GENERAL PRACTICE CONSULTATION PATTERNS BY TEENAGERS AND THEIR ASSOCIATIONS WITH HEALTH RISKS, NEEDS AND ATTITUDES

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Submitted for the Degree of
Doctor of Medicine

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Nottingham, January 2008

"The problems of youth are many-sided and compelling. To their solution medicine has a contribution to make: this is surely, above all, in the sphere of the family doctor".

Anonymous, British Medical Journal, 1954

ABSTRACT

During the transition from childhood to adulthood young people are vulnerable to relatively unique health problems and risks, whilst also developing personal autonomy, and learning when and how to access health services. This thesis describes three studies, the overall aim of which was to gain a greater understanding of how teenagers use general practice, and to identify those factors that influence this behaviour and ultimate health outcomes.

The aim of the first two studies was to identify demographic, health, and attitudinal factors associated with both overall general practice consultation rates and consultation for specific types of condition.

The first study involved identifying annual consultation rates and reasons for consultation from the medical records of 836 (94.4%) of 886 teenagers aged 13 to 15 registered with five general practices across the East Midlands, covering the 12 month period prior to the second study. In the second study, 713 (80.5%) of the 886 teenagers from the first study responded to a postal questionnaire survey, carried out between May and August 1997, which explored health concerns, help-seeking behaviour, health related behaviour, use of health services, and attitudes to general practice. The results from each of the first two studies were linked, in order to identify associations between self-reported health status, attitudes and behaviour and recorded consultation behaviour, based on the 678 teenagers for whom complete data sets were available.

The median annual consultation rate was two, with 76.1% of teenagers consulting at least once and 23.8% consulting on four or more occasions. Consultation rates

increased with age amongst girls, who had significantly higher rates than boys by age 15. Most consultations were for respiratory and skin problems, with consultations for psychological problems being least frequent. Teenagers reported a wide range of health concerns and, whilst general practitioners were identified as the most frequent source of health advice from formal health services, friends and family were cited far more frequently. Although 91.8% of survey respondents rated confidentiality as important, there was no association between attitudes towards confidentiality and actual consultation behaviour. In contrast, teenage girls who expressed concerns about embarrassment were less likely to consult about gynaecological problems and contraception.

The third study was a case control study in which the general practice consultation patterns of 240 young women who subsequently became pregnant (having a recorded termination, delivery or miscarriage between January 1995 and January 1998) were compared with those of 719 age-matched controls without a history of pregnancy. Cases were significantly more likely than controls to have consulted in the year prior to conception with 93% of cases consulting at least once and 71% having discussed contraception at some time. Teenagers whose pregnancy ended in a termination were significantly more likely than controls to have received emergency contraception.

In conclusion, whilst teenagers have been shown to use general practice for a range of health problems, the results from these studies suggest that there is a need to facilitate access for teenagers with more sensitive problems, and to improve identification and follow-up of those at greatest risk of adverse outcomes.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND: AN OVERVIEW OF TEENAGE HEALTH

This thesis is about the health of young people who are in the transition between childhood and adulthood, a phase of life described as 'adolescence'. Although the young people included in the studies are within a defined age band that classes them as 'teenagers' (13 to 19 years old) it is their developmental stage, rather than their chronological age, which is of greatest interest. Adolescence begins with the onset of physiologically normal puberty, and ends when an adult identity and behaviour are accepted (Coleman and Hendry 1999b; Christie and Viner 2005). Despite the concept of adolescence as a phase of development, the World Health Organisation defines it chronologically as the period between 10 and 19 years of age (http://www.un.org.in/Jinit/who.pdf).

In 2005 there were approximately 7.8 million adolescents living in the United Kingdom: 3.8 million between the ages of 10 and 14; and 3.9 million between 15 and 19 (Coleman and Schofield 2007). This age group therefore constitutes approximately 13.8% of the total UK population.

In this chapter I will provide a brief overview of adolescent development, a description of key health issues that affect young people, and a summary of recent health policy developments relevant to adolescents in England. This will provide the background to the more specific area of research into how young people use general practice based health services, which forms the focus of my thesis. Throughout the text I will use the terms 'teenager', 'adolescent', and 'young person' synonymously unless otherwise stated whilst acknowledging that there are slightly different meanings for each.

1.1.1 Adolescent Development

a) Physical Development

The most apparent changes that occur during adolescence are those of the physical changes associated with puberty. Puberty is initiated in late childhood through a cascade of endocrine changes that lead to sexual maturation and reproductive capability (Patton and Viner 2007). There is a growth spurt in both sexes associated with development of secondary sex characteristics and with the menarche in girls and genital enlargement in boys.

Coleman and Hendry (Coleman and Hendry 1999a) and Patton and Viner (Patton and Viner 2007) have summarised the physical changes associated with puberty, largely based on research by Tanner (Tanner 1991). There are wide variations in the onset of puberty, but deviations from the 'norm' can be a cause for anxiety amongst young people (Christie and Viner 2005). In boys the onset of the growth spurt is preceded by an increase in testicular volume and development of pubic hair, and can vary between nine and 15 years of age. In girls the first change of puberty is the development of breast buds, which can occur as young as eight but may not occur till up to 14 years of age. The peak growth velocity in girls is, on average, at age 12. Puberty in girls is characterised by the menarche, which occurs most commonly at 13 years of age. There was a substantial decline in the age of the menarche in the first half of the 20th century in westernised countries that has been attributed to improvements in health and nutrition (Patton and Viner 2007).

In addition to changes in overall body height and weight, there are other physiological changes such as increase in size and capacity of the heart and lungs, a

reduction in basal metabolic rate and increases in physical strength and endurance (Patton and Viner 2007). Physical changes also impact on self-image and self-consciousness. Early or delayed puberty can impact adversely on self-esteem and on social relationships.(Christie and Viner 2005)

b) Aspects of Psychosocial Development

In addition to physical changes, puberty also triggers emotional, cognitive, and behavioural changes (Patton and Viner 2007). Alterations in cognitive processing are associated with changes in attitudes of the young person to both themselves and to others. The theories and models regarding psychosocial transition in adolescence have recently been reviewed by Heaven (Heaven 2001), and by Coleman & Hendry (Coleman and Hendry 1999b). I have summarised some of the key features below.

Young people develop the ability to think in abstract ways in comparison to the concrete thinking of childhood. The Swiss psychologist, Piaget, first proposed a stage model for cognitive development in which he suggested that, between the ages of 12 and adulthood, young people develop the ability to think about hypothetical and imaginary events and to adopt a hypothetico-deductive approach to problem solving, and to assess multiple outcomes ('formal operations') (Inhelder and Piaget 1958). In the context of healthcare, a capacity for a degree of abstract thinking is important for the ability to give informed consent for treatment, and for managing chronic illness treatment regimens independently (Christie and Viner 2005).

Although there is general acceptance that adolescence involves cognitive changes, the transition is probably not as clear-cut as that proposed by Piaget, and some adults

may never develop a significant degree of formal operational thinking, or only need to apply it on selective occasions.

Biological theories of adolescent development suggest that some of the psychological and emotional changes of adolescence may be precipitated by changes in hormone levels associated with puberty (Paikoff and Brooks-Gunn 1990). Such changes may contribute to aggression and 'acting out' in boys, to sexual motivation, and to emotional changes such as depressive affect. However all of these influences may be modified by the social environment and context in which the young person is developing.

Another psychological feature of adolescence is that of egocentricity. Elkind (Elkind 1967) proposed that adolescents adopt the belief that others share the same preoccupations as themselves (Elkind 1967). One example of this is in relation to appearance: teenagers are not only concerned about their own view of themselves, but also believe that others will be equally concerned. In doing so Elkind proposed that they are reacting to an 'imaginary audience' in which they are the centre of attention. As with Piaget's model, there is some supporting evidence, but other evidence suggests that the social context may also strongly influence the nature and persistence of such transitional characteristics.

The ability of young people to take the perspectives of others into consideration is the subject of Selman's stage model of social perspective taking (Selman 1977). This model suggests that young people aged between 10 and 15 develop the ability to perceive the views of all parties from a generalised third party perspective ('mutual

perspective taking') in contrast to simply being aware of other perspectives. A further stage ('in-depth societal perspective taking') involves coordinating the perspectives of society with those of the individual and the group.

An important feature of adolescence is that of developing personal identity. Erikson proposed an eight-stage lifespan model in which each stage is characterised by a particular developmental task (Erikson 1968). Within this model the task for adolescence is resolving the tension between identity and identity confusion. Identity formation requires an element of role exploration and experimentation, resolution of tensions, and commitment to continuing beliefs and behaviours. The development of identity is closely linked with other factors such as self-evaluation, self-awareness, and self-esteem.

c) Social, Cultural & Legal Issues

Adolescence as we know it today in the United Kingdom is heavily influenced by the social and economic culture in which we live. The lives of young people today would be unrecognisable to those of a similar age 100 years ago or even much more recently, and equally there are marked differences between the process of adolescence in western society and that in developing countries. In their text on 'the Nature of Adolescence', Coleman & Hendry (Coleman and Hendry 1999b)highlighted the social changes that have affected youth in recent years and I have summarised some of these below (Coleman and Hendry 1999b).

Firstly there has been a change in the transition between education and employment. In the past, a majority of young people would have left school and started work in

their mid-teens. However, following the high levels of unemployment in the 1970s and 1980s there were an increasing number of initiatives aimed at job training and job preparation, with greater opportunities for entering higher education, such that now only a minority of teenagers leave school to start work at 16. One of the implications of a delayed entry into paid employment is that young people do not achieve economic independence until later and therefore continue to be financially dependent on their family or on the state. Consequently young people tend to live at home for longer and the whole process of completing adolescence is delayed.

Another important social change that has implications for adolescence is in relation to the nature of family structure. Divorce rates increased during the 1970s and 1980s but have now stabilised at about 13 per thousand couples per year. However an increasing number of children are born outside of marriage: from fewer than 10% in 1971 to approximately 40% in 2005. Amongst under 20 year olds the rate is approximately 90% (Coleman and Schofield 2007). As a consequence of these trends the number of children and young people who are living in lone parent households has also increased significantly. This has implications in terms of social support, parenting, and poverty. More young people are also living in reconstituted families in which the relationships and parenting roles are less clearly defined.

Where family structures are less secure, young people rely more on peer support and friendships. It is a normal part of adolescence to develop horizontal relationships between peers in contrast to the vertical relationships that they experience with adults. Such friendship groups are usually comprised of young people with similar interests and backgrounds, and there is pressure within the group to conform to

group norms so that similarities increase. There is increasing reliance on friendship groups, in contrast to families, as a source of support as young people grow up.

Finally, the legislative system dictates the age at which young people are permitted to develop autonomy in certain areas. This indicates to some extent how we, as a society, expect young people to develop in terms of maturity. However the legal framework contains some interesting inconsistencies and anomalies in relation to teenagers, some examples of which I have presented in table 1.1.

In terms of healthcare, the most important legal and ethical issues relate to the ability of young people to consent to treatment, and their rights to confidentiality. Young people under the age of 16 are not deemed to be automatically legally competent to give consent, but the courts have determined that such children can be legally competent if they have "sufficient understanding and intelligence to enable him or her to understand fully what is proposed". This concept is based on a decision made by Lord Fraser in the case of Gillick v West Norfolk & Wisbech HA in 1986 when Victoria Gillick challenged the right of doctors to prescribe oral contraception to under 16 year olds without parental knowledge. The principles are now applied more widely than to contraception alone, and have also been incorporated into professional guidance for doctors when treating young people under the age of 16 (Faculty of Family Planning & Reproductive Healthcare 2005; General Medical Council 2007).

Table 1.1: Examples of Legal Landmarks for Young People

Taken from: At What Age Can I? A Guide to Age Based Legislation (Hamilton and Fiddy 2002)

Age	**Legal Activity**
Any	Take flying lessons Have access to health and education records Make valid contracts for 'necessaries' (such as food or clothing)
14	Ride a horse without a helmet Possess an air weapon Be fined up to £1,000 for a criminal offence
16	Consent to sex Leave home without parental consent Live in a brothel Marry with parental consent
17	Donate blood without parental consent Drive a car Buy or hire a firearm or ammunition
18	Make binding contracts Buy alcohol Marry without parental consent Vote in elections
21	Become an MP or local councillor Supervise a learner driver Adopt a child

1.1.2 Public Health and Adolescence

Although mortality rates are relatively low amongst young people, they begin to increase from the age of 15, with the commonest causes of mortality amongst teenagers and young adults being injury, poisoning, and road traffic accidents, and with rates being significantly higher in males than females (Coleman and Schofield 2007). Whilst young people are otherwise generally considered to be a healthy population, they can adopt attitudes, actions and behaviours that can have long-term effects on their health. For example most people who start smoking cigarettes do so in their early teens but, if the behaviour is sustained it is likely to result in a significantly reduced life expectancy due to lung cancer or cardiovascular disease in the long-term (Holland and Fitzsimons 1991).

The areas of greatest concern at a public health level relate to young people's sexual health, mental health, and the adoption of potentially harmful health related behaviours such as smoking, drinking and substance misuse. Although I will deal with each of these separately, health risks tend to cluster, such that some young people are vulnerable to a range of adverse health outcomes (Fuller 2007).

a) Sexual & Reproductive Health Issues

Sexual maturation is a normal part of adolescent development. However the onset of sexual activity is associated with multiple health risks, the two most important being unintended pregnancy in girls and sexually transmitted infections in young people of either sex. The public health issues relating to sexual activity are by no means confined to the United Kingdom, and Bearinger and colleagues have recently reviewed the global scale of sexual health and reproductive issues, particularly

highlighting the risk of HIV infection in young people in developing countries (Bearinger *et al.* 2007).

In the United Kingdom the age of first sexual intercourse has become progressively younger over the past four decades with 14% of boys and 5% of girls claiming to have had sexual intercourse below the age of 16 in 1964 compared with 38% and 32% respectively in 2002 (Coleman and Schofield 2007). Although these data have been acquired using different methodologies the trend has been remarkably consistent over time. There are also differences in the age of onset of sexual activity with respect to ethnicity, with lower rates first sexual intercourse below the age of 16 amongst Asian young people and highest rates amongst black young men (Testa and Coleman 2006).

Young people who have sexual intercourse below the age of 16 are almost twice as likely to report having had sex without contraception, and to having had sex in the context of a short relationship (Mellanby *et al.* 1993). Those that engage in sexual intercourse at the age of 13 and 14 are least likely to use contraception at first intercourse (Wellings *et al.* 2001). Darroch and colleagues reported a comparison of contraceptive use amongst young women from five developed countries – in the UK in the early 1990s, 21% of young women in the UK did not use contraception at first intercourse whilst 61% reported using a condom (Darroch *et al.* 2001).

The majority of young people do not access sexual health services prior to first intercourse. Stone and Ingham found that 70% of young people aged under the age of 20 did not access services prior to first intercourse (Stone and Ingham 2003).

These authors also reported that young people do not tend to use one service in isolation, with many using a combination of general practice based services, teenage specific initiatives and family planning clinics at different times. Unplanned intercourse, side effects of oral contraception, and embarrassment in accessing services have all been shown to be factors associated with failure to use contraception (Lo *et al.* 1994; Wareham and Drummond 1994; Coleman and Ingham 1998; Stone and Ingham 2003).

Recent data published by the Office for National statistics, based on a survey of 2,762 respondents showed that, in the 16-19 age group, the male condom is the most commonly used form of contraception (63%) followed by the contraceptive pill (48%) (Office for National Statistics 2007.) In the 16-19 year old age group, approximately half of the respondents had not accessed any services. Of those who had accessed services, 28% had been to their own GP or Practice Nurse and 29% to a Family Planning Clinic.

The United Kingdom has had the highest teenage pregnancy rate amongst 15-19 year olds in Western Europe for many years (Office of National Statistics 1996; Social Exclusion Unit 1999; Coleman and Schofield 2007). Until 2000 the UK pregnancy rate amongst teenagers aged 16-19 was approximately 60 per 1000. The conception rate amongst teenagers aged 13-15 was approximately 8 per 1000. Rates have declined by just over 10% in the past ten years but there are wide regional and local variations (Teenage Pregnancy Unit 2007).

Data on overall conception rates should also be interpreted in the context of the population 'at risk'. With a declining age of first intercourse there is an increased number of sexually active young people. Wellings and Kane demonstrated that fertility rates can actually decline even if conception rates are static or increase (Wellings and Kane 1999). However this concept is rarely acknowledged by policy makers who tend to focus solely on conception rates.

The likelihood of early pregnancy is associated with socioeconomic deprivation, early onset of sexual activity, low educational attainment and having a mother who was also a teen parent (Smith 1993; Seamark and Gray 1997b; McLeod 2001; Babb 2003; Bethea 2005). Young people in care, who have alcohol and substance misuse issues and those who do not attend school regularly, are also at a higher risk of early pregnancy (Social Exclusion Unit 1999). In the RIPPLE Study, Stephenson and colleagues followed up a cohort of 8,766 13-14 year old secondary school pupils. Teenage pregnancy was associated with lack of expectation of being in education at age 20, belief that more than half of peers are having sex, and being drunk more than once a month; risk factors amongst male partners were: belief that more than half of peers are having sex, intention to skip school, and being drunk at least once a month (Stephenson *et al.* 2004).

Whilst about a quarter of early pregnancies are intended (Kiernan 1995; Henshaw 1998) and can be a positive experience for some teenagers (Lee *et al.* 2004; Seamark and Lings 2004), teenage pregnancy is generally associated with increased risks to both the mother and child in terms of both physical and psychosocial outcomes (Jacobson *et al.* 1995b; Irvine *et al.* 1997; NHS Centre for Reviews and

Dissemination 1997). Teenagers are at higher risk of pregnancy related medical problems including anaemia, cephalopelvic disproportion, premature delivery, pre-eclampsia, and fetal growth retardation although some of the increased risk observed may be due to confounding by deprivation and poorer levels of antenatal care (Mackinson 1985; McAnarney 1985; Russell 1988; Goldenberg and Klerman 1995).

Teenage mothers themselves are reported to be more socially isolated, to suffer from long term stress, to smoke, and to consult more frequently with somatic symptoms (McIlroy *et al.* 1995). A recent study looking at the long-term consequences of teenage pregnancy found that, whilst some of the previously published negative associations were less widespread than previously believed, women having a teen birth were socially disadvantaged in the sense that their partners were more likely to be unemployed or poorly qualified (Teenage Pregnancy Unit 2004). Teen mothers were also shown to have 30% higher levels of mental illness in the two years following childbirth.

Early childbearing is associated with increased infant mortality and morbidity even after adjusting for socio-economic disadvantage (Irvine *et al.* 1997). Children of teenage mothers are at increased risk of sudden infant death syndrome, and of both accidental and non-accidental injury (Ekeus *et al.* 2004). In the long term they are more likely to have behavioural problems (Trautmann-Vilalba *et al.* 2004), have lower levels of educational attainment and a higher risk of economic inactivity (Teenage Pregnancy Unit 2004). They are also more likely to become teenage parents themselves, so that the cycle of disadvantage is perpetuated.

In overall economic terms, the consequences of teenage pregnancy make a significantly greater demand on resources than if the pregnancy had not occurred (Laing 1982). In relation to this, the potential costs of preventing pregnancy in terms of contraceptive provision and counselling are much less than if an unintended pregnancy occurs (Hughes and McGuire 1996).

Approximately 57% of pregnancies to young women aged under 16 result in a termination compared with about 40% in the 16 to 19 year old age group (Coleman and Schofield 2007). This represents an increase from 53% amongst under 16 year olds in 1998. Young women from more affluent backgrounds are more likely to seek a termination of pregnancy (Smith 1993; Jewell *et al.* 2000; Lee *et al.* 2004).

Sexual activity is also associated with increased risk of sexually transmitted infections. Between 1996 and 2005 the number of new diagnoses of chlamydia infection amongst 16-19 year olds at genitourinary medicine (GUM) clinics increased more than three-fold (Coleman and Schofield 2007). Whilst some of this may be due to increased detection of asymptomatic disease, much of the increase is due to higher rates of infection. This is related to an earlier age of sexual intercourse but also to a trend towards increased risk taking in relation to the number of sexual partners (Johnson *et al.* 2001).

Chlamydia is the most common sexually transmitted infection (STI) amongst young people, but others include gonorrhoea, genital herpes and genital warts. Apart from the immediate symptoms of infection, which may be absent, complications of

chlamydia include pelvic inflammatory disease, infertility, ectopic pregnancy and chronic pelvic pain.

STIs are more prevalent in poorer communities and also tend to be concentrated in some sub-groups (Holtgrave and Crosby 2003). For example, gonnorhoea rates are higher amongst homosexual men, young people and some black ethnic minority groups; the greatest proportional increase in genital warts is amongst young men aged under 16; and rates of chlamydia infection are highest in the under 25s (Health Protection Agency 2007). One study based in a genitourinary medicine clinic in London found that young women aged 16 and under were three times more likely than any other age group to be diagnosed with a STI and, half of the young people in this age group failed to attend for follow up appointments (Creighton *et al.* 2002).

There has been extensive debate about the most appropriate ways of reducing teenage pregnancy and the transmission of sexually transmitted infections amongst young people. Jacobson and colleagues highlighted repeated failed attempts by successive US administrations in the 1970s and 80s to address the problem, and suggest that this was largely due to the oversimplistic assumption that improved education, knowledge and access to contraception would have the desired effect (Jacobson *et al.* 1995b). As already discussed some teenage pregnancies are intended whilst others may result from contraceptive failure despite adequate information and access. For example, one study showed that approximately 40% of teenage girls who became pregnant were happy to be so, whilst in 20% the pregnancy was due to contraceptive failure (Simms and Smith 1986).

Systematic reviews of evidence for interventions intended to reduce teenage pregnancy or sexually transmitted infections have found a relative paucity of robust high quality studies (Oakley *et al.* 1995; NHS Centre for Reviews and Dissemination 1997; Swann 1998; National Institute for Health and Clinical Excellence 2007) There is some evidence from these reviews to support the effectiveness of integration of clinical and educational services, targeting vulnerable groups in a way that reflects local need, ensuring that provision is in place prior to the onset of sexual activity, and providing one to one counselling sessions. Based on the findings of a Delphi consensus consultation involving both young people and professionals, Chambers and colleagues emphasised the need for services to be young-person centred, and to engage young people in their design (Chambers *et al.* 2002). There is also a recognised need to target boys as well as girls in any intervention (Burack 1999).

Young people in general are relatively poorly informed about sexual health services . (Burack 2000; Balding 2006)However, teenagers who become pregnant tend to have higher levels of knowledge both about services and contraception (Pearson *et al.* 1995b). Thus knowledge of services in itself does not necessarily result in altered behaviour. This was also demonstrated in a recent study of college and university students found that most young people had a good knowledge of issues related to STI risk but that this was not associated with actual behaviour as many still took part in risky activities such as not using condoms during intercourse (Jones and Haynes 2006).

International comparisons would suggest that more open attitudes of society towards sexuality, reduced deprivation, and improved general education all act to defer early pregnancy (Macfarlane 1993; NHS Centre for Reviews and Dissemination 1997; Bearinger *et al.* 2007). This emphasises the importance of social, economic and environmental factors in changing behaviour which are beyond the control of most individual health interventions.

b) Mental Health in Young People

The young people's mental health charity 'Young Minds' defines mental health as *"the strength and capacity of children's minds to grow and develop with confidence and enjoyment. It consists of the capacity to learn from experience and to overcome difficulty and adversity. It is about physical and emotional well-being, the ability to live a full and creative life and the flexibility to give and take in friendships and relationships."(Young Minds).* This definition captures the important concepts of transition, development of coping skills and resilience, and functioning in relationships and is cited in the British Medical Association's report on Child & Adolescent Mental Health as highlighting that *"the key to good mental health in children and young people is an approach that involves the whole person."* (British Medical Association Board of Science 2006) (page 3).

Variations in mood and temporary deviant behaviours are part of the normal adolescent process (Michaud and Fombonne 2005). Mental health problems represent a spectrum of divergence from normal mental health that can range from experiencing relatively minor symptoms or difficulties, through to disorders involving a marked deviation from normality, together with impaired personal

functioning or development, or significant suffering, and finally to more severe forms of mental illness such as depression or schizophrenia (British Medical Association 1999).

The potential impact of mental health problems in young people was highlighted in the National Service Framework (NSF) for Children, Young People & Maternity Services: "*Mental health problems in children [and young people] are associated with educational failure, family disruption, disability, offending and antisocial behaviour, placing demands on social services, schools and the youth justice system. Untreated mental health problems create distress not only in the children and young people, but also for their families and carers, continuing into adult life, and affecting the next generation."(Department of Health 2004a)* (page 6).

Some young people are more likely to develop mental health problems than others. Factors that may influence the development of a problem can be classified as life stressors, risk factors, protective factors, vulnerability factors, and factors that promote resilience (Steinhausen and Metzke 2001). Life stressors are active events or exposures that may precipitate the development of a psychological problem, whilst risk factors and protective / compensatory factors independently act to increase or reduce the chance of this occurring. Vulnerability factors are longstanding conditions or life circumstances that reduce the chance of an individual being able to adapt to a stress, whilst the term resilience describes the ability of an individual to maintain their psychological well-being despite exposure to adverse events (Rutter 2006). Table 1.2 shows some of the factors that have been shown to increase or reduce the chance of a young person developing a mental health disorder.

