comparison sites to report using condoms; and YPDP young people and staff also felt that the programme was having a positive impact (Wiggins *et al.*, 2006). Few other positive impacts were identified at the end of the first year of this evaluation although this lack of initial impact needs to be treated with caution because at this stage only a relatively small number of young people had been recruited thus reducing the power of the study.

Implications for policy, practice and research

The research evidence discussed above illustrates the potential of two approaches for reducing teenage pregnancy and promoting young people's sexual health: school-ethos interventions, which aim to facilitate a positive and inclusive school-ethos, strengthen school relationships and reduce disaffection; and targeted, intensive youth work interventions, which aim to promote positive expectations, vocational readiness and self-esteem through vocational and life-skills education, volunteering and work experience. Although the evidence-base is not yet well developed, evidence from systematic reviews and high-quality intervention studies indicates the potential of institutional and targeted interventions which address these wider social determinants to complement existing sex education interventions which tackle the more obviously proximal determinants of teenage pregnancy such as poor knowledge, attitudes, skills and norms relating to sexual health.

It is not possible to tell from current evidence which of the two types of intervention discussed in this paper – school-ethos interventions or targeted, intensive youth work interventions – has the greatest potential for achieving reductions in overall rates of teenage pregnancy. The influential "Rose hypothesis" suggests that universal, population-based preventative strategies, of which school-ethos interventions are one example, are likely to be more effective and cost-effective in reducing rates of disease and other outcomes that are "normally distributed" within populations than are interventions which target individuals identified as at higher than median risk within a population (Rose, 1992). This is both because it is difficult to predict which individuals are actually at higher risk, and across populations more disease or other unwanted outcomes that are "normally distributed" are likely to arise among the large number of individuals regarded as at low or medium risk than the smaller number of individuals regarded as at high risk. However, given current uncertainties concerning intervention effects and the extent to which those at risk of teenage pregnancy are pre-identifiable, it is probably wise to view the two classes of intervention as potentially complementary and to continue to explore the effectiveness of both. It is also reasonable to assume that the appropriateness of these interventions may vary by gender because of evidence that their effects differ by gender.

Most of the evidence discussed above comes from US trials and other non-UK studies, such as the Gatehouse intervention trial in Australia. Nonetheless, there is evidence to suggest that these types of interventions will be appropriate for the UK. A systematic review of teenage parents' and other UK young people's views about school, work and money highlights how their "lived experiences" (as well as their knowledge about risks and access to contraception) determined their attitudes, choices and

behaviour relating to sex, contraception and parenting (Harden *et al.*, 2006). Drawing on the most recent studies carried out in the UK, this review concluded that interventions which promote young people's emotional well-being, enjoyment of school and expectations about life after school would be an appropriate approach to reduce vulnerability to teenage pregnancy and parenting. In particular, dislike of school is a recurring theme among young mothers (Wiggins *et al.*, 2005; Harden *et al.*, 2006). Arai's research with teenage mothers (Arai, 2007) suggests that young women who feel supported by their schools and confident about their future careers are less likely to view early parenthood as a way of finding meaning and gaining respect from their peers and communities. Thus a growing body of qualitative research in the UK finds that, when young people are happy with their school and their opportunities in the future, they are less likely to "gamble the odds" when they have sex or choose to become pregnant (Harden *et al.*, 2006). Therefore, it is likely that the types of interventions described in this paper could have an equally (if not more) significant "contraceptive effect" in the UK as they have been shown to have had elsewhere.

There is now an urgent need to explore the relevance of school-ethos and targeted, intensive youth work interventions in a UK context. This is already happening in the case of the YPDP evaluation which examines intervention processes, mechanisms of action and outcomes. However, interpretation of the outcome findings of this study will be hampered by the lack of use of a randomised design. The study will be unable to adjust for residual, unmeasured confounding, for example by differences in the baseline capacity of intervention providers. Initial findings also suggested that more effort needs to be made to ensure that the programme is fully implemented, particularly in terms of the intended amount of contact time with young people (Wiggins *et al.*, 2006).