Table 1.2: Factors Associated with Increased or Reduced Risk of Mental Health Problems in Young People

(Steinhausen and Metzke 2001; Michaud and Fombonne 2005)

	Increased Risk	**Reduced Risk**
Biological	Genetic risk (family history of disorder) Exposure to toxins in pregnancy (e.g. alcohol) Substance and alcohol misuse Head trauma Chronic illness, Malnutrition	Normal development from birth Good physical health
Psychological	Learning difficulties and educational needs Maladaptive personality traits Sexual, physical or emotional abuse or neglect 'Difficult temperament' Poor self esteem	Normal intellectual functioning Ability to learn from experiences Positive self esteem Problem solving skills Social skills
Social- Family	'Looked After Children' Parental conflict and family discord Poor family discipline including excessive punishment Family bereavement Parents with mental health problems	Family attachment Positive involvement in family Physically and mentally healthy family members Appropriate family discipline
Social - Education	Academic failure Bullying Inadequate support from school	Academic success Positive involvement in school life Good relationships in school environment
Community	Discrimination and marginalisation Exposure to violence Youth offending	Close friendships and peer support Opportunities for leisure Positive role models, Connectedness to community

Suicide rates represent the tip of the iceberg in terms of the impact of mental health problems. In 1993 the rate amongst young men (aged 15 to 24) was approximately 18 per 100,000 but this has now fallen to approximately 11 per 100,000 (Coleman and Schofield 2007). Amongst other things this may reflect an improved socio-economic environment with less risk of long-term unemployment than in previous years. The rate amongst young women has remained relatively static at approximately 3 per 100,000 over the same time period.

A more common problem amongst young people, not always classified as a mental health disorder, is that of self-harming behaviour. This is often carried out as a maladaptive response to emotional pain. Self-harming behaviour can include cutting, burning, hair pulling, and ingesting substances including overdosing. A recent Inquiry into self-harm in young people by the Mental Health Foundation and Camelot Foundation concluded that the incidence of self-cutting was between 1 in 12 and 1 in 15. However only a small proportion of such incidences ever come to the attention of medical services or even family members (Camelot Foundation 2006).

The commonest classifiable mental health disorders in adolescents are depression (3-5%), anxiety (4-6%), attention deficit / hyperactivity disorder (2-4%), eating disorders (1-2%), conduct disorders (4-6%), and substance misuse disorders (2-3%) (Michaud and Fombonne 2005). Less common disorders include panic disorder, posttraumatic stress disorder, borderline personality disorder, schizophrenia, and autistic spectrum disorder. Mental health disorders often co-exist.

Patel and colleagues recently estimated the international prevalence of mental health disorders in young people (aged 12 to 24) to be one in five based on DSM criteria, although reported rates varied widely between 8% in the Netherlands to 57% in San Diego (Patel *et al.* 2007). In 2004 the Office of National Statistics conducted its second survey into the mental health of children and young people in Great Britain (Green *et al.* 2005). Overall nearly one in ten were found to have a clinically diagnosable mental health disorder. Conduct disorders were more common than emotional disorders overall, and specifically amongst boys compared with girls. Emotional disorders were most common in older girls. Mental health problems of all types were significantly more common amongst disadvantaged families. Specifically, rates of mental disorder were higher amongst children who were: living in lone parent or reconstituted families; in families on low income or in receipt of disability benefits; with parents who were unemployed, not working, or who had no educational qualifications; or who were living in rented as opposed to privately owned accommodation.

There had been no significant change in overall prevalence rates since a previous survey that used identical methodology in 1999 (Meltzer *et al.* 2000).This survey also examined the rates of mental disorders in relation to ethnicity and found that in comparison with a rate of 10% in white children, 12% of black children, 8% of Pakistani and Bangladeshi children, and 4% of Indian children were assessed as having a mental health problem. Some of the differences may be explained by cultural variation in both presentation and acceptance of mental health problems as well as other protective factors.

Only a small proportion of young people with a mental health problem actually access formal services. Biddle and colleagues undertook a study to look at young peoples help-seeking behaviours for mental health problems (Biddle *et al.* 2004). They sent a questionnaire to a random sample of 3004 young people aged between 16 and 24 and received 1276 responses. Of those with a GHQ score of 4 or more (considered as 'cases'), few sought help for emotional problems and less than 10% had consulted a GP about their problem. A high GHQ score, thoughts of suicide, and female sex were all predictors of help seeking from a GP.

Child and adolescent health services (CAMHS) in England & Wales are organised according to a four tier model (NHS Health Advisory Service 1995). Tier 1 of the framework includes all professionals who come into regular contact with children - not only members of the primary health care team, but also staff in education and social care. Primary care mental health workers are a relatively new group of health professionals that potentially cross the boundary between Tier 1 and Tier 2, sometimes working with general practices and schools either on a referral basis or as a first point of contact (Ani and Garralda 2005; British Medical Association Board of Science 2006).

c) Health Related Behaviours

In this section I will focus on specific health related behaviours that I included within my studies – those of cigarette smoking, alcohol use, and substance misuse. However there is clearly a much wider range of behaviours that can impact on

health, such as exercise and diet, which I have deliberately omitted for the sake of brevity.

Data on the prevalence of different health related behaviours has been obtained from a series of cross-sectional surveys. These differ to an extent in their timing, scale, scope, and approach to questioning. This explains some of the differences in results that are highlighted. Four of the key surveys to which I will refer are as follows:

- The Trent Health Young People's Survey was carried out in 1994 in NHS Trent Region (Roberts *et al.* 1995). The sample consisted of 18,706 young people in Year 7 (11-12 years old) and Year 9 (14-15 years old) from a minimum of six randomly selected secondary schools in each Health Authority in the region. It is of particular relevance to my own studies in that it was performed in the same geographical location. I also used some of the same questions so that results are directly comparable.
- The Schools Health Education Unit Survey is a large scale annual national cross-sectional survey that includes some questions about health related behaviours, but also includes some questions that have been repeatedly used over 30 years, allowing observation of temporal trends. The most recent report was published in 2007 and was based on a sample of 68,495 young people between the ages of 10 and 15 (Balding 2007).
- The Health & Social Care Information Centre commissions regular school based surveys focussing on smoking, alcohol and drug use in England. The first survey was in 1982 and only covered smoking. Since 1998 the surveys have been conducted annually and cover all three aspects. The most recent results available are from Autumn 2006 and are based on 8200 pupils attending 288 schools (Fuller 2007).

- The Health Behaviour of School-Aged Children (HBSC) Survey is a cross-national four-yearly World Health Organisation survey, conducted using a common protocol initiated in 1982 and now covering 43 countries. The most recent results are from 2001/2002 (Currie 2004).

At one level, smoking, alcohol and substance use can all be considered in combination, since they are all behaviours that frequently begin in adolescence often as a result of experimentation, but can predict chronic patterns of use with associated mortality and morbidity both in youth and in later life (Toumbourou *et al.* 2007). Alcohol and other drugs make a substantial contribution to accidents, suicides, poisoning and spread of infectious diseases amongst young people. However Engels and van den Eijnden argue that there are social and psychological benefits to forms of substance use that can act to maintain the behaviours (Engels and van den Eijnden 2007).

Regulatory interventions that seek to increase perceived costs and reduce availability and accessibility of substances are important overall, but early detection and brief intervention are also important on an individual level (Toumbourou *et al.* 2007). However educational interventions need to take into account the balance of perceived benefits to the young person, as well as the potential harms (Engels and van den Eijnden 2007). Few general practice based interventions have been developed for health behaviours in young people, but those that have been reported have mainly been targeted at cigarette smoking.

Cigarette Smoking

Approximately 10% of teenagers aged 11-15 are regular smokers, and there has been little change between 1982 and 2006 (Diamond and Goddard 1995; Fuller 2007). Whilst data from the most recent SHEU Health Related Behaviour Survey in 2006 suggested that the rate amongst 15 year olds had declined gradually since 1996 from 22% to 13% in 2006 (Balding 2007), this seems inconsistent with other evidence: Currie reported a rate of approximately 23% in 15 year olds in 2001/2 which was similar to other Western European countries (Currie 2004), and the NHS Information Centre reported an overall rate of approximately 20% in 15 year olds in 2006 (Fuller 2007). Walker and colleagues also reported a smoking rate of 23% in their baseline survey of 14-15 year olds in 1999 (Walker *et al.* 2002).

Despite these differences in reported overall prevalence rates, there is consistent evidence of a steady increase in smoking rates from age 12 years onwards in all surveys, and a gender difference emerges from age 13 onwards with girls being at least 1.5 times more likely to smoke than boys at age 15 (Balding 2007; Fuller 2007).

Teenagers who smoke tend to have certain characteristics: they have family members and friends who smoke; they are more likely to come from single parent families; they may have low self-esteem, less confidence, more anxiety, and poor educational aspirations; and their leisure time is spent working or 'hanging out' (Holland and Fitzsimons 1991; Jacobson and Wilkinson 1994).

Although the peak age of onset of regular smoking appears to be at age 14, this is preceded by a stage of experimentation (Holland and Fitzsimons 1991). The Trent Lifestyle Survey asked regular smokers to indicate where they were most likely to smoke. The most frequently identified places were at parties, on the way to school, and in the street (Roberts *et al.* 1995).

School based interventions aimed at reducing smoking rates amongst teenagers may improve knowledge but do not necessarily influence behaviour (Nutbeam *et al.* 1993). Teenagers already appear to have relatively high levels of knowledge about the risks of smoking and so behaviour change requires more than just knowledge (Macfarlane *et al.* 1987; Turtle *et al.* 1997).

More than 60% of teenagers who smoke indicate that they would like to give up (Turtle *et al.* 1997; Balding 2007). Individual advice in a general practice setting has been shown to result in agreements for smoking cessation in one study (Townsend *et al.* 1991). Personalised interventions that are aimed at dissuading young people from commencing smoking may also have a role (Jacobson and Wilkinson 1994; Jacobson *et al.* 1995a; Fidler and Lambert 2001). However, the effect of individual health promotion activity with respect to smoking may be minimal compared with influences of advertising, pricing, peer group pressures, parental imitation, and chemical addiction, indicating the necessity of a multi-faceted approach (Macfarlane 1993; Townsend *et al.* 1994).

Alcohol

Alcohol consumption amongst teenagers is common. In the 2006 SHEU Health Related Behaviour Survey approximately 36% of Year 10 pupils (aged 14/15) claimed to have drunk at least one alcoholic drink in the previous week with 14 % of boys drinking more than 10 units per week (Balding 2007). This is consistent with the NHS Information Centre survey that found that 32% of 14 year olds and about 45% of 15 year olds had drunk alcohol in the previous week (Fuller 2007). Currie reported that 52% of 15 year olds reported having had at least one alcoholic drink in the previous week in England and this rate was higher than in most other Western European countries (Currie 2004). Although the proportion of young people drinking alcohol has not increased dramatically, the mean number of units consumed per week has doubled from approximately 5 in 1990 to more than 10 in 2006 (Fuller 2007). Walker and colleagues reported that 35% of their baseline sample of 14-15 year olds reported having been drunk at least once in the past three months (Walker *et al.* 2002).

Despite legislation restricting sales of alcohol to under-18 year olds, younger teenagers report being able to acquire it readily. In the most recent SHEU survey approximately 18% of Year 10 pupils reported having purchased alcohol from a supermarket, off licence, pub or club in the previous week, and 10% had bought alcohol from a pub (Balding 2007).

Many young people who drink alcohol do so at home, and frequently with parental knowledge (Roberts *et al.* 1995; Balding 2007). Other common venues include parties and clubs. There is some evidence to suggest that heavier drinkers are more

likely to do so when they are on their own, and when they feel down and troubled (Turtle *et al.* 1997). Preferred drinks are beer (by boys) and pre-mixed spirits and wine (by girls). So-called "designer drinks" such as fruit flavoured fortified wines, and white ciders, have been shown to be particularly attractive to teenagers (Hughes K *et al.* 1997). Consumption of such drinks has been associated with drinking in a less well-controlled environment and heavier drinking.

Health education messages about alcohol are ambiguous in that it is linked to smoking as something that should not be allowed amongst young people, and yet is socially acceptable and permissible within limits for adults (Fuller 2007). The fact that so many young people *d*o drink alcohol suggests that this is more of a normal behaviour. Engels & van den Eijden support this view and present evidence that, although there are short term risks associated with binge drinking, the longer term risks of alcohol are limited to those teenagers who develop dependence which is then maintained into adulthood, rather than those who drink 'socially' (Engels and van den Eijnden 2007). They suggest that interventions should be targeted at those who use alcohol as a maladaptive strategy for psychological issues rather than at all teenagers who drink. One trial of global health advice in a general practice setting, which included advice on alcohol intake, failed to show any significant change in behaviour or attitudes to alcohol consumption at three or 12 months (Walker *et al.* 2002).

Substance Misuse

Substance misuse is an increasing problem amongst teenagers and contributes significantly to the three major causes of death in this population (i.e. accidents, suicide and overdose) (Kaye 2004). Substances are any drugs or compounds that are used for non-medical purposes to alter feelings, beliefs or behaviour. They include both those that can be legally sold, purchased and possessed (such as prescription drugs and volatile substances) as well as those whose sale, purchase or possession constitutes an offence under the Misuse of Drugs Act (1971) (such as cannabis or ecstasy).

The majority of drug use amongst teenagers is experimental and short term, without any evidence of appreciable long-term harm. However experimentation at an early age, rapid progression to stronger drugs, and high frequency of cannabis use, are all associated with higher risk of later problems (Robson 1996).

Between 1969 and 1994 there was evidence that illegal drug use by teenagers was increasing rapidly as substances became more widely accessible and available, and drug use was becoming part of the youth culture. In a five-year interval survey amongst 14 and 15 year olds in Wolverhampton, Wright and Pearl found that the number of pupils reporting knowing someone taking drugs increased from 15% to 65% and the proportions being offered drugs had increased from 5% to 45% (Wright and Pearl 1995). The SHEU survey demonstrated similar trends with the number of 15-16 year olds trying illegal drugs having trebled between 1989 and 1993 (Balding 1998). However since 1998 there has been a small decline in the use of most substances by young people with the exception of cocaine (Coleman and Schofield 2007; Fuller 2007).

Cannabis is the most common substance used by young people followed by cocaine, ecstasy and hallucinogens. Current estimates of cannabis use vary according to survey methodology and the age group studied: Balding found that 18-19% of Year 10 pupils claimed to have ever tried cannabis in 2006 and 21% had used some form of substance (Coleman and Schofield 2007); the 2006 Information Centre Survey found that 27% of 15 year olds had tried cannabis and 34% had used some form of substance (Fuller 2007); Currie reported that approximately 34% of 15 year olds in England had tried cannabis, and this was one of the highest rates in Western Europe (Currie 2004).

There are few differences in drug usage by gender or social class but cultural background is influential. Drug misuse is not confined to inner city populations: a series of focus groups with young people in Lincolnshire demonstrated that many drugs are readily available in rural areas, and that their use (especially cannabis) is considered to be a peer norm (Galt 1997).

Prevention programmes based on information-giving alone do not result in measurable changes in behaviour (Robson 1996). Roker and Coleman reported the results of a study in which 2,100 young people aged 11-16 were interviewed about drug education and information (Roker and Coleman 1997). The young people indicated that they would like to receive drug education from someone with personal experience of illegal drugs, and from more private resources such as books and leaflets. Although there have been no reported interventions specifically for substance misuse in young people in general practice, Kaye suggests that increasing knowledge about the multiple factors involved in the development of substance

misuse should allow primary care clinicians to have a greater role in prevention in the future (Kaye 2004).

1.1.3 Health Policy and Young People

There has been an increasing focus on public policy relating to young people's health in recent years (Coleman *et al.* 2007). In this section I will summarise some of the key developments that have taken place. Table 1.3 provides a timeline of some of the important publications, events and activities that have taken place since 1990.

At the time that I began planning the research in this thesis, the only relevant national health policy relevant to adolescence was contained within the Health of the Nation targets (Secretary of State 1992). The Conservative government at that time had included the following targets with direct relevance to young people:

- To reduce smoking among 11-15 year olds by 33% by 1994
- To reduce death rate for accidents in under 15s by 33% by 2005
- To reduce rate of conceptions in girls aged < 16 by 50% by 2000
- To reduce the overall suicide rate by 15% by 2000

It is noteworthy that only the last target was actually achieved and this was probably due to other factors rather than any direct impact of the policy.

At a professional level, the Royal College of General Practitioners Adolescent Working Party was established in 1992 by Dr Chris Donovan to raise awareness of the specific needs of young people amongst general practitioners. The group continues to function in this role and has contributed to a number of national initiatives over the years.

Table 1.3: Some Key National Developments relevant to the Healthcare of Young People in England

Year	Development
1992	Publication of Health of the Nation Targets
1992	Establishment of the Royal College of General Practitioners Adolescent Working Party
1999	Launch of the Teenage Pregnancy Strategy
2001	Publication of a National Strategy for Sexual Health & HIV
2001	Secretary of State for Health announces the National Service Framework (NSF) for Children, Young People and Maternity Care
2003	Publication of the Children's Hospital Care Module of the NSF
2003	Publication of 'Bridging the Gaps' by an Intercollegiate Working Group of Medical Royal Colleges
2003	British Medical Association (BMA) Report on Adolescent Health
2003	Every Child Matters – Green Paper
2004	The Childen's Act – providing the legal framework for Every Child Matters.
2005	Appointment of first Children's Commissioner for England
2005	Youth Matters – Green Paper
2006	Establishment of Teenage Health Demonstration sites
2007	Piloting of an on-line Teenage Health Check
2008	Launch of the Association for Young People's Health

In 1999, under a new Labour government, the Social Exclusion produced a report on teenage pregnancy leading to the publication of a teenage pregnancy strategy (Social Exclusion Unit 1999). A Teenage Pregnancy Unit was established and tasked with both halving the under-18 conception rate by 2010 and providing support to teenage parents to reduce the long term risk of social exclusion by increasing the proportion in education, training and employment. An evaluation of the strategy in 2005 concluded that it had been appropriately targeted and was showing signs of success with a fall in conception rates (Centre for Sexual Health Research 2005).

A related strategy with relevance to young people is the National Strategy for Sexual Health & HIV, published in 2002 (Department of Health 2002). Specific relevant aims include to improve access to abortion services for young women, to reduce rates of sexually transmitted infections in young people, to provide improved information for your people on the risks of STIs, and to specifically target key groups including young men.

Two professional organisations published influential reports on adolescent health in 2003: an intercollegiate working party of the Medical Royal Colleges published 'Bridging the Gaps' (Royal College of Paediatrics & Child Health 2003); whilst the British Medical Association produced its own report entitled 'Adolescent Health' (British Medical Association 2003). The former report was the first in recent to years to present a consensus view from a group of professional bodies about the health of young people. It particularly highlighted the fact that adolescents differ from both children and adults, and that health services need to take this into account. The

BMA report highlighted specific health issues relating to young people and the influence of deprivation.

The Green Paper, Every Child Matters, was published in 2003 and covers the well-being of children and young people from birth to age 19 (Department for Education & Skills 2003) . The government set five key aims for this age group: be healthy; stay safe; enjoy and achieve; make a positive contribution; and achieve economic well-being. The relevant legislation was enacted in 2004 and includes an emphasis on interagency working, safeguarding, and targeting young people at greatest need.

The development of policy regarding adolescent health is often intertwined with, and influenced by, initiatives aimed at younger children. The death of Victoria Climbié (2000) and the Kennedy inquiry into children's heart surgery at the Bristol Royal Infirmary (2003), acted as drivers for the production of the *National Service Framework for Children, Young People and Maternity Services in 2004.(Department of Health 2004b)* The NSF describes standards for the care of both children and young people. However it includes some elements that are specific to young people, such as the reference to quality standards for primary care services for adolescents.

In March 2005, as a consequence of the 2004 Children's Act, the Government appointed Professor Al Aynsley-Green as England's first Children's Commissioner. The role aims to give a national voice to all children and young people, especially the disadvantaged and the vulnerable. Independent of government, the Commissioner's remit is to promote awareness of views and interests of children. He is expected to raise the profile of the issues that affect and concern children in

England, and promote awareness and understanding of their views and interests among all sectors of society, both public and private.

The Green Paper, Youth Matters, is a development of Every Child Matters. Approximately 19,000 young people contributed to the consultation. The response, *Youth Matters: Next Steps* was published in 2006 and sets out the government's vision for empowering young people, giving them somewhere to go, something to do and someone to talk to (Department for Education & Skills 2006). The aspiration is that young people will have more choice and influence over services and facilities that are available to them, including health services.

There are a number of government-supported developments occurring as a consequence of the above policy frameworks. These include the establishment of four Young People's Health Demonstration Sites, development of an on-line 'health check' for teenagers, and support for an Association for Young People's Health as a forum for all professionals involved in delivering, developing or evaluating health services for young people.

1.1.4 The Role of General Practice in UK Healthcare

The research described in this thesis was performed in the United Kingdom. Since the creation of the National Health Service in 1948 healthcare in the UK has been delivered via a tiered system in which general practice acts as the most frequently accessed point of contact for patients (primary care). (Horder – History of RCGP, 1998)

GPs are independent practitioners who have a contract with the NHS to provide a range of primary care services for their registered patients. More than 98% of the population are registered with a general practitioner and more than 90% of health contacts take place within this setting (Royal College of General Practitioners 2005).

Some key characteristics of general practice (also sometimes known as family practice) include an holistic approach to care (employing a biopsychosocial approach), continuity of care (with the GP acting as the guardian of the patient's lifelong medical record), and family care (with a GP or practice caring for several members of the same family) (McWhinney 1989).

The contract that was in place with general practitioners at the time that this research was performed allowed them to manage their own budgets for patient care, and to prioritise spending to the needs of their own practice population (Smith and Wilton 1998). This initiative, known as fundholding, has since been abolished, although there are references later in this thesis as to whether practices participating in the research were taking part in this scheme at that time.

1.2 LITERATURE REVIEW: TEENAGERS AND GENERAL PRACTICE

In order to inform my research I undertook a systematic literature review of published literature relating to young people and their use of general practice based health services in the United Kingdom.

1.2.1 Search Strategy

I undertook a preliminary search of the literature using Medline and EMBASE databases in 1997. This was updated periodically, and most recently by a further literature search in 2007 using ISI Web of Science. I used the same keywords for all searches as follows:

"teenager*" OR "adolescen*" OR "young people"

AND

"primary care" OR "general practice" OR "family practice"

I excluded any papers that were not written in English. I reviewed the titles and, where available, the electronic abstracts of all papers identified in the search, and selected all that had direct reference to the healthcare of adolescents in general practice in the United Kingdom. I then searched cited reference lists in each of these papers and also subsequent references that cited each paper. I included references from outside of the UK only where these provided data or details of studies that were not available from a UK setting.

1.2.2 Classification of Search Results

I identified five main methodological types of published paper as follows:

- Reports of questionnaire, interview and focus group studies undertaken with either teenagers or healthcare providers, or a combination of both.
- Reports of observational studies usually undertaken on the basis of medical records.
- Reports of specific interventions for young people, ranging from descriptive accounts to formal evaluations.
- Reports of large database studies.
- Narrative reviews and editorials.

Some of the papers deal with generic teenage health issues whilst others focus on specific issues such as mental health or contraception.

I have attached summaries of the studies in the first three categories in tables 1 to 5 in Appendix 2. In addition there were several studies that were specific to mental health issues of young people in general practice and these are presented separately in table 6 of Appendix 2 because of the mixed methodologies used.

1.2.3 Historical Perspective

Most of the research and commentary cited dates from the late 1980s onwards. However I identified an editorial from the British Medical Journal in 1954 that appears to be the first to suggest a role for family doctors in the United Kingdom (Anonymous 1954). Entitled 'Adolescence', this article focused entirely on issues of young men ('lads') and highlighted the difficulties of transition from school to employment, at a time when the minimum school leaving age had been raised to 15, compulsory national service had been introduced, and any employment was looked upon as a 'permanent job for life'. The author refers to 'new interests' and 'new

temptations' to which these young men would be exposed and also highlighted that 'young people from a good home get on the best'. Physical health was identified as a low priority in this age group 'though tuberculosis is a problem among these young people'. Instead, psychological and emotional problems were considered to be important, with one study suggesting that 12 out of 'a representative group of seventy-four 18-year old lads' being called up for national service were 'clearly disturbed' to the extent that 'psychiatric help would have been advisable'. The article concluded that:

> *"the problems of youth are many-sided and compelling. To their solution medicine has a contribution to make: this is surely, above all, in the sphere of the family doctor".*

It is worth considering that the 'lads' under consideration in this article had been born or brought up during World War II and would now be in their 60s or 70s. However the issue of mental health problems in adolescence is still as topical as ever.

In a response to the editorial, Maurice Backett (later to become Foundation Professor of Public Health at the University of Nottingham) identified two key issues relating to the suggested role of the family doctor in dealing with adolescent mental health problems: firstly, the difficulties of identifying mental health problems in young people who are presenting primarily with physical symptoms; and secondly, the lack of skills that family doctors have to deal with such problems once they have been

identified. Again, both of these issues seem as relevant now as fifty years ago (Backett 1954).

1.2.4 Questionnaire Surveys, Interviews and Focus Groups

Questionnaire surveys, interviews and focus groups have been used to explore a wide range of issues with young people including: health needs, concerns and attitudes towards help-seeking; knowledge of, and attitudes towards, health services (including perceived barriers to care); previous experiences of health services; and health-related behaviours.

Two main settings have been used for these types of study, each of which has potential advantages and disadvantages:

- School-based questionnaire surveys usually have high response rates, because pupils usually undertake questionnaire surveys during lessons. With respect to general practice they may also gauge a broader range of views from a population who are registered with a variety of practices. However they are subject to potential bias because they do not include pupils who are absent due to illness or truantism, and pupils may be less inclined to give honest answers about sensitive issues if they believe that their responses may be viewed by teachers or other pupils. One of the largest school based studies specific to general practice was that of Donovan and colleagues (Donovan *et al.* 1997) with further analysis reported by Jacobson and colleagues (Jacobson *et al.* 2000). However the annual Health Related Behaviour Survey carried out by the Schools Health Education Unit also contains questions about general practice consultation behaviour, and

the longitudinal nature of this survey makes it possible to comment on trends (Balding 1998; Balding 2007).

- General practice based surveys have usually been undertaken by post (for example Bewley and colleagues and Jacobson and colleagues (Bewley *et al.* 1984; Jacobson *et al.* 2001)). The results may be applicable to single practices but response rates can vary widely. There are potential problems in extrapolating results from single practices to wider populations, especially if these are in atypical environments, such as inner-London practices (Bewley *et al.* 1984). Postal questionnaires that are completed in the home environment may be subject to interference by other family members. Some surveys have been undertaken amongst surgery attenders only (Davies and Casey 1999; Yates *et al.* 2004), but such surveys are more difficult to administer and are usually for the purpose of linking to exploration of some specific aspect of the consultation, such as mental health.

Other methodological considerations include the relative merits of questionnaire surveys over interviews and focus groups. Questionnaire surveys allow sampling of larger numbers but are restricted in the range of questions that can be asked, whilst interviews and focus groups allow more in-depth exploration and identification of themes amongst a restricted sample (Oppong-Odiseng and Heycock 1997; Garside *et al.* 2002). Some papers, such as those by Epstein and colleagues(Epstein *et al.* 1989; Jacobson *et al.* 2001), Jacobson and colleagues (Jacobson *et al.* 2001), and Garside and colleagues (Garside *et al.* 2002) adopted the use of pluralistic methodologies in order to combine the benefits of both approaches.

The results of some of the earliest surveys suggested that young people have health concerns for which they do not seek help but would like to do so if such help was more available and accessible (Bewley *et al.* 1984; Macfarlane *et al.* 1987; Epstein *et al.* 1989). In a letter, Finlay and colleagues supported this view based on the large number of letters to 'agony aunts' in teenage magazines, and their own experiences of providing opportunities for anonymised questions in schools (Finlay *et al.* 1998).

In their survey of a mix of school pupils and teenage magazine readers Jones and colleagues asked for issues that young people would like to discuss (Jones *et al.* 1997). Their top 10 included questions about contraception, periods, weight, healthy eating, sex, sexually transmitted infections, confidentiality, acne, stress / depression, and cancer.

Survey results show that, although young people frequently cite friends, family and the media as common sources of health advice, they also rate GPs as the next most common potential source of advice, particularly for physical problems (Bewley *et al.* 1984; Epstein *et al.* 1989; Oppong-Odiseng and Heycock 1997). Jacobson and colleagues (Jacobson *et al.* 2000)reported that 87% of Year 11 pupils reported being satisfied with the help that they received for the problem with which they consulted (Jacobson *et al.* 2000). However a relatively high proportion had health concerns for which they did not seek advice.

Several studies have explored the attitudes of young people to general practice and the potential barriers to care that they perceive. Donovan and colleagues (Donovan *et al.* 1997) identified concerns about confidentiality, embarrassment, difficulties in

getting quick appointments, and unsympathetic GPs as being common problems encountered by young people (Donovan *et al.* 1997). Similar results were found amongst a more selective population in North London (Kari *et al.* 1997; Oppong-Odiseng and Heycock 1997; Burack 2000).

Concerns about confidentiality are frequently cited as a potential barrier to general practice in surveys of young people (McPherson *et al.* 1996; Oppong-Odiseng and Heycock 1997; Davies and Casey 1999; Burack 2000; Hine and Oakeshott 2001). Donovan & colleagues (Donovan *et al.* 1997) reported that respondents who believed that their GPs treated information confidentially were also likely to consult more frequently. Oppong-Odiseng & Heycock (Oppong-Odiseng and Heycock 1997) found that young people believed that GPs were more likely to keep information confidential than school nurses or doctors and that this was one reason why they were a commonly cited source of health advice (Oppong-Odiseng and Heycock 1997).

Teenagers have two specific areas of concern around confidentiality. The first is particularly relevant to under 16 year olds who worry about parents finding out. A quote from Jacobson and colleagues (Jacobson *et al.* 2001) focus group study illustrates this: *'Teenagers know that a doctor is confidential, in that the service is confidential, but individually they still worry about the doctor telling their parent.'* Secondly there are concerns about being seen at the surgery by other people. This is particularly an issue in rural settings and small communities. Garside and colleagues (Garside *et al.* 2002) identified this theme in a series of focus groups with young people in Devon: *"You go in there [doctor's] and you'll see loads of your friends in*

there and you'll think 'Oh God, it's going to go all around the village, my mum's going to find out'."

Carlisle and colleagues explored young peoples views of confidentiality by carrying out a qualitative study using semi-structured interviews with young people aged 14 to 17 year olds (Carlisle *et al.* 2006). Although they recruited young people from secondary care selectively on the basis that they would have had more experience of accessing health care, the questions have relevance to primary care. Young women were more concerned than young men, and older teenagers more concerned than younger teenagers, about people other than their general practitioner (GP) having access to their health information. Young people with little experience of the healthcare system were less happy than those with greater knowledge of the National Health Service (NHS) for non-medical staff to access their health information. As they grow older, adolescents become increasingly concerned that their health information should remain confidential.

Embarrassment is another common factor that is commonly cited as a potential barrier to GP consultation, especially amongst girls. Donovan and colleagues (Donovan *et al.* 1997) found that 63% of girls cited embarrassment as a potential difficulty compared with 46% of boys, a finding confirmed by Hine & Oakeshott (Hine and Oakeshott 2001). However they also found that teenagers who were sexually active were less likely to be embarrassed or to be concerned about the gender of the GP. Age is also a factor, although probably over a wider range: Seamark and Blake compared the views of women in their late teens, thirties, and fifties and found that embarrassment on attending a GP decreased from 38%

amongst teenagers to 16% amongst women in their fifties (Seamark and Blake 2005).

Several surveys have explored teenager's attitudes to potential improvements in primary care services. Jones and colleagues reported that 91% of respondents would like a special teenage clinic staffed by specialist teenage health workers (Jones *et al.* 1997), whilst 76% of respondents in Kari and colleagues' study also indicated a desire for a local 'drop-in' clinic (Kari *et al.* 1997). However both of these questionnaires used closed directive questions that were likely to invite a positive response. Other aspects of care that are rated as important by young people include having more time in the consultation, having the option to see a female GP, friendly and accessible receptionists (Donovan *et al.* 1997; Kari *et al.* 1997; Davies and Casey 1999). McPherson and colleagues invited young people to rate aspects of services in order of importance (McPherson *et al.* 1996). After confidentiality, young people rated the ability to phone for advice on an anonymous basis as the next most important preference from the six options offered. None of these surveys address the question of whether or not improvements to services as such would improve health outcomes for young people.

Jones and colleagues invited teenagers to make suggestions for an ideal surgery and an ideal doctor (Jones *et al.* 1997). Respondents (who were disproportionately female) wanted the surgery to be bright and colourful, to have a relaxed ambience, comfortable seating, friendly receptionists, and age appropriate literature. Comments about the doctor concerned their personality (friendly, outgoing,

sympathetic and easy to talk to) and dress (casual, smart or well-dressed), whilst other aspects concerned competence, experience and trustworthiness.

Adequate knowledge and understanding of health services is a pre-requisite to appropriate use. In his large-scale survey of 13 to 15 year old pupils in suburban London Burack explored knowledge of general practice based health services (Burack 2000). He found that, whilst more than two-thirds of respondents knew that general practice provided sexual health services, more than half believed that they had to be over 16 to access them. Donovan & colleagues reported that, in their South Wales study, 78% of respondents were aware that family planning services and contraception were available in general practice, but only 56% knew that emergency contraception could be provided (Donovan *et al.* 2001). Whilst the majority knew that they could obtain help for physical problems, such as skin or respiratory problems, only 36% knew that help was available to for emotional problems. Just over half were aware that help was available for smoking, drug and alcohol related problems.

Several studies have explored the experiences of young people in the general practice consultation itself. The results are varied. Some studies suggest that young people are very satisfied with the care provided whilst others reveal potential problems. For example, Jacobson and colleagues reported that 83% of young people felt able to talk easily to their GP and 87% were satisfied with the help and advice received (Jacobson *et al.* 2000). However such global satisfaction ratings can conceal minority but significant views, especially as the majority of young people will have consulted for common physical problems. Donovan and colleagues noted

free text comments that highlighted problems with the GPs approach which included being patronising or dismissive (Donovan *et al.* 1997). Such attitudes are likely to have an inhibiting effect on young people consulting for more sensitive problems.

Four surveys have been published exploring the views of GPs towards young people, and particularly their attitudes to confidentiality and under 16 year olds (Appendix 2, table 2). Both Garside and colleagues, and Davies found that more than 90% of GPs were willing to provide confidential consultations for young people under the age of 16 (Garside *et al.* 2000; Davies 2003). Davies found that more than 85% of GPs were comfortable with applying Fraser guidelines, although relatively few practices had specific policies on young people. Garside and colleagues also highlighted the tensions involved in assuring confidentiality whilst trying to encourage a young person to involve their parents in the decision to take oral contraception as required by the Fraser guidelines. In another study, Graham and colleagues found that whilst the majority of GPs in Avon would be willing to prescribe emergency contraception to a 14 year old, a small minority (1.6%) of the 486 respondents indicated that they would require parental consent before doing so (Graham *et al.* 2001). In addition, Garside and colleagues found that 10% of GPs believed that they were aiding a criminal act by providing contraception to under 16 year olds (Garside *et al.* 2000). The ethnic origin of the GP may also be influential as Sengupta and colleagues found that GPs from the Indian Sub-continent were significantly less likely to be prepared to prescribe contraception to under 16 year olds (Sengupta *et al.* 1998).

Two studies have explored the views of both teenagers and service providers (Appendix 2, table 3): In one survey in London, Lempp and colleagues compared

the attitudes of young people with those of GPs and practice nurses to a range of potential advantages and disadvantages to having sexual health services provided in general practice (Lemmp *et al.* 1998). GPs and practice nurses rated the benefits of general practice significantly more highly, but underrated concerns about embarrassment and the difficulties of discussing sexual health issues, compared with the views of young people themselves. Interestingly the young people tended to rate issues of confidentiality as less important than service providers, but this may reflect that this was a relatively old group of young people in whom understanding about the ethical duties of health professionals may be greater, and for whom concerns about information being passed to parents would be less important.

Jacobson and colleagues compared the attitudes of practice staff and young people based on interviews and focus groups respectively (Donovan *et al.* 2001; Jacobson *et al.* 2001). They highlight several areas in which the views of staff and young people differ. For example, young people perceive receptionists as a barrier to care whilst receptionists themselves were very aware of the stereotypical views that people hold of receptionists, implying that they tried to avoid acting in this way and tried to facilitate a positive approach. Practice nurses perceive themselves as more approachable than doctors, but were not a frequently used source of help by young people. Teenagers found it difficult to communicate with GPs, but the opinions of young people and GPs about what constitutes effective communication differed.

Two studies that have not been included in the summary tables merit mention. The most recent SHEU survey carried out in 2006 showed that approximately 85% of Year 8 and 10 pupils reported having visited their GP in the past year, based upon

approximately 38,000 responses (Balding 2007). Rates have been relatively unchanged since 1997 (Balding 1998). Overall, 42% reported feeling 'at ease' with the GP on their last visit, with females and younger people feeling less at ease. Boys and girls both report being more at ease with female doctors. Analysis of data from 1997 suggests that those who were at ease were more likely to have reported visiting their GP more recently.

Finally, Donovan established a Balint group with GPs and other health professionals dealing with young people in which they were asked to discuss teenage consultations that they had found difficult (Donovan and Suckling 2004). The published report 'Difficult Consultations with Teenagers' highlights a wide range of difficulties including the false assumptions that GPs sometimes make (for example, 'that there is always a hidden agenda'), the influence of the physical or 'virtual' presence of parents, the doctor's own agenda, and the fear of opening 'Pandora's box' and revealing a wider range of problems. Although this study only involved 'interested' clinicians and focussed on 'difficult consultations' it highlights a range of issues relevant to the process of consultation, an area that has not otherwise been subject to research.

In the specific area of mental health, three studies have undertaken questionnaire surveys or interviews with young people attending their surgery in order to assess their mental state in relation to GP recognition of mental health problems (Appendix 2, table 6). Reported rates of psychiatric disorder depended on the screening instrument used, but the results are relatively consistent. All three studies were based on 13 to 16 year olds. Based on face to face interviews, Kramer and Garralda found

that 38% attending a single London practice had evidence of psychiatric disorder in the previous 12 months of which 21% were identified by GPs (Kramer and Garralda 1998a); Yates and colleagues (2004) found that up to 33% attending three surgeries in various settings were high scorers on the Moods and Feelings Questionnaire of whom 25% were identified by GPs (Yates *et al.* 2004); whilst Martinez et al (2006) found that 32% attending one of 13 GPs in Norfolk had psychological problems according to the Strengths and Difficulties Questionnaire of which 61% were identified by GPs (Martinez *et al.* 2006). GPs were more likely to identify more severe problems with a specificity of more than 85% (Kramer and Garralda 1998b; Martinez *et al.* 2006).

A further questionnaire survey of a random sample of 99 young people that was not related directly to the consultation found that 26% fulfilled criteria for caseness based on the General Health Questionnaire (GHQ-12) with half of respondents feeling unhappy or low in the previous year (Potts *et al.* 2001). However only one of these had actually consulted a GP about this.

In order to explore the reasons why young adults do not consult their GP about mental health problems, Biddle and colleagues carried a qualitative study of interviews with 23 young people aged between 16 and 24 identified as having GHQ-12 score >4 (with the presence of a mental health disorder confirmed in 21/23 by use of a clinical interview schedule) (Biddle *et al.* 2004; Biddle *et al.* 2006). Interviewees tended to dichotomise physical and psychological health problems and believed that the GP was there for physical illness. They believed that the GP would tend to prescribe medication and, as most did not want this, they avoided consulting.

Those that consulted often did so as a result of a crisis or because of pressure from family or friends. GPs were perceived as being unskilled in the area of mental health.

Although this review has concentrated on teenagers as recipients of healthcare, one paper by Free and colleagues highlights their potential role as supporters within the consultation, when bilingual young people are used as interpreters in consultations by their relatives (Free *et al.* 2003). This is an increasingly important issue with increased immigration in recent years. In an in-depth interview study most such consultations were reported as being unproblematic.

1.2.5 Case Note Review and other Observational Studies

Two main studies have reported results from retrospective case note review of teenagers over a one-year period in order to describe their consultation rates and overall consultation behaviour(Jacobson and Owen 1993; Kramer *et al.* 1997). Both of these were performed in single surgeries and differed in their findings: in Cardiff Jacobson showed that consultation rates increased between the ages of 11-14 and 15-19, with increased consultations by females over males in the older age group (Jacobson and Owen 1993); in contrast, Kramer and colleagues found that only 54% of teenagers had consulted and that there were no differences between males and females up to the age of 16 (Kramer *et al.* 1997). They also found that 23% of teenagers consulted on four or more occasions and that frequent attenders were more likely to consult with psychological and possible psychosomatic problems.

The main reasons for consultation in both studies were upper respiratory tract infections, asthma, injury and acne. The increased rate of consulting by older girls in Cardiff was not entirely explained on the basis of gynaecological consultations or requests for contraception. Differences between the two studies may be due to differences in accessibility of general practice, provision of alternative services locally, or different migration rates away from the practice so that the registered list is not up to date.

Potts and colleagues conducted a much larger multi-practice retrospective case note review primarily with the aim of estimating the prevalence of psychological diagnoses amongst teenagers in general practice (Potts *et al.* 2001). However they also reported consultation rates and reasons for consultation. Their sample of 2,359 15-year olds had an average consultation rate of 2.3 per year with females consulting more frequently at a ratio of 3:2. Overall only 70% had consulted in the previous year and 21% consulted on four or more occasions, a rate consistent with that found by Kramer and colleagues (Kramer *et al.* 1997). The most common reasons for consultation were for sore throats, upper respiratory tract infections, and tonsillitis. Definite mental health problems were identified in 5% of notes and possible problems in a further 1%. The most common presentation was for emotional or behavioural problems.

In 1994 Jacobson and colleagues reported the results of a frequently cited landmark study that demonstrated that teenagers aged 11 to 19 have consultations that are, on average, 1.9 minutes shorter than those with other patients (Jacobson *et al.* 1994). They argued that consultations with young people are often seen as a way to catch up

on time, and that potential opportunities for health promotion are missed with this age group.

Seamark and Pereira Gray published a series of papers which all involved retrospective case note review to explore aspects of sexual health and contraception based on teenage patients registered with one or two practices in Devon (Seamark and Pereira Gray 1995; Seamark 1997; Seamark and Gray 1997a; Seamark and Gray 1997b; Seamark and Gray 1998). Their main findings were that general practice is a common source of contraception and emergency contraception for teenage girls, with more than 50% of 16-17 year olds having consulted overall, and 16% having been provided with emergency contraception (usually due to unprotected intercourse or condom failure). They also undertook a case-control study of teenagers who became pregnant and found that this group were significantly more likely than their non-pregnant peers to be smokers and to have a mother who had a teenage pregnancy.

Most observational studies based on case-notes have been cross-sectional, usually based on one year of consultation. However Smeeton and colleagues reported a longitudinal study following up a cohort of young people registered with a single GP with respect to mental health problems (Smeeton *et al.* 1992). They reported that 11% of males and 6% of females received a diagnosis of a psychiatric problem between the ages of 10 to 14 and 13% males and 24% of females in their late teens. Although there were a number of methodological problems with this naturalistic study, there was evidence that psychological problems in young adolescence increased the risk of problems in young adulthood.

1.2.6 Interventions

Two studies in the late 1990s reported the prevalence of specific interventions for young people in general practice: Lempp and colleagues found that 17% of practices provided, or had access to, specific services for young people which included a teenage screening drop-in clinic, contraceptive services, group sessions, open access to nurse counsellors(Lemmp *et al.* 1998) , and an invitation to school leavers to visit the practice to discuss health concerns (Lemmp *et al.* 1998); Gregg and colleagues found that 15% of practices had special facilities for teenagers, but did not report what these were (Gregg *et al.* 1998).

Several of the published reports of specific interventions for young people in general practice have been confined to single practices without any robust evaluation (Donovan and McCarthy 1988; Hibble and Elwood 1992; Campbell and Edgar 1993; Cowap 1996). Response rates to invitations to health interventions have varied from 7% (Cowap 1996) to 83% (Hibble and Elwood 1992) with differences potentially attributable to the setting (inner city versus rural), deprivation, and target age range of the intervention. Whilst several reports suggest that invitations to a health check and discussion with a practice nurse or GP are viewed as acceptable by those that attend (Campbell and Edgar 1993; Walker *et al.* 2000) and can have an impact on health outcomes (Campbell and Edgar 1993; Walker *et al.* 2002) it is likely that many of those young people who are most in need of health advice are least likely to attend (Jacobson and Wilkinson 1994).

Only one randomised controlled trial of a health promotion clinic in general practice has been carried out (Walker *et al.* 2002) following preparatory and pilot studies

(Townsend *et al.* 1991; Walker *et al.* 2000). Only 41% of invited teenagers attended. There was evidence of short-term intent to change health related behaviours amongst the intervention group but the differences did not persist at 12 months. However a secondary finding was that recognition of possible depression resulted in improved mental health outcomes that persisted to 12 months, and young people in the intervention group were more informed than those in the control group about where to seek confidential and contraceptive advice.

Three studies have reported possible specific interventions in relation to smoking. In a pilot study of nurse-led health promotion advice, Townsend and colleagues found that 60% of smokers who attended made an agreement to quit (Townsend *et al.* 1991). However there was no follow-up. The other two studies focussed on targeting potential smokers instead of existing smokers. Jacobson piloted a visual analogue scale to identify young people who were contemplating smoking and then targeted health advice at this group (Jacobson *et al.* 1995a). In a larger randomised controlled trial, Fidler and Lambert used postal advice targeted at young (10 to 14 year old) never smokers to reduce the uptake of smoking and found a statistically significant benefit of this approach, but only amongst boys (Fidler and Lambert 2001). These studies suggest that general practice may have a role to play in preventing the uptake of smoking amongst teenagers and encouraging early cessation in those that take it up.

With respect to mental health there have been two approaches used to improve mental health outcomes for young people. In the first, Westman and Garralda described a pilot intervention inviting young people to a mental health promotion

clinic (Westman and Garralda 1996). Only 22% of those invited actually attended, of whom nearly half had some type of disorder diagnosed (usually depression). However the model was not considered to be cost effective and the authors concluded that opportunistic identification in GP consultations would be more appropriate. An alternative approach by the same group was to develop an educational intervention for GPs in relation to the detection and initial management of depression. A pilot study found that the sensitivity of GP detection of disorder improved from 20% to 43% as a result of the intervention (Gledhill *et al.* 2003).

1.2.7 Large Database Studies

General practice clinical databases provide the opportunity for studies based on large populations. However their usefulness is potentially limited by the validity of the data entered. Two papers have reported the use of large-scale general practice databases to explore prescribing of contraceptives for young people. In the first, Rowlands and colleagues used the General Practice Research Database to determine prescribing rates of the combined oral contraceptive pill to under 16 year olds when combined with data from family planning clinic returns (Rowlands *et al.* 2001a) . They estimated that in 1997 4.2 per 100 girls aged 16 or less were prescribed the pill and suggest that this is low in relation to the reportedly increasing rates of sexual activity in this age group. Higher rates were found in more rural areas. In a second paper these authors describe prescribing trends of specific oral contraceptives to 13 to 19 year olds between 1994 and 1997, with a reduction in the use of third generation combined oral contraceptives and an increase in the use of cyproterone acetate in girls with a recorded diagnosis of acne (Rowlands *et al.* 2001b).

Murray and colleagues used the GPRD to analyse prescribing patterns of antidepressants to children and adolescents (Murray *et al.* 2004). They described an increase in prescribing of both selective serotonin reuptake inhibitors (SSRIs) and tricyclic antidepressants between 1992 and 2001. SSRI prescribing increased by approximately 10 fold. However the median durations for treatment were between 58 and 30 days respectively. SSRI prescribing was associated with recorded diagnoses of depression, whilst TCA prescribing was for nocturnal enuresis in the younger age group and depression in those aged 15 year and above. A follow-up study was carried out following the issue of advice from the Committee on Safety of Medicines in 2003 regarding the safe prescribing of SSRIs to children and adolescents (Murray *et al.* 2005) . This demonstrated a fall in prescribing of all types of antidepressant medication, confirming the impact of the advice.

Hippisley Cox and colleagues (2000) combined data from several regional sources to explore the relationship between teenage pregnancy rates by practice and general practice organisational factors in Trent Region (Hippisley-Cox 2000). After adjusting for deprivation, lower teenage pregnancy rates were found to be associated with the presence of female GPs within the practice, and with more practice nurse hours. These results may suggest that such factors influence consultation behaviour for contraceptive advice by young people.

Finally, Gunnell and Martin used data from the fourth National GP Morbidity Survey to compare the rates of consultation for mental health problems by young people living in urban and rural areas (Gunnell and Martin 2004). After adjustment for deprivation they found that young people in rural areas were between 16 %

(girls) and 30% (boys) less likely to consult than their urban counterparts. Although they interpret these findings as being consistent with lower rates of mental illness in rural areas the results could also be due to the fact that young people are less able to access general practice services.

1.2.8 Reviews and International Studies

a) Reviews & Editorials

Teenage health in general practice has been the subject of numerous reviews and commentaries over the past 20 years, many of which cite the research presented above. In this section I will briefly summarise some of the conclusions of some key papers.

Melville was one of the first GPs to highlight the problems of young people in general practice (Melville 1989). In a review in *Family Practice* he highlighted the unmet needs of young people, the difficulties that they experience within the consultation, and problems of the practice organisation overall. This review preceded many of the later surveys confirming these assertions.

In 1994 Jacobson & Wilkinson highlighted the implications of two public health issues (smoking and sexual health / pregnancy) for adolescents in general practice (Jacobson and Wilkinson 1994). They discussed potential reasons behind the findings that teenagers have shorter consultations which include the nature of the presenting problem, the GPs agenda (catching up on late surgery), the fact that teenagers may prefer short consultations, and the possibility that GPs do not see the need to include health promotion or to seek a deeper understanding of the reason for consultation.

In an editorial in the British Medical Journal MacFarlane & McPherson argued the case for improved primary care services for young people (Macfarlane and McPherson 1995) . In particular they suggested that the characteristics of young

people within general practices should be identified in order to meet their specific needs; that teenagers aged 16 should be given the opportunity to re-register so that they have greater autonomy from their families; that provision of specific services, such as emergency contraception, should be clearly identified and promoted; that practice environments should be more teenage-friendly with, for example, relevant and age-appropriate reading material; and that staff should be adequately trained to be responsive to what teenagers want, including their wish to be able to phone a practice for advice on an anonymous basis.

In 1995, in a review of child and adolescent mental health problems, Bernard and Garralda argued that general practice is well suited to identifying and managing such conditions (Bernard and Garralda 1995). They based this firstly on the prevalence of mental health problems and the relatively high rates of disorder amongst general practice attenders, and also on the relatively trusting and influential position of primary care doctors. Walker & Townsend carried out a systematic review of mental health promotion interventions in primary care and concluded that "primary care offers a promising setting for the prevention and detection of mental health problems in adolescents but further research is needed to determine the most cost effective way of using this opportunity" (Walker and Townsend 1998). Garralda proposed that more needed to be done in terms of undergraduate and postgraduate training, improved information and advice giving by the primary health care team, development of brief interventions by GPs, development of focussed protocols for referral, and provision of mental health promotion clinics in primary care (Garralda 2001).