Regarding school ethos, there have been some policy shifts in the UK towards whole-school approaches to health promotion. For example, the National Healthy Schools Programme (NHSP) – compulsory in all schools by 2009 – requires schools to develop positive and supportive environments and encourage participation (DoH and DfES, 2005). However, an evaluation of schools involved in pilots indicated that schools rarely implement structured sets of activities to improve the environment or ethos similar to those undertaken in the US and Australian studies described above (Warwick *et al.*, 2004). Further, NHSP schools still do not receive detailed guidance on how they should do this. There is also concern that the NHSP is too directive and that the process of monitoring and inspection will mean that schools merely "tick all the action boxes" required rather than deliver real change to the whole school environment (Noble and Robson, 2005). An initial pilot of a school-ethos intervention more closely based on the work done in Australia and USA and examining intervention feasibility and appropriateness has begun, funded by the UK Medical Research Council, prior to evaluating the effects of such an intervention via a cluster randomised controlled trial. However, it may be difficult to promote a positive, inclusive ethos while the "Holy Grail" for school management teams continues to be success in standard attainment tests, GCSEs and school league tables.

We conclude that interventions addressing determinants of teenage pregnancy and sexual health relating to disaffection and low expectations are a potentially important complement to more traditional interventions such as sex education which address the more obviously proximal determinants of teenage pregnancy. It is important to build on recent advances in the policy and research agenda in the UK, which places greater

emphasis on the development and evaluation of interventions addressing these wider social determinants to promote the sexual health of young people.

References

Allen, J.P. and Philliber, S. (2001), "Who benefits most from a broadly targeted prevention program? Differential efficacy across populations in the Teen Outreach Program", *Journal of Community Psychology*, Vol. 29, pp. 637-55.

Allen, J.P., Philliber, S., Herrling, S. and Kuperminc, G.P. (1997), "Preventing teen pregnancy and academic failure: experimental evaluation of a developmentally-based approach", *Child Development*, Vol. 64, pp. 729-42.

Arai, L. (2007), "Peer and neighbourhood influences on teenage pregnancy and fertility: qualitative findings from research in English communities", *Health & Place*, Vol. 13, pp. 87-98.

Berrington, A., Diamond, I., Ingham, R., Stevenson, J., Borgoni, R., Hernández, I.C. and Smith, P.W.F. (2005), *Consequences of Teenage Parenthood: Pathways which Minimise the Long-term Negative Impacts of Teenage Childbearing: Final Report*, University of Southampton, Southampton.

Bond, L., Patton, G., Glover, S., Carlin, J.B., Butler, H., Thomas, L. and Bowes, G. (2004), "The Gatehouse Project: can a multi-level school intervention affect emotional well-being and health risk behaviours?", *Journal of Epidemiology and Community Health*, Vol. 58, pp. 997-1003.

Bonell, C., Fletcher, A. and McCambridge, J. (2007), "Improving school ethos may reduce substance misuse and teenage pregnancy", *British Medical Journal*, Vol. 334, pp. 614-16.

Bonell, C., Allen, E., Strange, V., Copas, A., Oakley, A., Stephenson, J. and Johnson, A. (2005), "The effect of dislike of school on risk of teenage pregnancy: testing of hypotheses using longitudinal data from a randomised trial of sex education", *Journal of Epidemiology and Community Health*, Vol. 59, pp. 223-30.

Catalano, R.F. and Hawkins, J.D. (1996), "The social development model: a theory of anti-social behaviour", in Hawkins, J.D. (Ed.), *Delinquency and Crime and Current Theories*, Cambridge University Press, New York, NY, pp. 149-97.

Department for Education and Skills (2004), *Every Child Matters: Change for Children*, HMSO, London.

Department for Education and Skills (2006), *Teenage Pregnancy: Accelerating the Strategy to 2010*, Department for Education and Skills, London.

DiCenso, A., Guyatt, G., Willan, A. and Griffith, L. (2002), "Interventions to reduce unintended pregnancies among adolescents: systematic review of randomised controlled trials", *British Medical Journal*, Vol. 324, pp. 1426-34.