In a review of health promotion in primary care, Walker and Townsend outlined the health problems and behaviours of teenagers and reviewed the studies that had been reported of general practice interventions (Walker and Townsend 1999). They argued that general practice may be more suitable for health promotion activities than school based settings, partly because those most in need of intervention are more likely to be alienated from school whilst still engaging with health services. However the impact of behaviour change on screening alone or in conjunction with further interventions required further evaluation.

Bekaert reviewed some of the research pertaining to adolescent health services in general practice, with particular emphasis on the role of the practice nurse (Bekaert 2003). She concluded that, whilst there are many examples of adolescent services described in the nursing press, such articles are usually descriptive and lack any evaluation in terms of either quantitative or qualitative data. Many published interventions have been medically led. Whilst nurses are a potential source of health advice for young people they often lack confidence and training, and young people themselves do not perceive them to be a source of help.

b) International Studies

The main healthcare issues that affect young people accessing primary care do not appear to be confined to the UK, but are mirrored in reports from other westernised countries. I present a few examples below.

The relative importance of communication issues for young people was exemplified by an American study in which content analysis was performed on the narrative

response to the question "What would your ideal doctor be like?" A total of 272 responses related to communication compared with only 30 relating to medical competence (Clowers 2002). The need for more time for consultation, more training for primary care clinicians in adolescent health, and for increased flexibility of service provision were also highlighted in a cross-sectional qualitative study of Australian primary healthcare providers (Kang *et al.* 2003).

Veit and colleagues carried out a qualitative interview study of general practitioners in Victoria, Australia (Veit *et al.* 1995). Of the 57 GPs interviewed, 52 had no normal formal training in adolescent health, and 43 had some concerns about their knowledge and competence in dealing with adolescents, despite the fact that this age group were perceived as constituting 10% or more of their workload. Key barriers to health care were perceived as concerns about confidentiality, communication and cost.

Purcell and colleagues described a survey of primary care clinicians in the USA to describe normal practice when consulting with teenagers (Purcell *et al.* 1997). Of 1,630 responses approximately half (49%) 'always' or 'almost always' asked parents to leave the consulting room. Female practitioners were significantly more likely to do so. The decision to do so depended on the scenario presented – they were less likely to do so for a respiratory problem than for a female with abdominal pain.

In a recent innovative study in Australia, Haller and colleagues attempted to explore the general practice consultation in more detail by comparing the prior expectations of a 450 consecutive attenders aged 16 to 24 at 26 randomly selected practices with

the outcome of the consultation (Haller *et al.* 2007). They found significant discrepancies between expectation and outcome – in particular prescriptions were issued more frequently than expected, and perceived mental health or emotional problems were discussed infrequently. The authors highlighted the need for doctors to explore the beliefs and expectations of young people in more detail.

A small qualitative study of teenage girls attending their primary care physician in Canada identified five key themes: adolescent girls felt more comfortable with female physicians, they felt uncomfortable during physical examinations, they would like doctors to explain medical issues, they would like doctors to be more like friends, and they wanted to be treated as teenagers (as opposed to children) by their doctors (Oandasan and Malik 1998).

Sanci & colleagues described an evaluation of a cluster randomized controlled intervention to improve general practitioners management of adolescents (Sanci *et al.* 2000a; Sanci *et al.* 2000b): 108 GPs in Melbourne, Australia underwent a multifaceted educational programme consisting of six weekly 2.5 hour sessions with a debrief session six-weeks later. Outcomes included participant self-completion questionnaires measuring their knowledge, skill, and self perceived competency, satisfaction with the programme, and self reported change in practice.; objective rating of videoed consultations with simulated patients; simulated patient rating of rapport and satisfaction; and self-reported change. The intervention was perceived as acceptable and positive, and there were significant improvements at seven and 13 months in all areas except for simulated patient ratings. Improvements were sustained for at least five years after the intervention (Sanci *et al.* 2005).

Following a survey of Australian GPs which found widely varying knowledge about suicide risk in young people (Smith and Scoullar 2001) a single one day educational course was shown to improve detection of psychological problems and risk of self-harm, but had no impact on their management (Pfaff *et al.* 2001). Joiner and colleagues identified higher levels of self-harm ideation amongst younger female patients with depression and distress (Joiner *et al.* 2002a) and have developed a screening questionnaire aimed at detecting suicide risk in general practice (Joiner *et al.* 2002b).

In an innovative Flemish study three standardised adolescent patients visited 30 GPs to request a first prescription of the oral contraceptive pill (Peremans *et al.* 2005). Standardised patients scored the performance of the GPs against a checklist. 28 consultations were analysed. GPs rarely asked about attitudes to safe sex, took gynaecological history, excluded pregnancy or discussed contraindications. Sufficient information was provided about correct pill use and simulated patients were generally satisfied. The results cannot be directly extrapolated to UK general practice but the research model could be applied elsewhere.

1.2.9 Conclusions from the Literature Review

Teenagers have been shown to have health needs that are not currently being met, despite the fact that most consult their GP at least once each year. In particular they rarely consult about mental health and emotional problems that they are experiencing, and despite evidence that some teenage girls use general practice for contraceptive provision, high teenage pregnancy rates suggest that there is still a need for improving the service.

GPs tend to have shorter consultations with young people and potentially miss the opportunity to provide health promotion. Although most teenagers consult for minor physical problems they still experience varying degrees of unease, particularly in relation to communication. They also perceive a range of potential barriers to accessing general practice particularly for more sensitive problems, although there is limited evidence about whether or not these actually influence consultation behaviour.

Specific health interventions for young people have tended to focus on invitations to special health checks. However there is limited evidence that these are effective and may not target those most at risk. Opportunistic approaches, in which GPs target care appropriately when young people attend, may be more effective, but this depends on an improved knowledge of the consultation behaviour of young people.

1.3 AIMS AND OBJECTIVES OF THE RESEARCH

1.3.1 Rationale for the Research

Figure 1.1 presents a model that can be used to consider the role of general practice in providing health care for young people. This model consists of a pathway in which young people experiencing health concerns make a decision to seek help, which might be from general practice. The general practice consultation may then influence health outcomes.

The development of health problem sand concerns, adoption of risky behaviours, decisions about whether or not to consult a GP, and subsequent outcomes will all be dependent on a wide range of personal and environmental factors, some of which have been identified in the literature review. Whilst some of these factors impact at specific points on the pathway, others are more over-arching. In particular gender, deprivation, and health locus of control might all be considered to have a role at a number of stages in the pathway. The rationale for including these broader variables within the model is considered below.

Gender differences in health and health behaviour are well documented amongst adult populations (Bird and Rieker 1999). Results from previous research have shown that boys and girls also differ in their health concerns and health related behaviours during adolescence (Bewley *et al.* 1984; Roberts *et al.* 1995; Oppong-Odiseng and Heycock 1997; Balding 2007). There is also evidence that gender-specific consultation patterns change during adolescence as girls increase their consultation frequency (Jacobson and Owen 1993; Kramer *et al.* 1997). The extent to which this relates to increased health concerns merits further exploration, and so

gender has been included as a key variable in this research. However there are difficulties in disentangling reasons for gender differences amongst adult populations which have been highlighted by Malterud & Oakes (Malterud and Okkes 1998).

There is a well-established association between socio-economic deprivation and increased mortality and morbidity across the age range (Townsend *et al.* 1988; Marmot *et al.* 1997). Both general practice and A&E consultation rates have been shown to be significantly higher amongst more deprived populations overall (Carlisle *et al.* 1998) and some of these differences appear to relate to educational level (van der Meer and Mackenbach 1998). The same pattern exists for general practice consultations for children aged 10 to 15 with those from lower social classes having highest consultation rates (Saxena *et al.* 2002). However there has been little research specifically on the impact of deprivation on consultation patterns during adolescence. Social deprivation measures were therefore included in the current research.

Attitudes towards health can be categorised according to whether a person believes that they have control over their own health, or whether they believe that health is more related to chance. Such attitudes may then potentially influence health related behaviour, risk taking, and help-seeking. This concept forms the basis of 'health locus of control' measures (Norman and Bennett 1996). There is some evidence that health locus of control in youth may be associated with long term health outcomes: in one longitudinal study, children aged 10 who were found to have a more internal locus of control were less likely to be obese or have psychological distress at age 30 (Gale *et al.* 2008). Health locus of control amongst teenagers may also predict

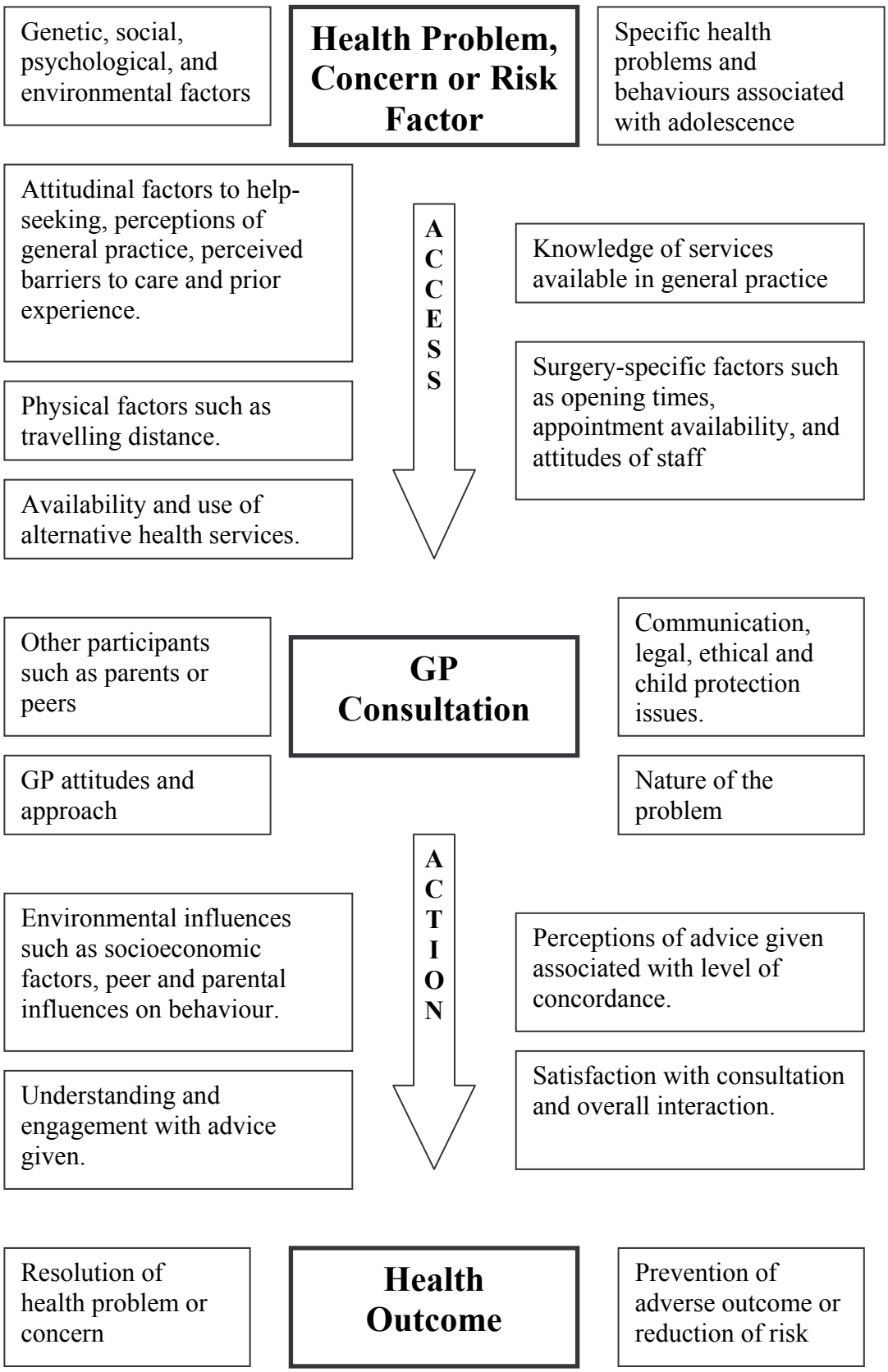
health outcomes over shorter periods, with one study demonstrating correlation between the 'chance' locus of control and several health outcome measures two years later (Zdanowicz *et al.* 2006). Studies have also shown correlation between health locus of control measures and dental hygiene, pregnancy, and eating behaviours in young people (Gracey *et al.* 1996; Macgregor *et al.* 1997; Young *et al.* 2004). Health locus of control was therefore considered an important variable in the current research to determine the extent to which it may be associated with general practice consultation patterns.

Factors that might be important specifically in the decision to consult are knowledge of the services available, perceived barriers to accessing care (including physical logistic difficulties such as travelling to the surgery and opening times) and negative attitudes or expectations towards the care provided. Attitudes towards confidentiality and embarrassment have also been previously shown to be very important to young people (Donovan *et al.* 1997; Oppong-Odiseng and Heycock 1997) and may be expected to influence consultation behaviour either overall, or for more sensitive issues.

The consultation itself is a complex process that involves not only an interaction between the GP and teenager, but also often with a parent or sometimes a friend. There are communication issues as well as legal and ethical factors that can complicate the process.

The ultimate aim of any form of health care provision is to improve the health outcomes of those with access to the service. Outcomes will be partly related to action resulting from the consultation and a range of factors will influence these. Most previous research has focussed on the early stages of the model in isolation, without exploring links between the stages and with outcomes. The overall aim of my research as described in this thesis was therefore to explore aspects of this whole model including links between health needs, attitudes and actual behaviour, and then between health outcome (using teenage pregnancy as a marker) and prior consultation behaviour.

Figure 1.1: A Model for the Potential Role of General Practice in Teenage Healthcare



1.3.2 Research Aims & Objectives

Studies 1 and 2 are linked in terms of their aims and objectives and so are considered together.

STUDY 1 & 2

Aims

The overall aim of these studies was to explore the impact of a range of factors on general practice consultation rates by teenagers with special reference to their health needs, and to their attitudes and beliefs concerning this healthcare setting. The ages 13 to 15 were selected for study because young people are starting to acquire adult characteristics and behaviours with respect to health whilst still being considered as minors from a legal and health service perspective.

Objectives

Study 1

- To describe the uptake of general practice based health services by young teenagers aged 13 to 15, in terms of consultation rate and reasons for consulting.
- To determine whether there are differences in consultation pattern (both overall and for specific types of condition) by teenagers in relation to age, sex, deprivation, practice, and distance of home from the surgery. The null hypothesis is that there will be no difference.

Study 2

- To describe the self-reported health status, health-related behaviour, and help-seeking attitudes of young teenagers.

- To describe the experiences, attitudes and beliefs of young people to general practice including their views on a range of possible alternative models, and with particular emphasis on perceptions of confidentiality and accessibility.

Studies 1 & 2 Combined

- To determine whether differences in self-reported health status, health related behaviours, and help seeking attitudes are associated with consultation frequency (both overall, and for specific types of condition) in young adults. The null hypothesis is that no such associations exist.

STUDY 3

Aim

The overall aim of this study was to compare the general practice consultation patterns preceding conception of teenagers who become pregnant with those of non-pregnant peers. This was in order to be able to explore relative use of contraception and to identify the presence of potential risk factors that might facilitate opportunities for early intervention. I considered teenagers whose pregnancy ended in a termination as a separate sub-group.

Objectives

- To describe the general practice consultation patterns (both in terms of overall consultation rates and specific reasons for consultation) of teenagers who become pregnant, in the year prior to conception.
- To determine whether differences exist between teenagers who become pregnant and age-matched controls in terms of consultations for contraception, types of

contraception provided and duration of contraceptive provision. The null hypothesis is that there would be no difference.

- To determine whether differences exist between teenagers who become pregnant and age-matched controls in terms of consultations for non-contraceptive reasons including psychological problems, gynaecological problems, gastrointestinal problems, or consultations resulting in an antibiotic prescription in the year prior to conception. The null hypothesis is that there would be no difference.
- To determine whether differences exist between teenagers whose pregnancy ended in a termination with those whose pregnancy had other outcomes in relation to the above variables.

1.4 METHODOLOGICAL ISSUES

In this section I will describe some of the specific methodological issues relating to my research. These include some aspects that are specific to research with young people such as appropriate questionnaire design, ethical issues, and assessing the health status of teenagers, as well as more general issues such as study design, using clinical data for research purposes, and statistical approaches.

1.4.1 Ethical Issues

Children and young people are considered to be a potentially vulnerable group in the context of involving them in research (Hennen 1993). Care must therefore be taken to protect their rights, which includes protecting the confidentiality of their medical information. The General Medical Council recommends that children and young people should only be involved in research when research on adults cannot provide the same benefits (General Medical Council 2007). They should not usually be involved in research if they object or appear to object in either words or actions, even if their parents consent. If they are able to consent for themselves then consideration should still be given to involving their parents, depending on the nature of the research. The World Medical Association *Declaration of Helsinki and Medicines for Human Use (Clinical Trials) Regulations 2004* require parental consent to complement even competent under-16's agreement to involvement in trials (World Medical Association 2004). Pressure should not be placed on children, young people, or their parents to consent to research in the expectation of therapeutic, financial or any other benefit.

Access to the medical records of young people is controlled by the same legal and governance framework as for adults. Key legislation includes the Data Protection Act, 1998; the Access to Medical Records Act, 1988; Access to Health Records Act, 1990; and Human Rights Act, 1998; as well as a common law duty of confidentiality. Caldicott principles applied to the NHS also dictate that, where information is required, only the minimum required for the specific purpose should be extracted, and that this should be on an anonymised basis whenever possible. Competent young people have the legal right to access their own health records and to prevent access by others, including their parents and potential researchers. They should therefore be asked to consent if access to their medical records is required for research purposes. Although the same principles should be applied equally across all types of research, there is a greater emphasis when such research is likely to reveal particularly sensitive information, such as with teenage pregnancy.

1.4.2 Using Clinical Data for Research Purposes

The primary aim of medical records is to inform the appropriate and continuing management of an individual patient (Shaw 2005). Secondary aims are to provide medico-legal justification of actions taken, act as an aide-memoir for a clinician in continuing care, and to enable clinical audit. Most clinical records are therefore not intended for the purpose of research. There is also evidence of significant inter-clinician variation in the content of both written and computerised clinical records (Yorkshire Breast Cancer Group 1977; de Lusignan *et al.* 2003).

In general practice clinical data is collected in both coded and free-text formats. The most common coded format, used almost universally within GP clinical systems, is

the Read code system. Although coding is intended to record aspects of care in an unambiguous manner and reduce the uncertainty that would arise from analysis of free text, coded data is not necessarily more reliable or valid than free-text data as it requires an element of subjective judgement on the part of the clinician (de Lusignan *et al.* 2003; de Lusignan and van Weel 2006). Clinical coding is variable in UK general practice and de Lusignan attributes this to the limitations of the coding systems and terminologies and the skill gap in their use; time and distraction involved in recording structured data in the consultation; and the level of motivation of primary care professionals (de Lusignan 2005).

Where clinical data are accurately and reliably recorded this potentially allows rapid extraction for research purposes and has resulted in analysis of large scale databases (Shaw 2005). However where the required data may not have been recorded in a systematic manner it is necessary to gather information from both free text and coded entries and then to classify this for the specific purposes of the research.

A classification "is a set of discrete exhaustive and mutually exclusive observations which can be assigned to one or more variables to be measured in the collation and/or presentation of data" (United Nations Statistics Division 2001). Classification normally involves the categorisation of relevant natural language for the purposes of systematic analysis within a single field of concepts. The essential characteristic of a classification is aggregation.

The United Nations have proposed technical qualities for classification systems and, although these were written for the purpose of large-scale classifications, most of

them apply equally to classification of clinical data for research purposes (United Nations Statistics Division 2001):

- Each classification should have a hierarchical and/or multi-axial structure such that it is possible to aggregate data from individual codes into larger categories.
- The classification is comparable to other related (national or international) standard classifications.
- Classification categories should be exhaustive and mutually exclusive.
- The categories are stable, i.e. they are not changed too frequently or without proper review, justification and documentation.
- An entity within a classification that is of particular importance should have its own category.
- Categories within a classification should facilitate the description of phenomena in a way that allows unambiguous understanding by others, including statistical users.
- Each code should have a unique definition.
- Terms should not be ambiguous and the relationship between terms should be consistent.

The process of extracting data and classifying it for research purposes is also dependent on subjective judgements. Yawn and Wollan therefore propose that inter-rater reliability checks are performed in all large medical records studies (Yawn and Wollan 2005).

1.4.3 Questionnaire Design

Questionnaires can be used to measure knowledge, attitudes, emotion, cognition, intention, and behaviour (Rattray and Jones 2007). This approach captures the self-reported observations of the individual and is commonly used to measure patient perceptions of many aspects of health care. When developing a questionnaire, items or questions are generated that require the respondent to respond to a series of questions or statements. Participant responses are then converted into numerical form and statistically analysed. The main benefits of such a method of data collection are that questionnaires are usually relatively quick to complete, relatively economical, and easy to analyse (Bowling 2001b; Bowling 2005a).

Questionnaires may be structured or semi-structured. Structured questionnaires involve the use of fixed or standardised questions that are presented to all respondents in the same way and with pre-coded response choices. Whilst this allows relatively easy collection of large amounts of data for analysis it assumes that the researcher and respondents share underlying assumptions about language and interpret statement wording in a similar manner. Closed questions also restrict the range and depth of participant responses, and so are most appropriate when there is prior knowledge about the range of responses expected (Bowling 2001b; Bowling 2005b).

According to Stone (Stone 1993) the questions in a survey should be appropriate, intelligible, unambiguous, omni-competent (capable of encompassing all possible responses), appropriately coded, piloted, and ethical. Of these, key issues for young people are appropriateness and intelligibility. Appropriate questions are ones that can

readily be answered by the respondents. It would be inappropriate, for example, to ask a young person for details of their parental income since they are unlikely to know this with any accuracy. Intelligibility is an important concept since it relates both to use of appropriate language and also to literacy skills. Readability tests can be applied to materials to ensure that they are appropriate for the age range undertaking the survey (Jensen *et al.* 2006). Piloting also allows testing of intelligibility. Finally, ethical considerations need to include the appropriateness of asking young people about sensitive issues, such as sexual abuse, without appropriate processes for acting upon such a disclosure.

The type of question, language used and order of items may all bias response (Rattray and Jones 2007). Consideration should be given to the order in which items are presented. For example it is best to avoid presenting controversial or emotive items at the beginning of the questionnaire and instead to begin with questions that are of interest to the respondent. Leading questions or those including double negative responses should be avoided (Bowling 2001b; Bowling 2005b). A mixture of both positively and negatively worded items reduces the risk of acquiescent response bias, which is the tendency for respondents to agree with a statement, or respond in the same way to items.

Scales are frequently used to assess attitudes because they allow respondents to record their views along a continuum. Likert-type scales are most commonly used in which respondents are asked to select one of a number of fixed choice categories that best represents their level of agreement or disagreement with a particular statement (Likert 1932). A Likert-type scale assumes that the strength and intensity of

experience is linear, and makes the assumption that attitudes can be measured (Rattray and Jones 2007). Five categories are commonly used although there are both advantages and disadvantages of a neutral mid-point category and different numbers of response categories.

Although questionnaire surveys are commonly used amongst people of all ages, Ann Bowling highlights the cognitive demands that they place on the respondent (Bowling 2005a):

- Comprehension of the question
- Recall of the requested information from memory
- Evaluation of the link between the retrieved information and the question
- Communication of the response

Questionnaires therefore need to be designed to place the least possible cognitive burden on the recipient.

1.4.4 Undertaking Surveys

Once a questionnaire has been designed it is important that the survey is conducted in a manner that will produce meaningful results. This involves appropriate selection of a sample from the population under consideration, and maximising response rates to the survey.

Any sample should be representative of the overall population being studied. If the population is limited (for example to a certain number of general practices) then it may be feasible to include all subjects. However where this is not possible a random sample should be selected from the overall sampling frame. It is usual to consider

whether any individuals should be excluded and to explicitly define the criteria for such exclusion before sampling. The appropriate size of the sample is considered later under statistical issues.

A survey response rate is the number of eligible respondents successfully included in the study, as a proportion of the total eligible study population (Bowling 2001b). Although a response rate of 75% and above is generally considered acceptable, this still means that 25% of the sample will not have responded. There is the potential for these subjects to be different in terms of their characteristics from those who responded, thus creating a source of bias. Where possible the known characteristics of responders and non-responders should be compared in order to estimate the extent of possible response bias.

A number of factors have been shown to improve postal survey response rates amongst adult populations (Edwards *et al.* 2001; McColl *et al.* 2001). However not all of these may be equally relevant to young people.

- Financial incentives
- Shorter questionnaires (although there is mixed evidence for this)
- Providing a second copy of the questionnaire with follow-up mailing to non-responders
- User-friendly questionnaires
- University sponsorship or signed by a well-known or senior person
- Pre-notification of the survey
- Non-monetary incentives
- Providing personalised questionnaires

- Use of coloured ink (other than black or blue)
- Use of stamped (as opposed to franked) first class mail

Poorer response occurs if the questionnaire contains sensitive questions, if it starts with general questions, and if people are given the opportunity to opt out (Bowling 2005a).

In addition to overall response, non-response to individual questions can also occur. Item non-response is more common for postal questionnaires than for interviews, and particularly for questions requiring a single answer from multiple responses (Bowling 2001a; Bowling 2001b).

1.4.5 Case-Control Studies

At its most basic, a case control study is a descriptive research method that involves comparing the characteristics of a group of interest with a comparison or control group without the characteristic of interest (Bowling and Rees Jones 2001). Case-control studies are usually performed retrospectively, so that after cases and unaffected controls have been identified the frequency of risk factors and past exposure to potential aetiological factors in each group can be compared (Altman 1991). They can also sometimes be performed prospectively (Bowling and Rees Jones 2001).

Schlesselmann has described the history of case control studies (Schlesselman 1982). Modern case-control studies date from the 1920s: in 1920 Broders published a case-control study looking for causes of squamous cell carcinoma of the lip by comparing characteristics of 537 cases with the condition with 500 controls without it. He

found that, whilst the proportion of smokers was similar in each group, there were nearly twice as many pipe smokers amongst the cases than controls suggesting that this was the contributory factor.

The main advantages of case-control studies are that they are relatively cheap to perform in comparison with experimental designs, they are useful for the study of relatively uncommon conditions or events (such as teenage pregnancy), and they can provide relatively quick results (Bowling and Rees Jones 2001). Disadvantages of the method include the need for relatively large numbers, a risk of potential selection bias among participants, and the danger of false interpretations being made as a result of confounding. Confounding occurs when there is an association with a third variable that provides an alternative explanation for an association between exposure and outcome. Bowling & Rees Jones cite the example of lorry drivers having higher death rates from lung cancer than the general population. Whilst this could be interpreted as showing that lorry driving exposes the worker to an occupational hazard, the more likely inference is that lorry drivers smoke more than the general population, thus increasing their risk.

The key steps in undertaking a case-control study are (Martin 2005):

- Defining objective criteria for the diagnosis of a case
- Selecting cases and controls
- Estimating the 'exposure' status

Cases must be clearly defined in order to avoid dilution of the case series with individuals who are not cases, thus reducing the chance of detecting a real difference

between cases and controls. Equally it is important to ensure that the control series is not contaminated with people who have the condition of interest.

When identifying a source of cases it is important that these are representative of the entire population and not likely to be selective. For example, using hospital maternity records to identify pregnant women would miss those who had home deliveries as well as those who may have had terminations or miscarriages in earlier pregnancy.

The control group is intended to provide an estimate of exposure prevalence in the population from which the cases have arisen (Schlesselman 1982). Inappropriate choice of a control population can result in selection bias and a biased estimate of risk (Martin 2005). Controls may be matched to cases with respect to certain characteristics, such as age, sex, ethnicity or social class. The purpose of matching is to ensure that distributions of potential confounding variables are similar in both groups resulting in increased statistical efficiency. However matching is not recommended except for known strong confounding factors, since overmatching can mask potential associations and there is no possibility of subsequently adjusting for the matched factor in the analysis.

In case-control studies the strength of an association is estimated using an odds ratio. This is because the study design does not usually allow calculation of absolute rates because the denominator population is unknown. Instead the odds of exposure to non-exposure are compared between cases and controls and this ratio approximates well to the rate or risk ratio (Martin 2005).

1.4.6 Specific Measures used in the Studies

a) Socio-economic Variation and Deprivation

There is an enormous body of evidence linking lower socio-economic status with poorer health outcomes in both younger children and adulthood (Reading *et al.* 1993; Marmot 2005). However Klerman asserts that it is difficult to establish a link between economic status and adolescent health due to limitations of existing data derived from youth surveys (Klerman 1993).

Various options can be used to assign socio-economic status to an individual (Marsh *et al.* 2000). Firstly, parental occupation can be used to assign a social class, ranging from unskilled to professional, with a separate category for those out of work. In order to do this, the young person would be required both to know and record the information with sufficient accuracy. Currie reported that, in the HBSC survey, more than 20% of young people were unable to provide a substantive occupation for their father (Currie *et al.* 1997). Many young people will not know the nature of their parents work in detail; and there is also a risk of bias, with children of unemployed parents or in unskilled occupations being less likely to record this, or possibly to overstate the amount of responsibility that they hold (Klerman 1993).

Because of the above difficulties, Currie proposed the use of a family affluence scale based on car ownership, telephone ownership, and the young person having their own unshared bedroom (Currie *et al.* 1997). The response to these questions was much greater, and there was correlation between this scale and socio-economic status determined from parental occupation where recorded. A further variable, that

of weekly spending money, was recorded slightly less frequently and did not correlate directly with the other variables. Little research has been carried out on the association between these proposed measures and health status to date.

An alternative approach is to use a young person's postcode of residence to identify their ward or enumeration district and then to use a deprivation index derived from national census data from this area. Commonly used deprivation indices include the Jarman Underprivileged Area Score, Townsend score and Carstairs Index. This approach does not require any information from the young person directly, but does assume homogeneity between individuals and households within the same ward (Carr-Hill and Rice 1995), and stability of census data over time (Majeed *et al.* 1995). In areas of new housing data may not be available at all.

The Jarman score (Jarman 1983) is calculated from eight weighted transformed census variables (unemployment, overcrowding, lone pensioners, single parents, birth in New Commonwealth, children aged under five, low social class, and one year migrants) but has been subject to significant criticism (Carr-Hill and Sheldon 1991). The Townsend score (Townsend *et al.* 1988) is derived from only four variables (unemployment, overcrowding, non-car ownership, and non-home ownership) and is more closely related to material deprivation (Benshlomo *et al.* 1992). The Carstairs index is also based on four variables (unemployment, overcrowding, non-car ownership, & low social class) (Carstairs and Morris 1989).

b) Health Status in Young People

In their classic text on 'Measuring Health: a guide to rating scales and questionnaires' McDowell and Newell describe health status measures as ones that combine physical, social and emotional aspects of health into one instrument (McDowell and Newell 1996). Furthermore they use the terms 'health status' and 'quality of life' measures interchangeably in view of the overlap between them and the lack of any agreed definition.

Many of the questionnaires described in the literature review of teenagers and general practice encompassed questions about health. However these had not generally been developed as fully validated and reliable tools. For the purposes of the current study I wanted to incorporate a tool that was already tried and tested rather than starting from scratch.

Jenney & Campbell (1997) have described some of the issues relating to quality of life measures for children (Jenney and Campbell 1997). Instruments divide 'health' into a number of domains (such as physical, emotional, and social) within which there can be a number of dimensions. For example, dimensions within the domain of physical health can include self-care, mobility and activity. The greater the sophistication of the instrument in terms of the number of dimensions explored, then the more questions it will have.

In 1999 Connolly & Johnson reviewed all of the currently available quality of life measures for children and young people (Connolly and Johnson 1999). These differed in relation to the domains covered, target ages, number of questions

included, respondent (child / young person, parent, or clinician), format of administration, validity and reliability. Validity is a difficult concept to assess in relation to quality of life measures in that there is no 'gold standard' for comparison.

From the 15 generic measures described by Connolly and Johnson, three were self-completion instruments that covered a combination of physical, emotional and social domains and were designed for use amongst adolescent populations:

- The Child Health & Illness Profile – Adolescent Edition (CHIP-AE) (Starfield *et al.* 1993; Starfield *et al.* 1995)
- The Child Health Questionnaire – Child Form (CHQ-CF) (Raat *et al.* 2007)
- The 16 dimensional health related measure (16D) (Apajasalo *et al.* 1996)
- The Dartmouth Cooperative Primary Care Information Project (COOP) Charts (Wasson *et al.* 1994)

The first three of these instruments are highly detailed and intended to be used as stand-alone measures. For example, the CHQ-CF contains 87 questions. In contrast, the COOP charts are intended to act as a screening instrument covering six domains in the adolescent version, and requiring only one response on a word-picture chart for each. The internal consistency (Cronbach alpha 0.60-0.94) is potentially poorer than the other measures but the test-retest reliability coefficient of 0.77 is similar. The word-picture format allows it to be used across a variety of cultures with limited need for translation or rewording.

c) Health Locus of Control

Attitudes towards health can be categorised according to whether a person believes that they have control over their own health, or whether they believe that health is more related to chance. Such attitudes may then potentially influence health related behaviour, risk taking, and help-seeking. This concept forms the basis of 'health locus of control' measures (Norman and Bennett 1996).

The origins of health locus of control can be traced back to Rotter's social learning theory. Initially this resulted in a uni-dimensional construct in which individuals were classed as either being 'internals' who believe that events are a consequence of their own actions, or 'externals' who believed that events are unrelated to their actions and therefore beyond their personal control. However subsequently it was recognised that it is possible to distinguish between external control exerted by powerful others and the influence of chance and fate (Norman and Bennett 1996).

In 1978 Wallston and colleagues developed the multidimensional locus of control (MHLC) scale which has been validated and widely used in research on health behaviour, particularly amongst adults (Wallston *et al.* 1978; Hartke and Kunce 1982; Marshall *et al.* 1990). It has also been adapted for use amongst young people (Morgan *et al.* 1995; Macgregor *et al.* 1997).

The original MHLC questionnaire consisted of six items for each scale measuring the strength of beliefs along a six-point Likert scale. However a shorter version was developed for large-scale epidemiological studies consisting of three items for each scale (Norman and Bennett 1996), whilst another group of researchers attempted to

simplify the administration by reducing the response to a two-point (agree-disagree) format (McCallum *et al.* 1988). Whilst each of the modifications resulted in lower levels of internal consistency, this was considered to be appropriate for the purpose of the research.

1.4.7 Concepts of Validity and Reliability

Two concepts are important when interpreting the quality of data derived for the purposes of any research: validity and reliability. I have summarised some of the issues from a variety of sources (Moser and Kalton 1993; Bowling 2001b; Bowling 2005a; Balding 2007).

Validity is the concept of whether the data collection tool collects the information that it is intended to collect. There are different categories of internal validity as listed below:

- Face validity refers to the investigators' perception of whether or not the tool appears to be relevant and appropriate.
- Content validity is similar but depends on an external evaluation of the tool in relation to whether it is comprehensive in coverage and balanced in approach. In my studies I used steering groups to undertake evaluation of the tools for this purpose.
- Criterion validity refers to the correlation of the measure with a 'gold standard' where this exists (this can be subdivided into concurrent and predictive validity).
- Construct validity is corroboration that the instrument is measuring the underlying concept that it purports to measure: convergent validity requires that

the scale should correlate with related variables, whilst divergent validity means that it should not correlate with dissimilar variables.

External validity refers to the extent to which the results can be generalised to a wider population, and is therefore dependent on sampling techniques.

Reliability refers to the reproducibility and consistency of the measure or instrument and the extent to which repeat testing will produce the same result.

- Test-retest reliability is a test of its stability over time (assume that the characteristic that it is measuring has remained constant).
- Inter-rater reliability is the extent to which multiple observers agree for similar or the same populations.
- Internal consistency is the extent to which the items or questions relating to a particular dimension measure this and no other.

1.4.8 Statistical Issues

In this section I have summarised some of the basic statistical concepts that I have employed throughout the research. This information has been drawn from a variety of sources (Altman 1991; Bowling 2001b; Bowling 2005a; Tilling *et al.* 2005).

a) Statistical Testing

Statistical testing is used to evaluate the likelihood that observed differences in the sample under study could have arisen by chance. The significance level or probability value is an estimate of such likelihood. A probability of 0.05 indicates that there is a 5% (or 1 in 20) probability that the difference is due to chance. By convention differences are said to be statistically significant if the calculated

probability is 0.05 or less. However this can lead to false assumptions as detailed below.

There are two main types of error that can occur when interpreting statistical results:

- A type I error occurs when a difference is accepted to exist when there is no such difference.
- A type II error occurs when it is accepted that there is no difference when a difference does, in fact, exist.

The larger the sample size then the less risk of errors occurring.

Statistical tests comparing two samples can be one or two-sided. One-sided tests make the assumption that a difference will occur only in one direction whereas two-tailed (sided) tests examine relationships in both directions.

Confidence intervals provide a range of values within which the population mean is likely to occur with a stated probability. They provide an indication of the precision of the sample mean.

The specific type of statistical test employed depends on the type and distribution of data.

b) Sample Size Calculation

Because most research studies are performed on a sample of the whole population the results obtained provide only an estimate of the results within the total population. The larger the sample, the closer the estimate will be to the true value.

Sample size calculations are performed to assess the numbers required to make valid estimates on the basis of statistical assumptions.

Sample sizes can be calculated on the basis of the following information:

- The confidence level required
- The sample error that is acceptable to the researcher (sampling error is the probability that any one sample is not completely representative of the population from which it is drawn)
- The prevalence of the factor of interest in the population

Sample size calculations are also important when comparing two samples to determine the extent of homogeneity between them, that is to test the null hypothesis that there is no difference between them and that they have been drawn from the same population.

c) Regression Models

In statistical analysis mathematical regression models can be used to control for the confounding effects of other variables. The type of model used depends on the nature of the outcome variable:

- Linear regression models are used when the outcome variable is numerical. The statistical outcome measure is a difference in means.
- Logistic regression models are used when the outcome variable is binary. The statistical outcome measure is an odds ratio.
- If matching is used, as in a matched case-control study then a modified version of logistic regression is required for binary outcome measures: conditional logistic regression.

- Poisson regression analysis was developed to look at outcomes in terms of time to a binary event. However it can also be applied to consultation rates. The statistical outcome variable is an incident rate ratio.

CHAPTER 2

METHODS

2.1 INTRODUCTION TO METHODOLOGY

The first two studies were closely linked in design in that they were both carried out on the same population with the aim of linking the two sets of data in the final part of the analysis. Study 3 was performed independently of the other two studies.

2.2 STUDY ONE METHODS

2.2.1 Overall Design

Study One was a 12-month retrospective analysis of medical records of teenagers aged 13 to 15 years old inclusive registered with five general practices in the East Midlands. The data extracted included overall GP consultation rates and main reasons for consultation.

2.2.2 Study Sample

(a) Practices

Five general practices within the East Midlands were selected opportunistically on the basis of willingness to participate in the study. The first was the practice in which I work, because this allowed me to readily pilot data collection techniques for use in other practices. A second suburban surgery was the practice of a GP colleague who was on the steering group for the project. The other three practices were selected to represent inner city and rural practice populations. Two of these were practices with which I had professional contact, from either an educational perspective or from my activities in the Royal College of General Practitioners. The final practice was selected randomly from five located in inner city Derby. This practice was initially contacted by letter and then by telephone after which the GPs

agreed to participate. In return for participation, practices were provided with a specific report on the results from the teenagers in their practice.

The *principal* criterion for selection was that none of the practices had current health promotion initiatives aimed specifically at young people. Selected practices were also required to be located a minimum of five miles apart and each had to have at least one major characteristic distinguishing it from the other practices. Two of the practices operated from more than one surgery site but were treated as single populations for the purpose of the study.

(b) Subjects

Each practice was asked to generate a list of all registered teenagers aged between 13 years, 0 days and 15 years, 364 days, on a specified index date, from their computerised database. The administration of the study was staggered such that the index date differed between practices over a period of approximately three months (between May and August 1997). The index date also acted as the date prior to which consultations were recorded.

The following subjects were excluded from the study:

- any who were known by practice staff to have moved away from the practice despite still being registered.
- any identified by practice staff as having significant learning difficulties that would prevent them from completing a questionnaire.
- boarding school pupils at the Royal School for the Deaf in Derby who were likely to be atypical in terms of health needs and care.

c) Sample Size

Although the sample size was to some extent dictated by practical issues, I estimated that, in order to reliably measure a 10% smoking rate in my sample with 95% confidence and 20% sampling error (80% power) then I would require a sample size of 864.

2.2.3 Ethical Approval

Local research ethics committee (LREC) approval for Studies One and Two were granted by the three committees covering the study practice areas:

- Nottingham University Hospital NHS Trust LREC;
- North Derbyshire Health LREC;
- Southern Derbyshire Health LREC.

Consent for access to identifiable case records by a researcher was requested within the questionnaire survey for those that completed it. Where informed consent was not given (15.6% of respondents), agreement was reached for one GP within each practice to extract the relevant data and to provide it to the researcher, identified only by a unique study ID number. This allowed it to be linked to survey data, once identifiable information had been removed.

2.2.4 Core Data

Core data, available on all eligible teenagers, included age, gender and postcode. The postcode was used to determine the Jarman Underprivileged Area Score (Jarman 1983), Townsend Score (Townsend *et al.* 1988) and Carstairs Index (Carstairs and Morris 1989) for the teenager's ward of residence in order to give an indirect

estimate of socio-economic class as discussed in Chapter 1 (section 1.4.6a). Initial analysis was based on 1991 census data since this was all that was available at the time. However I subsequently obtained Townsend Scores and Carstairs Indices based on 2001 census data and I therefore repeated the analyses using these updated variables.

In order to determine deprivation indices I downloaded source tables in Excel format from the Census Dissemination Website (www.cdu.mimas.ac.uk/index.htm). I then used postcodes to identify the ward of residence for which deprivation indices were provided.

In order to calculate the distance of the subjects' home from their surgery I used the Postcode Distances Batch Tool available on the Department for Children, Schools and Families (DCSF) website (www.dfes.gov.uk/cgi-bin/inyourarea/dist.pl). This allows uploading a spreadsheet of pairs of postcodes and with automatic calculation of the direct distance between each pair in miles.

2.2.5 Consultation Data

Practices differed in their recording of clinical data, and so both written and computer records were accessed. All case note abstraction was performed by either the project research assistant (see Appendix 1) or myself. I provided training for the research assistant and double-checked a series of 20 sets of records before she undertook data abstraction independently. In addition I dealt with any queries that she had during the process.

We recorded a summary of consultation details on a standard data abstraction sheet that was identifiable only by a unique study code (Appendix 4). For each consultation we recorded the date and place of contact, presenting symptom(s), diagnoses, and outcome for each problem. An assessment was also made of whether the consultation was for a new problem or a continuing or recurring problem and, in the latter case, whether the contact had been initiated by the patient or the doctor.

a) Consultation Rates

A consultation was defined as any recorded face-to-face contact between the teenager and a general practitioner during the 12 months preceding the index date. This included both surgery consultations and home visits, although the latter were infrequent. Recorded telephone contacts (usually with a parent) were noted but not used in the analysis as these were again infrequent. Clinical contacts with other members of the primary health care team (usually the practice nurse) were coded separately.

In addition to considering the total number of consultations I also grouped subjects according to consultation frequency:

- Non-attenders (no recorded consultations during the index year)
- One to three consultations during the index year
- Frequent attenders (four or more consultations during the index year)

b) Coding of Reasons for Consultation

For each recorded consultation, individual presenting problems and diagnoses were itemised separately. Because of differing recording practices between general

practitioners only broad classifications could be employed for coding purposes. Each presenting problem was categorised according to a diagnostic group if a diagnosis was recorded, or alternatively according to the nature of the presenting symptom, if no diagnosis was made. I devised a simple method of classification for the purpose of the study and revised this in an iterative manner as new problems were encountered.

The main groups of conditions into which problems were categorised are listed as follows: respiratory, dermatological, musculoskeletal, otorhinological, ophthalmic, urogenital, gastrointestinal, psychological, and miscellaneous. More details of the classification are provided in Appendix 3.

In order to adjust for multiple follow-up consultations for the same condition, analysis was performed on an 'ever' or 'never' basis for each clinical category. Teenagers were therefore classified into groups depending on whether they had consulted at all or not at all for the particular category over the 12-month period.

In order to promote consistency I performed all coding from the data abstraction sheets personally. I carried out a reliability check on this part of the process by blindly repeating the coding on 20 subjects six months after the initial data abstraction and found 100% consistency with my original coding.

2.3 STUDY TWO METHODS

2.3.1 Overall Design

Study Two was a cross-sectional postal questionnaire survey of teenagers aged 13 to 15 years old inclusive registered with five general practices in the East Midlands. The questionnaire was designed to explore a range of areas including perceived health needs, health status, help-seeking attitudes, health locus of control, use of health services, and attitudes to aspects of general practice based health services.

2.3.2 Study Sample

The study sample was identical to that used in Study One described in detail in section 2.2.2 above.

2.3.3 Ethical Approval

Local medical research ethics committee approval for the project was granted by the three committees covering the study practice areas together with Study One.

2.3.4 Questionnaire Design & Development

The questionnaire was designed to include the following features:

- An introduction on the front page explaining the purpose and importance of the questionnaire and offering an incentive for returning completed questionnaires.
- Initial questions asking about TV viewing in order to engage participation.
- Humorous graphical illustrations scattered throughout.
- Short simple explanatory sentences at the start of each section of questions.
- A variety of similar but different response formats in order to maintain attention.

- A limited range of response options for each item in order to limit cognitive demand.
- Space for free text comments at the end of the questionnaire.

The questionnaire covered the following 11 content areas, which are described in more detail in the next section:

- Demographic data
- Common chronic morbidity and regular medication usage
- Recent experience of general practice consultation
- Health concerns
- Help-seeking attitudes
- Use of other health services
- Attitudes to confidentiality
- Attitudes to general practice and satisfaction with medical care
- Health locus of control
- General health status
- Health related behaviours

In addition one question was included asking for consent to examine particpants' medical records for Study One.

The research steering group was shown each version of the questionnaire during development and members were asked to comment on its face validity and content validity. It was also shown to young people in the appropriate age range who were related to members of the steering group.

The final draft of the questionnaire was subjected to a readability test. Readability describes the ease with which a document can be read. Readability tests, which are mathematical formulas, were designed to assess the suitability of books for students at particular grade levels or ages. Several such tests are available on-line. One such test, the Flesch-Kinaid Grade Level Score, showed the questionnaire to be consistent with a reading age of an eleven year old. It was therefore considered suitable for the study.

The final draft of the questionnaire was piloted amongst a group of 25 mixed ability Year 9 school children, in a Comprehensive School in Derbyshire. After completing the questionnaire pupils were asked to complete a brief proforma asking them to rate various aspects on a Likert scale. They were also asked to identify any difficulties that they had encountered and to make suggestions for improvement. It was also possible to assess the time taken for the questionnaire to be completed.

From the piloting proforma all but one pupil reported that the questionnaire was either easy or very easy to complete, and all thought that the instructions for the questions were either easy or very easy to follow. Three pupils reported that they thought the questionnaire was boring, five thought it was very interesting and the majority thought that it was quite interesting. Illustrations were added to the questionnaire in order to promote interest, and other minor modifications were incorporated into the final version as a result of comments received.

A copy of the final questionnaire is attached as Appendix 6.

2.3.5 Key Outcome Variables

The following section identifies the main recorded outcome measures from the questionnaire with details of their derivation.

a) Demographic Data: Age and gender. Ethnicity options were derived from government census categories with the exception that 'white' was not sub-classified into British, Irish or other, and mixed race was not offered as a specified option, although space was provided for unspecified responses.

b) Chronic Morbidity: Self-report of any of the following conditions: asthma, eczema, diabetes, epilepsy, or acne.

c) Regular Medication Usage: Any medicine, tablets, or inhalers used at least daily.

d) Recent Experience of General Practice Consultation: Timing of the most recent consultation (past week, past month, past six months, past year, or more than one year). Details of who made the appointment, who accompanied the young person to surgery, and who accompanied the young person into the consultation.

e) Health Concerns: Frequency of worry (all the time, some of the time, or never) about the following specified problems: skin problems, breathing problems, headaches, bullying, sleep problems, weight problems, tiredness, painful joints, feeling depressed or stressed, death and dying.

f) Help-Seeking Attitudes: Selection of likely sources of help (from family member, GP, practice nurse, school nurse, friend, nobody, or other) for the following problems: cigarette smoking, depression / stress, relationships, illegal drugs, weight / diet, contraception / pregnancy, alcohol, skin problems.

g) Use of Other Health Services: Any visits in the past 12 months (never, once, or more than once) to health services other than general practice, selected from: hospital inpatients, hospital outpatients, accident and emergency department, family planning clinic, teenage clinic.

h) Attitudes to Confidentiality: Agreement or otherwise with statements about perceived importance of confidentiality and the extent to which it is maintained in general practice. This also included the perceived influence of attitudes to confidentiality and embarrassment on consulting behaviour.

i) Attitudes to General Practice and Satisfaction with Medical Care: Three level responses (agree, disagree, not sure) to relevant items from the Surgery Satisfaction Questionnaire (Baker 1991) (covering continuity, accessibility, availability, medical care, and premises) were supplemented by statements concerning reception staff attitudes, reception privacy, waiting times, consultation duration, and attitudes of the doctor

j) Health Locus of Control: Two level responses (agree or disagree) to statements relating to the shortened version of the multidimensional health locus of control scales (internal, chance, and powerful others) as discussed in Chapter 1

(section 1.4.6c). Respondents scored between zero and three depending for each scale depending on their responses to each of the three questions relating to each scale.

k) General Health Status: The adolescent version of the Dartmouth COOP charts incorporating picture-word charts for six dimensions (physical health, emotional well-being, school work, social support, family communication, and health habits) (see section 1.4.6b)

l) Health Related Behaviours: Self-reported cigarette smoking, alcohol intake, and illicit drug use were classified according to current activity, previous activity, and intention. The term 'illicit drug use' was intended to encompass all categories of non-prescribed recreational drugs. Questions were modified from those used in the Trent Health Young People's Survey (Roberts *et al.* 1995).

m) Rating of Aspects of Service Provision: Three level rating of perceived importance (very important, important, not important) of ten aspects of service provision identified as relevant from previous surveys (McPherson 1996): confidentiality, choice of gender of GP, continuity, friendly reception staff, interested GP, anonymous telephone advice, 'drop in' teenage clinics, teenage health checks, choice of doctor or nurse, same day appointments.

2.3.6 Survey Administration

The survey was carried out between May and August 1997. Prior to sending the questionnaire, a letter was sent to all parents and guardians of eligible teenagers asking for permission to contact their child. No response was required if consent was granted, and the questionnaire was sent after two weeks. Further information was sent if requested. A copy of the letter to parents is included as Appendix 5.

Teenagers were offered the incentive of a £4 gift voucher on returning completed questionnaires in the freepost envelope provided by the specified date. A reminder letter and second questionnaire was sent to teenagers in practices from which the overall response rate was less than 80% after three to four weeks.