DoH (2001), *The National Strategy for Sexual Health and HIV*, HMSO, London.

DoH (2004), *Choosing Health: Making Healthier Choices Easier*, HMSO, London.

DoH and DfES (2005), *National Healthy School Status: A Guide for Schools*, Department of Health and Department for Education and Skills, London.

Ermisch, J. (2003), *Does a 'Teen-Birth' Have Longer-Term Impacts on the Mother? Suggestive Evidence from the British Household Panel Survey*, Institute for Social and Economic Research, Colchester.

Flay, B.R., Graumlich, S., Segawa, E., Burns, J.L., Holliday, M.Y. and Aban Aya Investigators (2004), "Effects of 2 prevention programs on high-risk behaviors among African American youth. A randomized trial", *Archives of Paediatric and Adolescent Medicine*, Vol. 158, pp. 377-84.

Glasier, A. (2006), "Emergency contraception", *British Medical Journal*, Vol. 333, pp. 560-1.

Hahn, A., Leavitt, T. and Aaron, P. (1994), *Evaluation of the Quantum Opportunities Program*, Heller Graduate School, Brandeis University, Waltham, MA.

Harden, A., Brunton, G., Fletcher, A., Oakley, A., Burchett, H. and Backhams, M. (2006), *Young People, Pregnancy and Social Exclusion: A Systematic Synthesis of Research Evidence to Identify Effective, Appropriate and Promising Approaches for Prevention and Support*, EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, London.

Hawkins, D.J., Catalano, R.F., Kosterman, R., Abbott, R. and Hill, K.G. (1999), "Preventing adolescent health-risk behaviours by strengthening protection during childhood", *Archives of Paediatric and Adolescent Medicine*, Vol. 153, pp. 226-34.

Henderson, M., Wight, D., Raab, G., Abraham, C., Parkes, A., Scott, S. and Hart, G. (2007), "The impact of a theoretically based sex education programme (SHARE), delivered by teachers on NHS registered conceptions and terminations: final results of cluster randomised trial", *British Medical Journal*, Vol. 334, pp. 133-5.

Holgate, H.S. and Evans, R. (2006), "Sexuality and young motherhood: discourses and definitions", in Holgate, H.S., Evans, R. and Yuen, F.K.O. (Eds), *Teenage Pregnancy and Parenthood: Global Perspectives, Issues and Interventions*, Routledge, Abingdon.

Lagerspetz, K. and Bjorkqvist, K. (1994), "Indirect aggression in boys and girls", in Huesmann, L. (Ed.), *Aggressive Behavior*, Basic Books, New York, NY.

Lonczak, H.S., Abbott, R.D., Hawkins, D.J., Kosterman, R. and Catalano, R.F. (2002), "Effects of the Seattle Social Development Project on sexual behaviour, pregnancy, birth, and sexually transmitted disease outcomes by age 21 years", *Archives of Paediatric and Adolescent Medicine*, Vol. 156, pp. 438-47.

Macbeath, J., Meuret, D. and Schratz, M. (1997), *Evaluating Quality in School Education: A European Pilot Project*, European Commission, Brussels.

McNeely, C. and Falci, C. (2004), "School connectedness and transition into and out of health-risk behaviour among adolescents: a comparison of social belonging and teacher support", *Journal of School Health*, Vol. 74, pp. 284-92.

Noble, C. and Robson, C. (2005), "Just how far can healthy schools go?", *Health Education*, Vol. 105, pp. 161-5.

Paton, D. (2006), "Random behaviour or rational choice? Family planning, teenage pregnancy and sexually transmitted infections", *Sex Education*, Vol. 6, pp. 281-308.

Patton, G., Bond, L., Butler, H. and Glover, H. (2003), "Changing schools, changing health? Design and implementation of the Gatehouse Project", *Journal of Adolescent Health*, Vol. 33, pp. 231-9.

Patton, G.C., Bond, L., Carlin, J.B., Thomas, L., Butler, H., Glover, S., Catalano, R. and Bowes, G. (2006), "Promoting social inclusion in schools: a group-randomized trial of effects on student health risk behaviour and well-being", *American Journal of Public Health*, Vol. 96, pp. 1582-7.