2.4 DATA ENTRY AND ANALYSIS FOR STUDIES ONE & TWO

All teenagers were allocated a unique numerical identification code that was used to label both questionnaire and consultation data sets. I designed templates for data entry using an EpiInfo database and piloted the suitability of these templates before using them for the bulk of data entry. Data was numerically coded and double-entered onto the databases by the project research assistant. I undertook a comparison check of duplicate files and corrected data handling errors. I also performed quality control checks by ensuring that the frequency of responses for each item were within allowable limits.

I undertook most of the analysis using SPSS for Windows (SPSS Inc., 1989-1995, Release 6.1.3) except for Poisson regression analysis for which I used STATA 5.0 (Stata Corporation, Texas). Principal analyses consisted of cross-tabulation of key outcome measures against age, gender, practice, ethnicity, and consultation rate groups.

All statistical tests were two-sided and carried out at the 5% significance level. Ninety-five percent confidence intervals were calculated where appropriate. Chi-squared tests were used to compare categorical data or the Fisher exact test for small numbers. Normally distributed continuous variables were compared using Student's t test for comparison between two groups, or analysis of variance for comparison between multiple groups. Comparisons between other continuous variables, such as consultation rate, were made using the Mann-Whitney U test for two groups, and the Kruskal-Wallis H test for multiple groups.

Poisson regression analysis was used to calculate incidence rate ratios (IRR) comparing annual consultation rates of groups of teenagers giving different attitudinal responses, adjusting for gender and practice as potential confounding variables. An IRR greater than one demonstrates that a particular group had a higher annual consultation rate than the comparison group and vice versa. Logistic regression analysis was used to compare groups in relation to whether or not they had ever attended for specific conditions during the index year with results presented as odds ratios (OR).

2.5 STUDY THREE METHODS

2.5.1 Overall Design

This was a case-control study in which the characteristics of cases who conceived as teenagers were compared with those of controls matched by age and practice.

2.5.2 Study Population

a) Setting

All practices within the Trent General Practice Research Network were invited to participate. The study was carried out amongst the 14 general practices that agreed to take part.

b) Subjects

Identification of Cases

Cases were defined as any registered patient who conceived under the age of 20. Potential cases were identified by practice staff from computer records, maternity books, and personal knowledge. Where practices had a MIQUEST-compatible computer system, a dedicated search strategy was provided. MIQUEST is a computer programme that enables enquirers to execute queries and extract data from different types of general medical practice computer systems using a common query language.

Initial screening identified patients who may have conceived below the age of 20 years on the basis of the following outcomes:

- A termination of pregnancy performed whilst aged 20 years 3 months or less.
- A miscarriage of pregnancy when aged 20 years 6 months or less.

- A delivery of a baby when aged 20 years 9 months or less.

For each potential case the date of the last menstrual period (index LMP) prior to the index pregnancy was identified from medical records or estimated as three months prior to a termination or miscarriage, or nine months prior to delivery.

Cases were required to fulfill all of the following criteria:

- Index LMP between 1st January 1995 and 1st January 1998.
- Below the age of 20 at the date of the index LMP.
- Currently registered with the practice and also registered at the time of the index LMP.
- If any case had more than one eligible pregnancy during the study period then the earliest was selected as the index pregnancy.

Identification of Controls

Three controls were identified for each case. They were selected as the three currently registered female patients whose dates of birth were closest to the case but who had never had a teenage pregnancy. Each control must have also have been registered at the time of the index LMP for the matched case, and could only act as a control for one case. Twin siblings were excluded.

2.5.3 Ethical Approval And Considerations

The study was approved by the Trent Multi-Centre Research Ethics Committee, but only after extensive revision of the original protocol in relation to case identification and extraction of data from medical records. Their decision dictated that access to

medical records for this study was confined to staff who would normally have access to those records as part of routine clinical care. Practices therefore agreed to allocate a member of staff to assist the researcher in this respect. No unique identifying information was extracted or removed from practices: full date of birth was reduced to month and year of birth; postcoded variables were derived on-site, and individual postcodes removed from data sheets.

2.5.4 Key Variables

The following variables were extracted directly from medical records or derived as described below.

a) Case Details

- Date and outcome of index pregnancy.
- Number, dates, and outcomes of any previous pregnancies.

b) Demographic Variables

- Age at index LMP based on the first day of the month and year of birth.
- Townsend score derived from ward of residence based on postcode.
- Distance of residence from surgery calculated from postcodes of residence and surgery.
- Date of registration with practice.

c) Overall Consultation Variables

- Number of recorded face-to-face general practice consultations with any health professional in the 12 months prior to the index LMP.

- Number of recorded consultations with a general practitioner in the 12 months prior to the index LMP.
- Number of recorded consultations with a practice nurse in the 12 months prior to the index LMP.

d) Consultations for Contraception

- Number of consultations in which contraception was discussed in the 12 months prior to the index LMP.
- Number of consultations for oral contraception in the 12 months prior to the index LMP.
- Number of recorded pregnancy tests in the 12 months prior to the index LMP.

e) Consultations for Other Specific Reasons

- Number of consultations for gynaecological problems (excluding contraceptive) in the 12 months prior to the index LMP.
- Number of consultations for psychological problems in the 12 months prior to the index LMP.
- Number of consultations for diarrhoea and/or sickness in the 12 months prior to the index LMP.
- Number of consultations resulting in the prescription of an antibiotic in the 12 months prior to the index LMP.

f) Contraceptive Provision and Duration

- Date (and age) of first recorded contact for contraception.

- Provision of specific forms of contraception at any time prior to the index LMP: oral contraception, emergency contraception, injectable progestagens, intrauterine device, condoms, or other.
- Number of months of contraceptive provision in the 12 months prior to the index LMP.

2.5.5 Data Extraction & Coding

Because the data extraction was to be undertaken by different people in each practice it was important to produce a detailed protocol and instructions for them to follow in order to promote consistency. I prepared a data extraction sheet for cases and controls and piloted this on medical records from patients in my own practice. I then developed the detailed instructions, together with the project research assistant who undertook the training of practice staff. I was also available to deal with queries as they arose.

Demographic, consultation and contraceptive data were extracted from the medical records of cases and controls by a nominated member of each practice (usually the Practice Nurse) who was given initial training and continuing support by the project team. Information was recorded onto the data extraction proforma (Appendix 8) according to the standard protocol (Appendix 7). Consultation data were recorded for the same 12-month period prior to the index LMP for both the case and matched controls. I undertook categorisation and coding of clinical data from consultations prior to data entry.

2.5.6 Sample Size

The target sample size was initially calculated on the basis of a 2:1 ratio of controls to cases assuming 20% of cases were frequent attenders compared with 10% of controls. Such a difference would be detected at 5% significance level and 80% power with 158 cases and 316 controls. A 3:1 ratio of controls to cases was selected to increase the power or allow for any shortfall in the number of cases identified.

2.5.7 Data Entry And Statistical Analysis

I designed a template for data entry using an EpiInfo database and piloted it for suitability. Data was numerically coded and double-entered onto the database by the project research assistant. I undertook a comparison check of duplicate files and corrected data handling errors. I also performed quality control checks by ensuring that the frequency of responses for each item were within allowable limits.

Principal analyses and calculations of odds ratios were performed using STATA 5.0 (Stata Corporation, Texas) and descriptive analyses were carried out using SPSS for Windows 8.0 (SPSS Inc.).

Conditional logistic regression analysis was used to calculate odds ratios (with 95% confidence limits) and probabilities for matched case-control differences. Conditional logistic regression is used because of matched subjects.

Absolute differences in interval / continuous data were calculated between case values and the aggregate of matched control values using Student's t-test for normally distributed variables and Wilcoxon signed ranks test for other variables.

CHAPTER 3:

RESULTS

3.1 RESULTS: STUDY ONE

3.1.1 Study Population

a) Characteristics of the Study Practices

Study practices differed from each other with respect to setting, list size, population, number of GPs, proportion of female GPs, and proportion of younger GPs. Four were fundholding practices at the time of the study. All were located in different parts of the East Midlands, the closest practices being five miles apart. The target population (13 to 15 year olds) comprised between 2.1% and 4.2% of the total registered practice population. I have labelled the practices A to E in order to preserve their anonymity and presented the main characteristics of each in table 3.1.

b) Characteristics of the Study Population

The defined study population initially consisted of all teenagers aged 13 to 15 inclusive who were registered for general medical services at the index date for each practice. 36 teenagers were excluded on the basis of the criteria listed in Chapter 2 (section 2.2.2b).

After exclusions the study population numbered of 886, of whom 447 (50.5%) were male and 439 (49.5%) were female. I have summarised the breakdown of the final study population by age, sex and practice in table 3.2.

I derived deprivation indices for each teenager from postcode of residence using both 1991 and 2001 ward based census data. Postcodes had not been recorded for seven teenagers during data collection and a further six could not be mapped to a census ward, possibly because of incorrect recording at practice level or transcription

at the time of data extraction. The remaining 873 teenagers resided in 66 census wards, with the number of teenagers in each ward ranging from one to 126 with a median number of eight.

Deprivation data are discontinuous because they are derived from locality clusters (electoral wards) and so I have presented further analyses based on quintiles. The distribution of available Jarman, Carstairs and Townsend scores for teenagers in each practice is shown in table 3.3. This table also includes the distribution of deprivation indices based on national data for comparison.

There were significant differences in deprivation scores between practices, with the highest scores (greatest deprivation) being found for teenagers from the inner city practice, practice B (table 3.4)

I used postcodes of the teenagers' registered address to determine the distance of their home from their general practice. Data are based on the 873 teenagers for whom viable postcodes were available. The median distance was 0.9 miles and ranged from less than 0.1 miles to 12.1 miles. The distribution of distance from individual practices is shown in table 3.5. There were significant differences between practices with teenagers registered with practice A (suburban) living the shortest distance from the practice, and those registered with practice D (rural) residing the furthest away.

Overall there were no statistically significant differences in deprivation score or distance from practice by either age or gender.

Table 3.1: Characteristics of the Study Practices

	Practice					
Characteristics	**A**	**B**	**C**	**D**	**E**	**Overall**
Location	Suburban	Inner city	Semi-rural	Rural	Inner city	
List Size	8,607	3,238	5,437	3,708	6,505	27,495
% Population <5 years	6.7%	9.1%	7.7%	4.7%	5.1%	6.5%
% Population >75 years	6.3%	3.9%	3.7%	7.8%	7.5%	6.0%
% Teenagers 13-15	3.8%	2.7%	4.2%	2.9%	2.1%	3.2%
Full-time equivalent GPs	5.0	2.5	2.75	3.0	3.0	16.25
Patients per GP	1,721	1,295	1,977	1,236	2,168	1,692
% Female GPs	60%	100%	0%	33%	50%	49%
% GPs aged <40	40%	30%	33%	33%	75%	44%
Fundholding	Yes	No	Yes	Yes	Yes	
Other health clinics local to the practice providing services for teenagers	Family Planning Clinic	Family Planning Clinic Health Authority Teenage Clinic & Health Shop	Family Planning Clinic	Family Planning Clinic (infrequent & inaccessible)	Health Authority Teenage Clinic	

Table 3.2: Age and Gender Distribution of the Study Population

(number of teenagers in each group as a percentage of the total population)

Age	**13**				**14**				**15**				**Total**	
Sex	**M**		**F**		**M**		**F**		**M**		**F**			
Practice	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
A	66	**7.4**	60	**6.8**	50	**5.6**	50	**5.6**	52	**5.9**	52	**5.9**	**331**	**37.4**
B	12	**1.4**	12	**1.4**	13	**1.5**	18	**2.0**	12	**1.4**	19	**2.1**	**86**	**9.7**
C	49	**5.5**	27	**3.0**	41	**4.6**	40	**4.5**	33	**3.7**	38	**4.3**	**228**	**25.7**
D	16	**1.8**	15	**1.7**	20	**2.3**	21	**2.4**	15	**1.7**	19	**2.1**	**106**	**12.0**
E	20	**2.3**	28	**3.2**	27	**3.0**	15	**1.7**	20	**2.3**	25	**2.8**	**135**	**15.2**
Total	**163**	**18.4**	**142**	**16.0**	**151**	**17.0**	**144**	**16.3**	**133**	**15.0**	**153**	**17.3**	**886**	**100.0**

Table 3.3: Distribution of Deprivation Scores compared with National Data

	Score	Carstairs Index 1991	Jarman Index 1991	Townsend Score 1991	Carstairs Index 2001	Townsend Score 2001
Study Data (Based on individual postcodes)	Number of teenagers with valid postcodes	873	873	873	873	873
	Minimum value	-4.156	-29.035	-6.361	-4.014	-3.938
	Maximum value	11.741	54.871	10.174	10.129	11.295
	Mean	0.427	2.652	0.057	0.305	0.240
	Std Dev	3.237	17.482	3.446	2.502	2.922
	Median	-0.257	-1.883	-0.646	0.304	-0.048
Values for percentiles	20	-2.351	-13.118	-2.903	-2.097	-1.897
	40	-0.447	-3.121	-1.299	-0.361	-1.143
	60	0.809	2.239	0.391	0.859	0.872
	80	1.392	10.598	2.219	1.568	1.470
	Number of wards	9363	9363	9320	8844	8844
National Data (Based on electoral wards)	Minimum value	-5.415	-45.507	-8.768	-5.864	-4.952
	Maximum value	26.427	65.961	13.682	17.983	20.666
	Mean	0.000	-0.000	.0131	0.000	0.000
	Std Dev	3.426	17.333	3.486	3.380	3.440
	Median	-0.950	-1.943	-0.668	-0.877	-1.053

Table 3.4: Deprivation Scores by Practice

Deprivation Index	**Practice**	**A**	**B**	**C**	**D**	**E**	Krushkall Wallis Chi-square test
Carstairs 1991	Median	.437	7.540	-.256	-1.842	3.692	267.447 p<0.001
	Min	-4.155	.232	-3.987	-2.990	-3.677	
	Max	2.225	11.741	3.094	-.230	10.294	
Jarman 1991	Median	-5.597	36.483	-1.883	-11.682	6.215	293.185 p<0.001
	Min	-23.716	10.078	-25.899	-29.035	-24.889	
	Max	19.332	51.106	15.260	-1.512	54.871	
Townsend 1991	Median	-.317	6.822	-.646	-2.903	3.049	297.320 p<0.001
	Min	-6.361	.983	-5.147	-5.057	-5.902	
	Max	2.297	10.174	2.706	-.998	8.825	
Carstairs 2001	Median	.965	4.712	-.360	-2.379	3.299	392.645 p<0.001
	Min	3.220	-1.265	-4.014	-3.830	-2.740	
	Max	2.647	8.767	1.126	-.318	10.129	
Townsend 2001	Median	.871	7.369	-1.142	-1.897	2.948	389.316 p<0.001
	Min	3.684	-1.335	-3.938	-3.029	-3.379	
	Max	4.016	10.793	.889	-1.120	11.295	

Table 3.5: Distances from Registered Address to Practice

Distance from Surgery	Practice	A	B	C	D	E	Krushkall Wallis Chi-square test
Miles (n=873)	Median	0.5	0.7	1.3	2.5	1.1	175.356 p<0.001
	Min	<0.1	0.1	<0.1	<0.1	0.1	
	Max	2.5	2.4	7.4	8.5	12.1	

3.1.2 Consultation Rates

a) Overall Annual Consultation Rates

Consultation rate data were available for 836 teenagers from case-note abstraction. Records for the remaining 50 teenagers were either not available or were incomplete for the relevant 12 month period.

There were three different annual consultation rates depending on the criterion used:

- All practice consultations.
- Consultations with a GP.
- Consultations with a practice nurse.

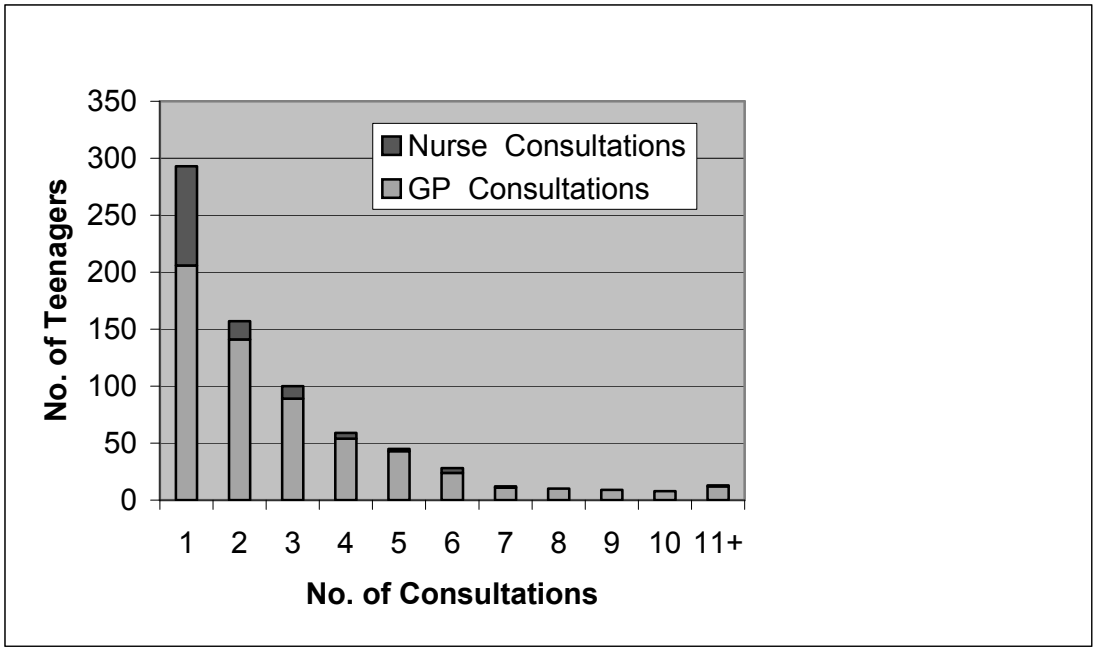
In addition, in an attempt to investigate actual patient (or parent) initiated help seeking behaviour I have presented the annual consultation frequency for newly presented problems (in contrast to repeat visits for an ongoing problem which might be practice or patient initiated).

The median overall practice consultation rate for the study population was two and ranged none to 29. Two hundred teenagers (23.9%) had no recorded practice consultations whilst 199 (23.8%) consulted on four or more occasions (designated as 'frequent attenders' for the purpose of this study). Nearly three-quarters (72.6%) of teenagers consulted a GP at least once with a median GP consultation rate of one and a range of none to 18. Only 15.2% of teenagers had a recorded practice nurse consultation with the maximum number of nurse contacts being 11. The median consultation rate for new problems was one with a maximum of 12. The distribution of consultation rates is shown in figure 3.1 and table 3.6.

Table 3.6: Annual Consultation Frequency

No.	All Contacts		GP Consultations		Nurse Consultations		Consultations for New Problems	
	No.	%	No.	%	No.	%	No.	%
0	200	**23.9**	229	**27.4**	709	**84.8**	243	**27.4**
1	203	**24.3**	206	**24.6**	87	**10.4**	247	**27.9**
2	144	**17.2**	141	**16.9**	16	**1.9**	165	**18.6**
3	90	**10.8**	89	**10.6**	11	**1.3**	94	**10.6**
4	66	**7.9**	54	**6.5**	5	**0.6**	44	**5.0**
5	45	**5.4**	43	**5.1**	2	**0.2**	17	**1.9**
6	22	**2.6**	24	**2.9**	4	**0.5**	8	**0.9**
7	16	**1.9**	11	**1.3**	1	**0.1**	3	**0.3**
8	13	**1.6**	10	**1.2**	0	**0.0**	8	**0.9**
9	10	**1.2**	9	**1.1**	0	**0.0**	3	**0.3**
10	10	**1.2**	8	**1.0**	0	**0.0**	0	**0.0**
11+	17	**2.0**	12	**1.4**	1	**0.1**	4	**0.4**
Total	**836**	**100**	**836**	**100**	**836**	**100**	**836**	**100**

Figure 3.1: Annual Consultation Frequency (n=836)



b) Consultation Rates by Age and Gender

In the following sections I have presented the analysis of annual consultation rate by the following variables derived from practice registration data: age; gender; practice; deprivation score; and distance between home address and the practice.

There were statistically significant associations between age and gender for all types of consultation (i.e. total practice contacts, GP consultations, and consultations for new problems). The results are shown in table 3.7. Between the ages of 13 and 15 the annual consultation rate increased for girls but not for boys such that a statistically significant gender difference emerged by the age of 15.

This is also reflected in the trends in the number of teenagers who had no recorded consultations (table 3.8) and those who consulted on four or more occasions (table 3.9). There were statistically significant linear trends by age in both the number of girls who had never consulted and in the number of girls who consulted frequently. However there were no such trends for boys.

c) Consultation Rates by Practice

Annual consultation rates by practice are presented in table 3.9. There was a statistically significant difference between practices in terms of the total number of surgery consultations and in consultations with a GP. Practice A had the highest rate and Practice E the lowest. There was a similar trend in relation to consultations for new problems although this did not attain statistical significance.

Practice E also had the highest proportion of teenagers who did not consult over the 12-month period and the lowest proportion of teenagers who consulted frequently, although these differences were not statistically significant.

d) Consultation Rates by Deprivation

I performed several analyses to determine whether or not an association existed between overall consultation rates and deprivation. Table 3.11 shows the distribution of consultation rates by quintile for each of the deprivation indices employed. Although some of the inter-quintile differences attained marginal statistical significance (Carstairs 1991 and Townsend 1991) the relationship is complex, with consultation rates being highest amongst the 3rd and 4th quintiles.

I performed separate analyses to determine whether or not there was an association between deprivation and either non-consulting or frequent consulting. The results of these analyses are shown in table 3.12 and 3.13 respectively. There were no statistically significant associations.

Finally, I repeated all analyses separately by gender in case different patterns of consultation by deprivation were concealed within the overall data. Figure 3.2 shows the distribution for Townsend 1991 data (selected as an example). However the patterns of consultation were similar amongst boys and girls for all deprivation indices, with no statistically significant differences, and so I have not presented these in more detail.

e) Consultation Rates by Distance from Surgery

For analytical purposes I grouped the study population into three groups based on the distance of their registered address from the surgery: less than one mile; one to two miles; and more than two miles. I then performed analyses to determine whether or not an association existed between overall consultation rates and distance. The results are shown in table 3.14. There were no statistically significant differences or apparent trends with any of the overall consultation rates, neither were there any associations with non-attendance or frequent attendance.

I repeated all analyses separately by gender in case different patterns of consultation by distance were concealed within the overall data. Figure 3.3 shows mean consultation rates by distance for both males and females. Amongst boys there is a trend, with consultation rates diminishing in relation to distance from surgery. However this was not statistically significant (Kruskall Wallis χ^2= 3.918; p=0.141). There was no such trend for girls.

A similar pattern emerged in relation to consulting on any occasion: 74.6% of boys who lived within one mile of the surgery consulted at least once compared with 71.8% who lived one or more miles away. Again, this difference did not attain statistical significance (χ^2= 0.405, df=1, p=0.525). In relation to frequent attenders, 22.0% of boys who lived within one mile consulted on four or more occasions compared with 13.8% who lived one or more miles away (χ^2= 4.610, df=1, p=0.032). There were no similar trends or differences amongst girls, and neither was there any interaction between age and distance to surgery in relation to overall consultation rates.

Table 3.7: Comparison of Annual Consultation Rates by Age & Gender

Age	**13** (n=295)		**14** (n=287)		**15** (n=254)		**All Ages** (n=836)		**p-value for age difference***
Consultation Rate	Mean	Median	Mean	Median	Mean	Median	Mean	Median	
ALL SURGERY CONSULTATIONS									
Male (n=428)	2.00	1.50	2.16	1.00	1.88	1.00	2.02	1.00	0.505
Female (n=408)	2.23	1.50	2.55	2.00	3.83	2.00	2.86	2.00	**<0.001**
Both (n=836)	2.11	1.50	2.35	1.00	2.91	2.00	2.43	2.00	**0.032**
p-value for gender difference **		0.987		0.177		**<0.001**		**<0.001**	
CONSULTATIONS WITH A GP									
Male (n=428)	1.82	1.0	1.83	1.0	1.69	1.0	1.79	1.0	0.566
Female (n=408)	2.07	1.0	2.41	1.0	3.23	2.0	2.56	2.0	**0.003**
Both (n=836)	1.94	1.0	2.11	1.0	2.50	2.0	2.17	1.0	0.154
p-value for gender difference **		0.668		0.071		**<0.001**		**<0.001**	
CONSULTATIONS FOR NEW PROBLEMS									
Male (n=428)	1.47	1.00	1.39	1.00	1.29	1.00	1.39	1.00	0.387
Female (n=408)	1.53	1.00	1.72	1.00	2.13	2.00	1.79	1.00	**0.020**
Both (n=836)	1.50	1.00	1.00	1.00	1.73	1.00	1.58	1.00	0.409
p-value for gender difference **		0.867		0.116		**<0.001**		**0.001**	

*Kruskal-Wallis test **Mann-Whitney U test

Table 3.8: Teenagers with No Recorded Consultations in Previous 12 Months by Age and Gender

	Age								p-value for age difference (χ^2-test)	p-value for age trend (χ^2-test)
	13 (n=295)		14 (n=287)		15 (n=254)		All Ages (n=836)			
	No.	%	No.	%	No.	%	No.	%		
Male (n=428)	42	26.6	33	22.1	39	32.2	114	26.6	0.176	0.351
Female (n=408)	43	31.2	28	20.4	15	11.3	86	21.1	**<0.001**	**<0.001**
Both (n=836)	85	28.7	61	21.3	54	21.3	200	23.9	0.055	**0.036**
p-value for gender difference (χ^2-test)	0.385		0.724		**<0.001**		0.060			

Table 3.9: Teenagers Consulting Frequently (4+) in the Previous 12 Months by Age and Gender

	Age								p-value for age difference (χ^2-test)	p-value for age trend (χ^2-test)
	13 (n=295)		**14** (n=287)		**15** (n=254)		**All Ages** (n=836)			
	No.	**%**	No.	**%**	No.	**%**	No.	**%**		
Male (n=428)	27	17.1	32	21.5	20	16.5	79	18.5	0.497	0.979
Female (n=408)	30	21.7	36	26.3	54	40.6	120	29.4	**0.002**	**0.001**
Both (n=836)	57	19.3	68	23.8	74	29.1	199	23.8	**0.025**	**0.007**
p-value for gender difference (χ^2-test)	0.311		0.341		**<0.001**		**<0.001**			

Table 3.9: Annual Consultation Rates by Practice

Practice	Annual Consultation Rate			
ALL SURGERY CONSULTATIONS	**Mean**	**Median**	**Min.**	**Max.**
A (n=298)	2.67	2.0	0	21
B (n = 86)	2.76	2.0	0	29
C (n=221)	2.30	2.0	0	15
D (n=103)	2.43	2.0	0	13
E (n=128)	1.90	1.0	0	10
Overall (n = 836)	2.43	2.0	0	29
p-value for difference (df=4)	**0.038** (Kruskal-Wallis test: χ^2=10.1)			
CONSULTATIONS WITH A GP				
A (n=298)	2.48	2.0	0	17
B (n = 86)	2.37	1.0	0	18
C (n=221)	2.00	1.0	0	13
D (n=103)	2.12	2.0	0	10
E (n=128)	1.63	1.0	0	9
Overall (n = 836)	2.17	1.0	0	18
p-value for difference (df=4)	**0.034** (Kruskal-Wallis test: χ^2=10.2)			
CONSULTATIONS FOR NEW PROBLEMS				
A (n=298)	1.71	1.00	0	11
B (n = 86)	1.81	1.00	0	12
C (n=221)	1.49	1.00	0	9
D (n=103)	1.64	1.00	0	6
E (n=128)	1.26	1.00	0	8
Overall (n = 836)	1.58	1.00	0	12
p-value for difference (df=4)	p=0.077 (Kruskal-Wallis test: χ^2=8.421)			

Table 3.10: Non-Attenders and Frequent Attenders by Practice

Practice	No. (%) with no recorded consultations		No. (%) consulting 4 or more times	
	No.	**%**	**No.**	**%**
A (n=298)	64	**21.7**	79	**26.8**
B (n = 86)	21	**24.4**	20	**23.3**
C (n=221)	51	**23.1**	51	**23.1**
D (n=103)	21	**20.0**	27	**25.7**
E (n=128)	43	**33.3**	22	**17.1**
Overall (n = 836)	200	**23.9**	199	**23.8**
p-value for difference (df=4)		0.089 (χ^2=8.06)		0.290 (χ^2=4.97)

Table 3.11: Distribution of Consultation Rates by Deprivation Indices (All Surgery Consultations)

		Deprivation Quintile					
		1	**2**	**3**	**4**	**5**	**p-value**
Deprivation Index	**Consultation Rate**	**Most Affluent**				**Least Affluent**	**Kruskall-Wallis test**
Carstairs 1991	Mean	2.21	2.12	2.63	3.12	2.07	
	Median	2.0	1.0	2.0	2.0	1.0	**0.033**
Jarman 1991	Mean	2.36	2.25	2.26	3.26	2.08	
	Median	2.0	1.0	2.0	2.0	1.0	0.123
Townsend 1991	Mean	2.38	2.08	2.44	3.23	1.98	
	Median	2.0	1.0	2.0	2.0	1.0	**0.006**
Carstairs 2001	Mean	2.26	2.48	2.64	2.23	1.86	
	Median	2.0	1.5	2.0	1.0	1.0	0.144
Townsend 2001	Mean	2.13	2.36	2.70	2.60	2.09	
	Median	2.0	2.0	2.0	2.0	1.0	0.268

Table 3.12: Distribution of Teenagers with No Recorded Consultations by Deprivation

		Deprivation Quintile						
		1	**2**	**3**	**4**	**5**	**All**	**p-value**
Deprivation Index		**Most Affluent**				**Least Affluent**		**Chi-square test**
Carstairs 1991	No.	26	51	40	36	43	196	0.067
	%	**17.0%**	**30.4%**	**23.4%**	**21.7%**	**26.1%**	**23.8%**	
Jarman 1991	No.	31	43	40	38	44	196	0.231
	%	**18.7%**	**27.9%**	**21.5%**	**24.2%**	**27.5%**	**23.8%**	
Townsend 1991	No.	32	42	40	38	44	196	0.285
	%	**18.6%**	**24.9%**	**25.0%**	**22.5%**	**28.8%**	**23.8%**	
Carstairs 2001	No.	23	37	86	26	24	196	**0.046**
	%	**17.0%**	**29.4%**	**21.9%**	**28.3%**	**31.2%**	**23.8%**	
Townsend 2001	No.	22	22	41	64	47	196	0.152
	%	**19.0%**	**25.0%**	**19.5%**	**25.9%**	**29.0%**	**23.8%**	

Table 3.13: Distribution of Teenagers who Consulted Frequently (4+ times) by Deprivation

		Deprivation Quintile						
		1	**2**	**3**	**4**	**5**	**All**	**p-value**
Deprivation Index		**Most Affluent**				**Least Affluent**		**Chi-square test**
Carstairs 1991	No.	33	37	43	52	30	195	0.062
	%	**21.6%**	**22.0%**	**25.1%**	**31.3%**	**18.2%**	**23.7%**	
Jarman 1991	No.	38	38	42	47	30	195	0.776
	%	**22.9%**	**24.7%**	**22.6%**	**29.9%**	**18.8%**	**23.7%**	
Townsend 1991	No.	43	34	42	50	26	195	0.062
	%	**25.0%**	**20.1%**	**26.3%**	**29.6%**	**17.0%**	**23.7%**	
Carstairs 2001	No.	27	35	102	19	12	195	0.161
	%	**20.0%**	**27.8%**	**26.0%**	**20.7%**	**15.6%**	**23.7%**	
Townsend 2001	No.	21	26	57	60	31	195	0.138
	%	**18.1%**	**29.5%**	**27.1%**	**24.3%**	**19.1%**	**23.7%**	

Figure 3.2: Annual Consultation Rates by Deprivation (Townsend Score 1991) and Gender

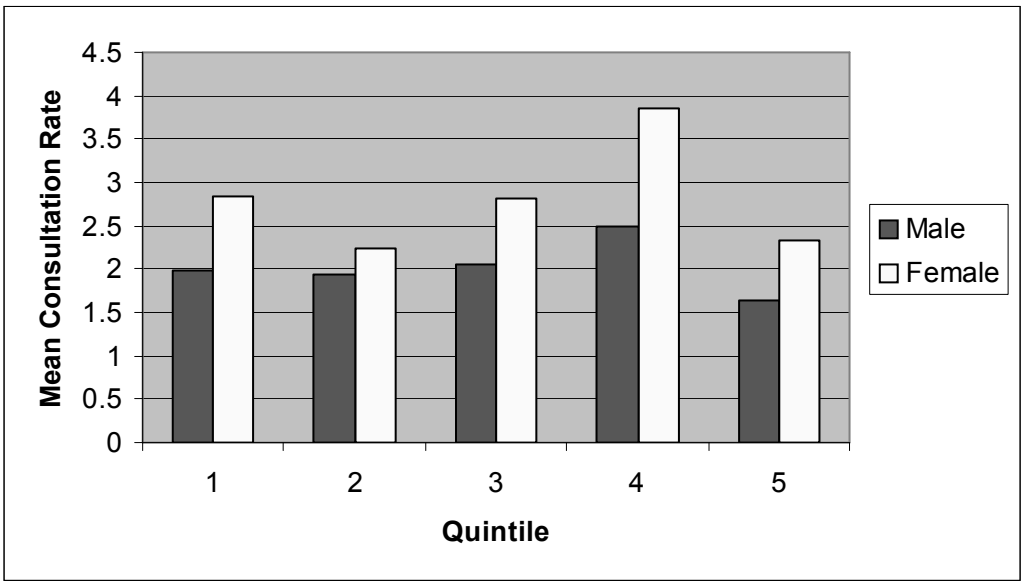
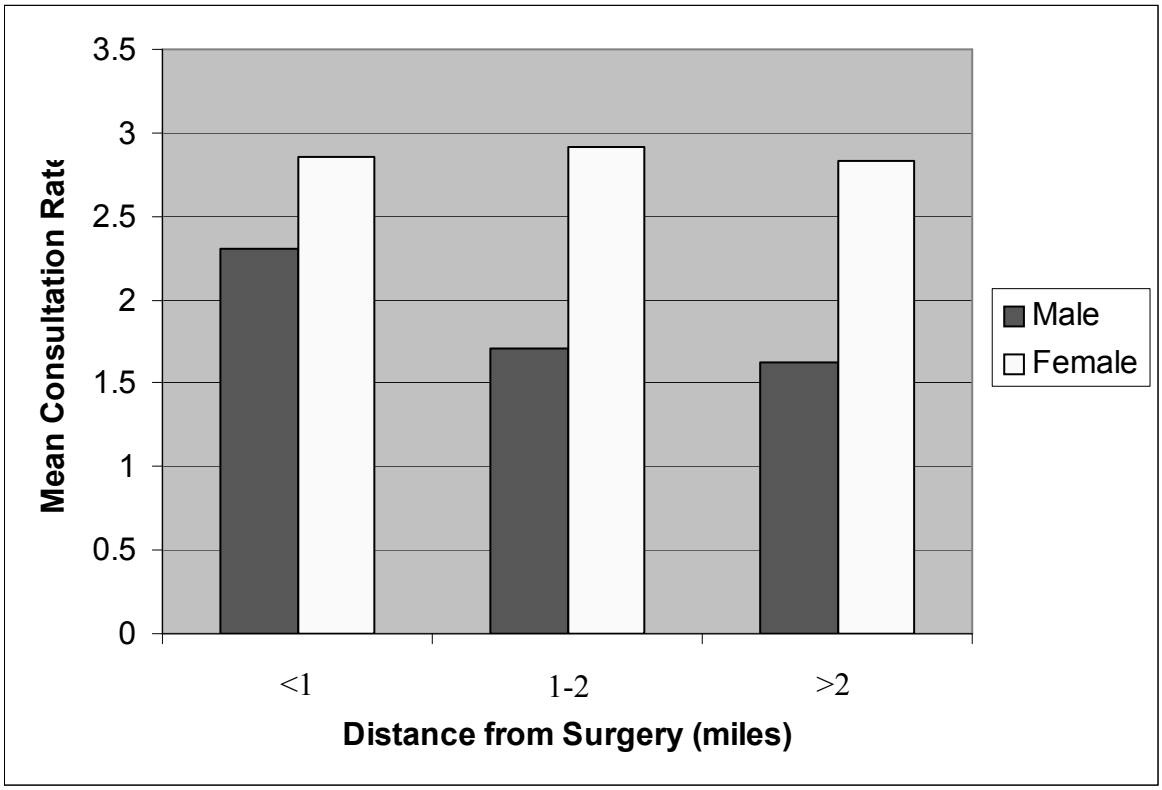


Table 3.14: Distribution of Consultation Rates by Distance from Surgery

Consultation Rate (n=823)		Distance from Surgery			p-value
		Less than one mile	One to two miles	More than two miles	Kruskall-Wallis test
	No.	476	206	141	
All Surgery Consultations	Mean	2.59	2.20	2.25	0.181
	Median	2.0	1.0	2.0	
Consultations with a GP	Mean	2.29	1.95	2.03	0.281
	Median	1.0	1.0	1.0	
Consultations for New Problems	Mean	1.64	1.48	1.53	0.249
	Median	1.0	1.0	1.0	

Figure 3.3: Annual Consultation Rate by Distance from Surgery and Gender



e) Summary of Results: Overall Consultation Rates

There was an association between overall consultation rates and age and gender, with an interaction between the two. Consultation rates increased significantly amongst girls but not boys between the ages of 13 and 15 such that there was a statistically significant gender difference at 15.

Overall consultation rates differed between practices - this was statistically significant in relation to all surgery consultations and consultations with a GP but not for consultations for new problems.

There was no association between overall consultation rate and any of the deprivation indices studied. There was a possible weak inverse relationship between overall consultation rate and distance from surgery amongst boys but not girls.

3.1.3 Purpose Of Consultation

In this section I will describe the consultation patterns of the study population in terms of their reason for consulting. The proportion of teenagers who consulted at least once for each of the main problem categories is shown in table 3.15. The majority of consultations were for respiratory (36.1%) and dermatological problems (29.1%), with psychological problems being least frequent (4.5%).

a) Purpose of Consultation by Gender

Table 3.15 also presents differences in consultation reasons by gender. Girls were more likely to have consulted for all categories of problem except for ophthalmic and musculoskeletal problems, with differences being most marked (and statistically significant) for consultations for dermatological and urogenital problems.

Girls were more likely to consult for nearly all sub-categories of dermatological conditions than boys, but differences were most pronounced with respect to consultations for acne vulgaris: 10.3% of girls consulted for acne compared with 5.9% of boys (difference=4.4%; 95% CI: 0.7, 8.1). With respect to otorhinological conditions, girls consulted more frequently for hayfever and otalgia, but differences were not statistically significant.

Gender differences in consultation for urogenital problems were due to gynaecological problems and requests for contraception. A similar proportion of boys and girls (2.1%) consulted with urinary tract infections.

Psychological conditions represented the least frequent single category of consultation, with only 4.6% of teenagers consulting for such problems. This group was subdivided into emotional and behavioural problems: 18 girls (4.4%) consulted with emotional problems compared with seven boys (1.6%) (difference=2.8%; 95% CI: 0.4, 5.1). A similar proportion of boys and girls consulted with behavioural problems (1.2%).

Amongst miscellaneous conditions, girls were significantly more likely to consult with fatigue than boys: 17 girls (4.2%) consulted with this problem compared with one boy (0.2%) (difference = 3.9%; 95% CI: 1.9, 5.9). However boys were more likely to consult with breast problems: 13 boys (3.0%) consulted compared with three girls (0.7%) (difference=2.3%; 95% CI: 0.5, 4.1). There were no significant gender differences for other sub-categories.

b) Purpose of Consultation by Age

The only major problem category for which there was a statistically significant age trend was that of urogenital problems. This was accounted for by differences in consultation for menstrual problems and contraception amongst girls. There were no significant differences in relation to urinary tract infections or miscellaneous genitourinary problems.

In relation to menstrual problems, 4 (1.4%) 13 year olds consulted at age 13 compared with 16 (5.6%) at 14, and 16 (6.3%) at 15 (χ^2 for difference=9.73, df=2, p=0.008; χ^2 for trend=8.28, df=1, p=0.004). Two (0.7%)13 year olds consulted for

contraception compared with 8 (2.8%) at 14, and 13 (5.1%) at 15 (χ^2 for difference=10.1, df=2, p=0.006; χ^2 for trend=10.1, df=1, p=0.004).

There was a non-statistically significant trend in increasing consultations for dermatological problems with age, with 26.7% consulting at age 13 compared with 34.6% at age 15. This was entirely due to the increase in consultation for acne vulgaris: 13 (4.4%) teenagers consulted with acne at age 13 compared with 18 (6.3%) at 14, and 36 (14.1%) at 15 (χ^2 for difference=19.1, df=2, p<0.001; χ^2 for trend=16.9, df=1, p<0.001).

c) Purpose of Consultation by Practice

Table 3.16 shows the proportion of teenagers consulting for specific categories of condition in relation to practice. There were significant differences between practices in terms of the proportion consulting for musculoskeletal, otorhinological, and urogenital conditions. Practice E had the lowest consultation rates for the former two categories. The high rate of consultation for urogenital conditions in practice B is partly accounted for by the proportion consulting for contraception (8.2%) compared with the overall rate of 2.8%.

Although the proportion of teenagers consulting for all respiratory conditions was similar for each practice, there was a significant difference in those specifically consulting with asthma: 16.5% of teenagers from practice B consulted with asthma compared with 13.9% from practice A, 13.3% from practice D, 8.5% from practice E, and 5.4% from practice C (χ^2=13.6, df=4, p=0.009).

Table 3.15: Recorded Reasons for Consultation: teenagers consulting at least once for specific reasons

Consultation Category	All Teenagers		Males n=428		Females n=408		Gender Difference (%)	95% Confidence Interval	Chi-square for Difference	p-value
	No.	%	No.	%	No.	%				
Respiratory	302	**36.1**	144	**33.6**	158	**388**	5.2%	-1.42, 11.6	2.337	0.126
Dermatological	243	**29.1**	107	**25.0**	136	**33.3**	8.3%	2.2, 14.4	7.035	**0.008**
Musculoskeletal	190	**22.7**	104	**24.3**	86	**21.1**	3.2%	-2.5, 8.8	1.234	0.276
Otorhinological	147	**17.6**	63	**14.7**	84	**20.6**	5.9%	0.7, 11.0	4.964	**0.026**
Ophthalmic	35	**4.2**	22	**5.1**	13	**3.2**	1.9%	-0.7, 4.8	1.988	0.159
Urogenital	84	**10.0**	13	**3.0**	71	**17.4**	14.4%	10.4, 18.6	47.69	**<0.001**
Gastrointestinal	70	**8.4**	30	**7.0**	40	**9.8**	2.8%	-1.0, 6.5	2.126	0.145
Psychological	38	**4.5**	12	**2.8**	26	**6.4**	3.6%	0.7, 6.4	6.132	**0.013**
Miscellaneous	118	**14.1**	50	**11.7**	68	**16.7**	5.0%	-0.02, 9.7	4.281	0.039

Table 3.16: Reasons for Consultation by Practice

Consultation Category	Practice (Number of teenagers)												Chi-square for difference	p-value
	A (294)		B (86)		C (221)		D (105)		E (129)		All (835)			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Respiratory	110	**37.3**	30	**34.9**	78	**35.3**	44	**41.9**	40	**31.0**	302	**36.1**	3.281	0.512
Dermatological	95	**32.2**	30	**34.9**	62	**28.1**	26	**24.8**	30	**23.3**	243	**29.1**	5.985	0.200
Musculoskeletal	76	**25.8**	22	**25.6**	50	**22.6**	26	**24.8**	16	**12.4**	190	**22.7**	10.02	**0.040**
Otorhinological	65	**22.0**	17	**19.8**	29	**13.1**	23	**21.9**	13	**10.1**	147	**17.6**	13.72	**0.008**
Ophthalmic	14	**4.7**	5	**5.8**	9	**4.1**	5	**4.8**	2	**1.6**	35	**4.2**	3.126	0.537
Urogenital	31	**10.5**	16	**18.6**	20	**9.0**	5	**4.8**	12	**9.3**	84	**10.0**	10.61	**0.031**
Gastrointestinal	27	**9.2**	9	**10.5**	23	**10.4**	5	**4.8**	6	**4.7**	70	**8.4**	6.030	0.197
Psychological	16	**5.4**	6	**7.0**	6	**2.7**	6	**5.7**	4	**3.1**	38	**4.5**	4.354	0.360
Miscellaneous	45	**15.3**	13	**15.1**	24	**10.9**	20	**19.0**	16	**12.4**	118	**14.1**	4.738	0.315

d) Summary of Results: Purpose of Consultation

The main problems with which teenagers consulted were respiratory and dermatological, with psychological problems being the least frequent major category. Girls were more likely to consult than boys for dermatological (especially acne) and urogenital (specifically menstrual problems and contraception) problems, and consultations for these categories of problem also increased with age. Variations in consultation patterns by practice were explained, in part, by differences in consultation for asthma and for contraception.

3.2 RESULTS: STUDY TWO

3.2.1 Response Rate

A total of 713 completed questionnaires were received from the 886 that I sent out: an overall response rate of 80.5%. Of the remainder, seven were returned because the patient was no longer at the registered address. Three parents declined permission for their child to participate: one because he was 'too busy', one because she was overweight and they felt that the questionnaire might cause distress; and one because the teenager herself did not want to take part. Six parents requested, and were sent, further information.

I have presented the response rate by age and gender in table 3.17. There was an increasing response with age although this was not statistically significant. There was a significantly higher response rate from girls overall compared with boys.

Response rates differed significantly between practices (table 3.18) with the highest rates from practices C and D, and the lowest from practices B and E (χ^2=17.6; df=4; p=0.001).

151 (21.3%) teenagers reported having received some help in completing the questionnaire. The most commonly reported source of help was from parents (129 teenagers), with five being helped by friends and 14 by other family members. The age of the teenager was the main factor associated with reported assistance, with 27.9% of those aged 13 receiving help, compared with 23.0% at 14, and 12.8% at 15 (χ^2=16.9; df=2; p<0.001). There were no significant differences in relation to gender or practice.

Table 3.17: Questionnaire Response Rate by Age & Gender

Gender	Age Group								χ^2	p-value
	13		14		15		All Ages			
	No.	%	No.	%	No.	%	No.	%		
Male	123	**75.5**	113	**74.8**	104	**78.2**	340	**76.1**	0.490	0.783
Female	117	**82.4**	123	**85.4**	133	**86.9**	373	**85.0**	1.219	0.544
Both	240	**78.7**	236	**80.0**	237	**82.9**	713	**80.5**	1.703	0.427
χ^2	2.176		5.159		3.822		11.17			
p-value	0.140		**0.023**		0.051		**0.001**			

Table 3.18: Questionnaire Response Rate by Practice

Practice	Questionnaires Sent	Questionnaires Received	Response Rate (%)
A	331	272	**82.2**
B	86	62	**72.1**
C	228	194	**85.1**
D	106	90	**84.9**
E	135	95	**70.4**
Total	**886**	**713**	**80.5**

3.2.2 Demographic Characteristics of Survey Respondents

a) Age and Gender Distribution

340 survey respondents were boys and 373 were girls. Respondents were approximately equally distributed by age (240, 236 and 237 at ages 13, 14 and 15 respectively).

b) Ethnicity

Overall 656 (92.0%) teenagers in the study reported that they were white and 58 (8.0%) that they were from other ethnic origins: 11 were black Caribbean, 11 were Indian, 10 were mixed race, 9 were black – other, 6 were Pakistani, 3 were Bangladeshi, and 3 were Chinese. No information was available from four respondents.

There were no differences in ethnicity in relation to age or gender. However the proportion of white caucasian teenagers differed significantly between practices as follows: practice A: 95.2%; practice B: 51.6%; practice C: 95.9%; practice D: 98.9%; practice E: 94.7% (Chi-square= 152.1; $p<0.001$).

Because of the low numbers of individual black and minority ethnic groups represented within the study population, all subsequent analyses are based on a comparison of white and 'other' ethnic groups.

3.2.3 Recent Experience of Consulting in General Practice

Forty-four (6.2%) respondents reported having visited their general practitioner within the previous seven days, 207 (29.2%) within the past month, 498 (70.3%) within the past six months, and 613 (86.6%) within the past year. 128 (34.5%) girls had consulted within the previous month compared with 79 (24.5%) boys (difference = 11.0%; 95% CI: 4.5%, 17.8%, p=0.001). There was no significant trend with age. Rates of recent reported consultation within the past month ranged between practices from 18.9% for practice E, to 37.1% for practice B, although differences were not statistically significant.

In the following section I have excluded those who reported that their last visit to the GP was more than 12 months ago. This was partly to reduce the impact of recall bias, and partly because of the impact of them being at a significantly younger (and unknown age) at their last consultation.

a) Making the Appointment

Of the 613 teenagers who reported having visited their GP within the past 12 months, 49 (8.0%) reported having made the appointment themselves whilst the majority (88.9%) were made by parents. In 15 cases (2.4%) the appointment had been made by another family member or someone else.

The proportion of teenagers making their own appointment increased from three (1.5%) at age 13, to eight (3.9%) at age 14, and 38 (18.0%)% at age 15 (χ^2 for difference=44.2; df=2; p<0.001; χ^2 for trend=37.9, df=1, p<0.001).

Thirty-eight (11.4%) girls reported making their own appointment compared with eleven (3.9%) boys (χ^2 =11.4; df=1; p=0.001), (difference = 7.4%; 95% CI: 3.2%, 11.7%).

Significantly more teenagers registered with Practice B reported making their own appointment (table 3.19) (χ^2 =12.3; df=4; p=0.015). There was also a significant difference by ethnic group with 40 (7.2%) white participants reporting making their own appointment compared with 9 (16.7%) non-white respondents (χ^2 =6.06; df=1; p=0.014). After multiple logistic regression analysis adjusting for practice and ethnicity, the association by practice was no longer statistically significant (p=0.141) but the association with ethnicity remained (p=0.024).

b) Attending the Surgery

Seventy-eight (12.7%) respondents reported attending the surgery alone, with 505 (82.4%) being accompanied by a parent or guardian, 18 (2.9%) by another family member, and 8 (1.3%) by a friend.

At age 13 only 3 (1.5%) teenagers attended alone compared with 18 (8.8%) at age 14, and 26.9% at age 15 (χ^2 for difference = 63.3, df=2, p<0.001; χ^2 for trend=59.7, df=1, p<0.001). Forty-nine (14.7%) girls reported attending alone compared with 29 (10.4%) boys although the difference was not significantly different.

Teenagers registered with practice B and practice D were more likely to report attending alone than those in the other practices (table 3.19) although the differences were not statistically significant. There was no significant difference by ethnicity.