Peersman, G., Oakley, A., Oliver, S. and Thomas, J. (1996), *Review of Effectiveness of Sexual Health Promotion Interventions for Young People*, EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, London.

Pevalin, D.J. (2003), *Outcomes in Childhood and Adulthood by Mother's Age: Evidence from the 1970 British Cohort Study*, Institute for Social and Economic Research, Colchester.

Philliber, S., Kaye, J. and Herrling, S. (2001), *The National Evaluation of the Children's Aid Society Carrera-Model Program to Prevent Teen Pregnancy*, Philliber Research, Accord, NY.

Resnick, M.D., Bearman, P.S., Blum, R.W., Bauman, K.E., Harris, K.M., Jones, J., Tabor, J., Beuhring, T., Sieving, R.E., Shew, M., Ireland, M., Bearinger, L.H. and Udry, J.R. (1997), "Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health", *Journal of the American Medical Association*, Vol. 278, pp. 823-32.

Rose, G. (1992), *The Strategy of Preventive Medicine*, Oxford University Press, Oxford.

Rutter, M., Maughan, B., Mortimer, P. and Ouston, J. (1979), *Fifteen Thousand Hours. Secondary Schools and Their Effects on Children*, Open Books Publishing, Cudworth.

Segawa, E., Ngwe, J.E., Li, Y., Flay, B.R. and Aban Aya Investigators (2005), "Evaluation of the effects of the Aban Aya youth project in reducing violence among African American adolescent males using latent class growth mixture modelling techniques", *Evaluation Review*, Vol. 29, pp. 128-48.

Sellstrom, E. and Bremberg, S. (2006), "Is there a 'school effect' on pupil outcomes? A review of multilevel studies", *Journal of Epidemiology and Community Health*, Vol. 60, pp. 149-55.

Social Exclusion Unit (1999), *Teenage Pregnancy*, HMSO, London.

Stephenson, J., Strange, V., Forrest, S., Oakley, A., Copas, A., Allen, E., Black, S., Ali, M., Monteiro, H., Johnson, A. and The RIPPLE Study Team (2004), "Pupil-led sex education in England (RIPPLE study): cluster-randomised intervention trial", *Lancet*, Vol. 364, pp. 338-46.

UNICEF (2001), *A League Table of Teenage Birth in Rich Nations*, UNICEF, Florence.

UNICEF (2007), *Child Poverty and Perspective: An Overview of Child Wellbeing in Rich Countries*, UNICEF, Florence.

Warwick, I., Aggleton, P., Chase, E., Zuurmond, M., Blenkinsop, S., Eggers, M., Schagen, I., Schagen, S. and Scott, E. (2004), *Evaluation of the Impact of the National Healthy School Standard*, Institute of Education/National Foundation for Educational Research, London.

West, P. (2006), "School effects research provide new and stronger evidence in support of the health-promoting school idea", *Health Education*, Vol. 106, pp. 421-4.

West, P., Sweeting, H. and Leyland, A. (2004), "School effects on pupils' health behaviours: evidence in support of the health promoting school", *Research Papers in Education*, Vol. 19, pp. 261-91.

Wiggins, M., Oakley, A., Sawtell, M., Austerbury, H., Clemens, F. and Elbourne, D. (2005), *Teenage Parenthood and Social Exclusion: A Multi-method Study*, Institute of Education, University of London, London.

Wiggins, M., Sawtell, M., Austerbury, H., Burchett, H., Strange, V. and Bonell, C. (2006), *Evaluation of the Young People's Development Programme; Second Interim Report*, Social Science Research Unit, Institute of Education, University of London, London.

Wight, D., Raab, G.M., Henderson, M., Abraham, C., Buston, K., Hart, G. and Scott, S. (2002), "Limits of teacher delivered sex education: interim behavioural outcomes from randomised control trial", *British Medical Journal*, Vol. 324, pp. 1430-3.

Corresponding author
Adam Fletcher can be contacted at: adam.fletcher@lshtm.ac.uk