Of the 48 teenagers who made their own appointment, 33 (68.8%) attended the surgery either alone or with a friend.

c) Consulting the GP

Overall 142 (19.9%) teenagers reported going into the consulting room on their own at their last visit to the surgery. This included 64 (12.0%) of the 535 who were accompanied to the surgery.

The likelihood of consulting alone increased with age: 14 (7.1%) of respondents reported consulting alone at age 13 compared with 40 (19.6%) at age 14, and 88 (41.5%) at age 15 (χ^2 for difference = 70.1, df=2, $p<0.001$; χ^2 for trend=68.3, df=1, $p<0.001$). There was no statistically significant difference by gender, with 82 (24.6%) of girls reporting consulting alone compared with 60 (21.5%) of boys.

Teenagers registered with practice B were more likely to report consulting alone (table 3.19) although differences between practices were not statistically significant. There was no significant difference by ethnicity.

Table 3.19: Comparison of GP Consultation Experience by Practice.

Practice	Number (%) making own appointment	Number (%) attending the surgery alone	Number (%)) going into the GP alone
A	21 (9.0%)	33 (14.1%)	53 (22.6%)
B	11 (18.3%)	12 (20.0%)	21 (35.0%)
C	8 (4.9%)	14 (8.6%)	39 (24.1%)
D	4 (4.9%)	12 (14.8%)	17 (21.0%)
E	5 (6.6%)	7 (9.2%)	12 (15.8%)
Total	**49 (8.0%)**	**78 (12.7%)**	**142 (23.2%)**

3.2.4 Use of Other Health Services

In the questionnaire survey teenagers were asked to indicate whether they had accessed specified health services, other than their general practitioner, in the past 12 months. The most commonly used services were secondary care outpatient clinics (28.7%) and Accident & Emergency services (26.0%). Results are shown in table 3.20.

There were no significant differences in the use of non-general practice services with respect to age, gender or practice with the exception of family planning clinics. Ten boys (3.0%) reported having attended a family planning clinic during the 12-month period compared with 28 girls (7.9%) (difference = 4.5%; 95% CI: 1.3%, 7.8%; X2=7.950, p=0.019). There was an increasing, but non-significant, trend in the use of family planning services with age, with 3% accessing them at aged 13 compared with 6.2% at 14 and 7.4% at 15.

The percentage of teenagers using family planning clinics in relation to practice is shown in table 3.21, demonstrating the significantly higher rates of attendance in practices B and E.

Although only 5% of white Caucasian respondents reported attending family planning clinics compared with 11.3% of others the difference was not statistically significant.

Table 3.20: Self-reported Use of Specified Health Services other than General Practice in the Previous 12 Months

n=690	Not at all		Once		More than once	
	No.	**%**	**No.**	**%**	**No.**	**%**
Hospital Inpatient	616	**89.4**	57	**8.3**	16	**2.3**
Hospital Outpatient	488	**71.2**	96	**14.0**	101	**14.7**
Accident & Emergency	510	**74.0**	120	**17.4**	59	**8.6**
Family Planning Clinic	652	**94.5**	24	**3.5**	14	**2.0**
Teenage Health Clinic	658	**95.6**	18	**2.6**	12	**1.7**

Table 3.21: Self-reported Attendance at Family Planning Clinics at Least Once in the Previous 12 Months by Practice

Practice	**No.**	**%**
A (n=264)	7	**2.6**
B (n=58)	8	**12.8**
C (n=189)	9	**4.7**
D (n=89)	4	**4.4**
E (n=90)	10	**11.1**
	χ^2=17.6, **p=0.001**	

3.2.5 Health Status

a) Chronic Medical Conditions & Regular Medication

One hundred and fifty-three (21.5%) teenagers reported that they had asthma with similar rates amongst boys and girls. There was a small, but non-statistically significant increase in rates with age, with 46 (19.2%) of respondents reporting asthma at age 13 compared with 50 (21.2%) at age 14 and 57 (24.1%) at age 15. Self-reported asthma varied significantly between practices as shown in table 3.22. There were no differences by ethnicity.

One hundred and three (14.4%) teenagers reported that they had eczema: 34 (10.0%) were boys and 69 (18.5%) were girls (difference = 8.4%; 95% CI: 3.3%, 13.5%). There were no significant differences by age, practice (table 3.22) or ethnicity.

Acne was reported by 70 (9.8%) respondents, with the frequency increasing from 14 (5.8%) at age 13 to 24 (10.2%) at age 14 and 42 (13.5%) at age 15 (χ^2 for difference=7.97, df=2, p=0.019; χ^2 for trend=7.91, df=1, p=0.005). Rates were similar by gender, practice (table 3.22), and ethnicity.

No teenagers in the sample reported having diabetes mellitus, and only two reported that they had epilepsy. Both were girls and registered with practice B.

One hundred and twenty (18.0%) of respondents reported taking medication at least on a daily basis: 61 were taking inhalers for asthma; 12 were on antihistamines for hay fever, six reported using oral antibiotics for acne, eight were taking iron or vitamin tablets, and six were on the oral contraceptive pill. There was a significant

difference in regular medication use by gender with 47 (14.8%) boys reporting regular medication use compared with 73 (20.9%) girls: (difference = 6.1; 95% CI: 0.4%, 11.7%). Forty-five (20.3%) reported using regular medication at age 15 compared with 38 (16.9%) and 37 (16.8%) at ages 13 and 14 respectively. However this difference was not statistically significant.

There was a significant difference in self-reported medication use by practice with lowest rates in practice E (table 3.22). Multiple logistic regression analysis based on gender, practice, and self-reported asthma resulted in a model in which practice was no longer significantly associated with medication use ($p=0.089$) but the association persisted with gender ($p=0.023$) and asthma ($p<0.001$).

Table 3.22: Comparison of Self-reported Chronic Conditions and Regular Medication Usage by Practice

Practice	Asthma	Eczema	Acne	Epilepsy	Regular Medication
A (n=272)	74	41	28	0.0	60
	27.2%	**15.1%**	**10.3%**		**23.3%**
B (n=62)	18	13	4	2	12
	29.0%	**21.0%**	**6.5%**	**3.2%**	**20.7%**
C (n=194)	33	23	24	0.0	23
	17.0%	**11.9%**	**12.4%**		**13.0%**
D (n=75)	15	15	5	0.0	17
	16.7%	**16.7%**	**5.6%**		**20.0%**
E (n=95)	13	11	9	0.0	8
	13.7%	**11.6%**	**9.5%**	**0.0%**	**8.9%**
Total (n=667)	153	103	70	2	120
	21.5%	**14.4%**	**9.8%**	**0.3%**	**18.0%**
p-value for difference (df=4)	χ^2 =14.3 **p=0.006**	χ^2 =4.26 p=0.372	χ^2 =4.15 p=0.386	N/A	χ^2 =13.6 **p=0.009**

b) Overall Health Status as assessed by Dartmouth COOP Charts

In the questionnaire survey teenagers were asked to rate themselves on the six scales of the Dartmouth COOP Charts: physical fitness, family support, schoolwork, emotional feelings, social support, and health habits. Each scale has five categories.

I have presented the distribution of results for each scale graphically in figure 3.4 (a-f). In order to analyse results further I calculated the mean and median scores on the basis of ratings from one to five with higher scores corresponding to poorer health. These are presented in table 3.23, together with a comparison by gender.

There were statistically significant differences by gender for all scales except for social support: girls perceived themselves as being less physically fit, more likely to feel sad or depressed, and more likely to have harmful health habits. However they also reported having better family relationships and doing better at schoolwork than boys.

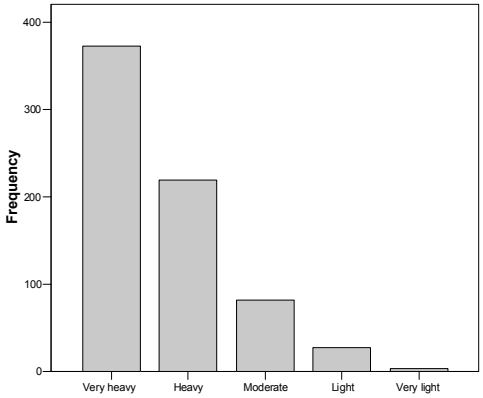
Scores for emotional feelings, schoolwork, and health habits increased significantly with older age as shown in table 3.24. This is consistent with an increase in depressive feelings with age, as well as perceived lower attainment at school, and greater likelihood of having harmful health habits.

Teenagers from practice B scored more highly on all scales than teenagers from other practices, although differences were only statistically significant with respect to schoolwork (table 3.25).

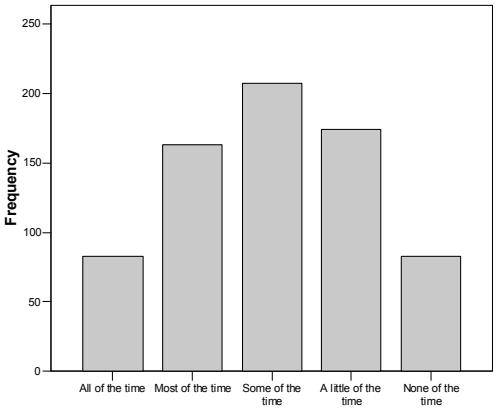
In terms of ethnicity, non-white respondents scored higher than white respondents on all scales with statistically significant differences in relation to family support, schoolwork and social support (table 3.26).

Figure 3.4: Responses to Dartmouth COOP Charts

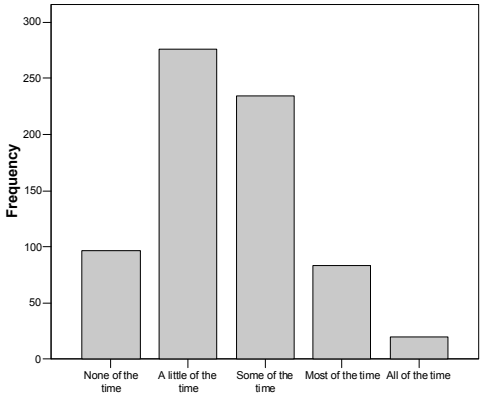
a) Physical Fitness: during the past month what was the hardest physical activity you could do for at least 10 minutes?



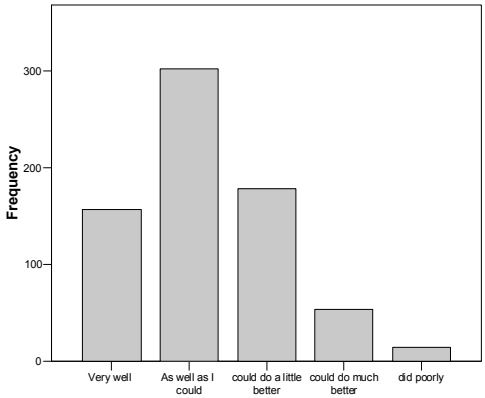
b) Family Support: during the past month how often did you talk about your problems, feelings or opinions with someone in your family?



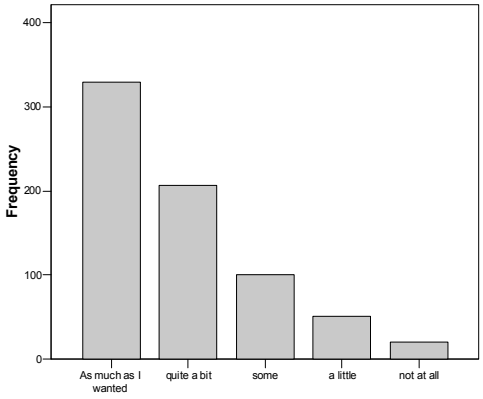
c) Emotional Feelings: during the past month how often did you feel depressed, irritable, sad, downhearted, or blue?



d) School Work: during the last month you were in school how did you do?



e) Social Support: during the past month, if you needed someone to listen or to help you, was there someone there for you?



f) Health Habits: during the past month how often did you do things that might be harmful to your health?

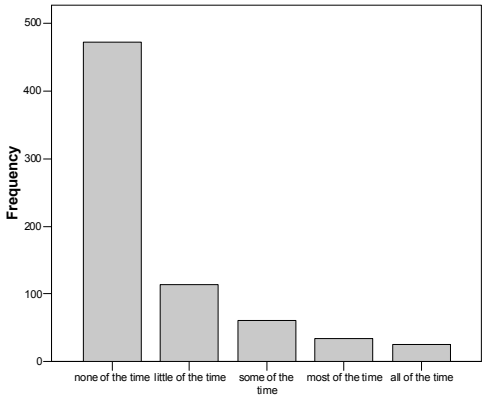


Table 3.23: Comparison of Scores from COOP Charts by Gender

Scale	Median (& Mean) Scores			p-value for gender difference (Mann-Whitney U)
	Overall (n=710)	Male (n=337)	Female (n=373)	
Physical Fitness	1.0 (1.68)	1.0 (1.52)	2.0 (1.82)	**<0.001**
Family Support	3.0 (3.02)	3.0 (3.22)	3.0 (2.83)	**<0.001**
Emotional Feelings	2.0 (2.51)	2.0 (2.24)	3.0 (2.76)	**<0.001**
School Work	2.0 (2.25)	2.0 (2.33)	2.0 (2.17)	**0.007**
Social Support	2.0 (1.91)	2.0 (1.99)	2.0 (1.84)	0.073
Health Habits	1.0 (1.63)	1.0 (1.50)	1.0 (1.75)	**<0.001**

Table 3.24: Comparison of Scores from COOP Charts by Age

Scale	Median (& Mean) Scores			p-value for age difference (Kruskal-Wallis test)
	Age 13 (n=239)	Age 14 (n=234)	Age 15 (n=237)	
Physical Fitness	1.0 (1.65)	1.0 (1.61)	2.0 (1.77)	0.061
Family Support	3.0 (2.89)	3.0 (3.08)	3.0 (3.08)	0.117
Emotional Feelings	2.0 (2.33)	2.0 (2.50)	3.0 (2.70)	**<0.001**
School Work	2.0 (2.19)	2.0 (2.15)	2.0 (2.40)	**0.006**
Social Support	2.0 (1.94)	2.0 (1.84)	2.0 (1.94)	0.554
Health Habits	1.0 (1.30)	1.0 (1.60)	2.0 (2.00)	**<0.001**

Table 3.25: Comparison of Scores from COOP Charts by Practice

Scale	Median (& Mean) Scores for each Practice					p-value for difference (Kruskal-Wallis test)
	A (n=270)	B (n=62)	C (n=193)	D (n=90)	E (n=95)	
Physical Fitness	1.0 (1.69)	1.0 (1.75)	1.0 (1.68)	1.0 (1.56)	1.0 (1.65)	0.820
Family Support	3.0 (2.96)	3.0 (3.25)	3.0 (3.12)	3.0 (2.91)	3.0 (2.97)	0.430
Emotional Feelings	3.0 (2.55)	3.0 (2.80)	2.0 (2.40)	2.0 (2.49)	2.0 (2.42)	0.108
School Work	2.0 (2.18)	3.0 (2.67)	2.0 (2.21)	2.0 (2.12)	2.0 (2.34)	**0.009**
Social Support	2.0 (1.94)	2.0 (2.28)	1.0 (1.86)	2.0 (1.76)	2.0 (1.84)	0.085
Health Habits	1.0 (1.55)	1.0 (2.00)	1.0 (1.62)	1.0 (1.60)	1.0 (1.68)	0.159

Table 3.26: Comparison of Scores from COOP Charts by Ethnicity

Scale	Median (& Mean) Scores			p-value for gender difference (Mann-Whitney U)
	Overall (n=710)	White (n=655)	Other (n=55)	
Physical Fitness	1.0 (1.68)	1.0 (1.66)	1.0 (1.78)	0.851
Family Support	3.0 (3.02)	3.0 (2.99)	3.0 (3.33)	**0.040**
Emotional Feelings	2.0 (2.51)	2.0 (2.50)	3.0 (3.65)	0.395
School Work	2.0 (2.25)	2.0 (2.21)	3.0 (2.64)	**0.004**
Social Support	2.0 (1.91)	2.0 (1.87)	2.0 (2.42)	**0.002**
Health Habits	1.0 (1.63)	1.0 (1.61)	1.0 (1.91)	0.097

3.2.6 Health Related Behaviour

In the questionnaire survey, teenagers were asked to report their behaviour in relation to cigarette smoking, alcohol intake and drug use. I have presented the results in table 3.27, which also shows the comparison by gender. Overall, 33.3% of respondents reported either having smoked cigarettes or being current smokers. There was a statistically significant difference by gender, with more boys having never smoked and girls being more likely to be regular smokers. There were no gender differences in relation to self-reported alcohol or drug use.

Rates of self-reported smoking, alcohol and drug use all increased significantly with age (table 3.28). By the age of 15, nearly one-third of respondents reported smoking occasionally or regularly, one-half were drinking alcohol regularly, and 16% were using drugs at least some of the time.

Self-reported health related behaviours differed significantly between practices with respect to smoking and drug use as shown in table 3.29. Practice B had highest reported rates of both. Rates of regular alcohol intake varied between 22.6% and 38.2% although differences were not statistically significant.

There were statistically significant differences by ethnicity in relation to smoking and drug use: 31.6% of non-white respondents were cigarette smokers (occasional or regular) compared with 19.8% of white respondents (χ^2 =5.28, p=0,021); and 19.6% of non-white responders reported illicit drug use (occasional or regular) compared with 8.1% of white respondents (χ^2 =8.40, p=0.004). Self-reported regular alcohol

consumption was lower amongst non-white respondents (22.8%) than white respondents (28.9%) but the difference was not statistically significant.

Multivariate analysis was performed including age, gender, practice and ethnicity as covariates:

- Cigarette smoking (occasional or regular) was found to be significantly associated with age ($p<0.001$), gender ($p=0.013$) and ethnicity ($p=0.020$).
- Regular alcohol consumption was associated with age only ($p<0.001$).
- Drug use was associated with age ($p<0.001$) and ethnicity ($p=0.002$).

Any associations by practice were therefore due to confounding by other variables.

Table 3.27: Comparison of Self-Reported Health Related Behaviour by Gender

	All Teenagers		Males n=336		Females n=371		Gender Difference (%)	95% Confidence Interval	Chi-square for Difference	p-value
	No.	%	No.	%	No.	%				
Smoking										
Never smoked	407	**57.5**	218	**64.8**	188	**50.8**	14.0	7.3, 21.7		
Never smoked but probably will	65	**9.2**	33	**9.8**	32	**8.6**	1.2	-3.1, 5.5	18.48	**<0.001**
Used to smoke but stopped	95	**13.4**	34	**10.1**	61	**16.5**	6.4	1.4, 11.3		
Sometimes smoke	73	**10.3**	28	**8.3**	45	**12.2**	3.9	-0.6, 8.2		
Smoke every day	68	**9.6**	24	**7.1**	44	**11.9**	4.7	0.4, 9.0		
Alcohol										
Never tasted	40	**5.7**	25	**7.4**	15	**4.0**	3.4	0.0, 6.9		
Never tasted but probably will	24	**3.4**	12	**3.6**	12	**3.2**	0.4	-2.3, 3.0	6.803	0.147
Drink on special occasions	442	**62.5**	203	**60.4**	239	**64.4**	4.0	-3.1, 11.2		
Drink regularly: no more than weekly	170	**24.0**	77	**22.9**	93	**25.1**	2.2	-4.2, 8.5		
Drink regularly more than weekly	31	**4.4**	19	**5.7**	12	**3.2**	2.4	-0.6, 5.5		
Drugs										
Will never use drugs	596	**83.8**	286	**85.0**	307	**82.8**	2.2	-2.6, 8.0		
Might try at some time	51	**7.2**	19	**5.6**	32	**8.6**	3.0	-8.1, 6.8	2.934	0.402
Use drugs occasionally	54	**7.6**	26	**7.7**	28	**7.5**	0.2	-3.7, 4.1		
Use drugs more than weekly	10	**1.4**	6	**1.8**	4	**1.1**	0.0	-2.5, 1.1		

Table 3.28: Comparison of Self-Reported Health Related Behaviours by Age

Health Behaviour	Age								Chi-squared for age difference	p-value for age difference	Chi-squared for trend	p-value for age trend
	13 (n=239)		14 (n=235)		15 (n=237)		All Ages (n=711)					
	No.	%	No.	%	No.	%	No.	%				
Current Smoking[1]	29	**12.2**	37	**15.7**	75	**31.8**	141	**19.9**	32.1	**<0.001**	28.3	**<0.001**
Regular Alcohol[2]	32	**13.4**	61	**26.1**	109	**46.0**	202	**28.5**	62.4	**<0.001**	61.3	**<0.001**
Drug Use[3]	8	**3.3**	18	**7.7**	38	**16.0**	64	**9.0**	24.2	**<0.001**	23.3	**<0.001**

[1] Current smoking = 'sometimes smoke' and 'smoke every day'

[2] Regular alcohol = 'drink regularly but no more than weekly' and 'drink regularly more than weekly'

[3] Drug use = 'use drugs occasionally' and 'use drugs more than weekly'

Table 3.29: Health Related Behaviours of Teenagers in Relation to Practice

	Practice												Chi-square for difference	p-value
	A (n=271)		B (n=61)		C (n=194)		D (n=90)		E (n=95)		All (n=711)			
Behaviour	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Current Smoking[1]	49	**17.9**	24	**38.7**	25	**12.9**	16	**17.8**	28	**29.8**	141	**19.9**	26.4	**<0.001**
Regular Alcohol[2]	69	**25.6**	14	**22.6**	60	**30.7**	34	**38.2**	25	**26.6**	202	**28.5**	6.97	0.076
Drug Use[3]	16	**5.9**	15	**24.6**	11	**5.7**	10	**11.1**	12	**12.6**	64	**9.0**	25.9	**<0.001**

[1] Current smoking = 'sometimes smoke' and 'smoke every day'

[2] Regular alcohol = 'drink regularly but no more than weekly' and 'drink regularly more than weekly'

[3] Drug use = 'use drugs occasionally' and 'use drugs more than weekly'

3.2.7 Self-Reported Health Concerns

In the questionnaire survey, teenagers were asked to rate a series of recognised teenage health problems according to whether they personally worried about them 'all of the time', 'some of the time', or 'never'. I have presented the overall results in table 3.30.

The most frequently reported problems (either 'some' or 'all of the time') were *feeling down or stressed*, *headaches*, and *skin problems*. However *weight problems*, *tiredness*, and *skin problems* were the most common problems experienced 'all of the time'. *Breathing problems* and *being bullied* were least frequent, but were still reported by more than one-third of respondents. For the purpose of subsequent analyses I have combined 'all of the time' and 'some of the time' into a single category.

Girls expressed a greater degree of concern about all types of problem (table 3.31). The gender difference was statistically significant for all except *breathing problems* and *painful joints*.

There were no statistically significant differences by age, except in relation to concerns about *being bullied*, *tiredness*, and *feeling down or stressed* (table 3.32): concerns about bullying declined with age whilst concerns about tiredness and about feeling down or stressed increased with age. There were also some age trends that did not attain statistical significance: concerns about *skin problems* and *sleep problems* increased with age whilst worries about *weight* declined.

There were statistically significant differences by practice in relation to self-reported *breathing problems* and *tiredness* (table 3.33): respondents from practices C and E reported fewer worries about both of these problems.

The only statistically significant difference by ethnicity was in relation to bullying, with more white Caucasian respondents being worried about *being bullied* than respondents from other ethnic groups (table 3.34).

I performed multiple logistic regression analysis on each of the self-reported health concerns including age, gender, ethnicity and practice as co-variates. Table 3.35 shows the variables that were significantly associated with each health concern.

Table 3.30: Prevalence of Self-Reported Health Concerns

n=713	All of the time		Some of the time		None of the time	
	No.	**%**	**No.**	**%**	**No.**	**%**
Skin problems	75	**10.7**	392	**55.8**	236	**33.6**
Breathing problems	42	**6.1**	231	**33.1**	420	**60.6**
Headaches	43	**6.2**	423	**61.0**	227	**32.8**
Being bullied	31	**4.5**	232	**33.4**	432	**62.2**
Problems with sleep	42	**6.1**	240	**34.6**	412	**59.4**
Problems with weight	69	**10.0**	224	**32.4**	399	**57.7**
Tiredness	76	**11.0**	349	**50.3**	266	**38.5**
Painful joints	44	**6.3**	346	**49.9**	303	**43.7**
Feeling down or stressed	61	**8.8**	408	**58.8**	225	**32.4**
Death and dying	66	**9.5**	225	**32.4**	403	**58.1**

Table 3.31: Comparison of Self-Reported Health Concerns by Gender

(based on proportion reporting worry either all or some of the time)

	All n=703*		Males n=334*		Females n=369*		Gender Difference (%)	95% Confidence Interval	Chi-square for difference	p-value
	No.	%	No.	%	No.	%				
Skin problems	467	**66.4**	172	**51.5**	295	**79.9**	28.4	21.7, 35.2	63.63	**<0.001**
Breathing problems	273	**39.4**	120	**36.8**	153	**41.7**	4.9	-2.4, 12.1	1.722	0.189
Headaches	466	**67.2**	197	**60.4**	269	**73.3**	12.9	5.9, 19.8	12.98	**<0.001**
Being bullied	263	**37.8**	111	**33.7**	152	**41.5**	7.8	0.6, 15.0	4.472	**0.034**
Problems with sleep	282	**40.6**	115	**35.2**	167	**45.5**	10.3	3.1, 17.6	7.658	**0.006**
Problems with weight	293	**42.2**	76	**23.3**	217	**59.3**	36.0	29.2, 42.8	91.41	**<0.001**
Tiredness	425	**61.5**	185	**57.1**	240	**65.4**	8.3	1.0, 15.6	5.003	**0.025**
Painful joints	390	**56.3**	185	**56.2**	205	**56.3**	0.1	-7.3, 7.5	0.001	0.981
Feeling down or stressed	469	**67.5**	186	**56.7**	283	**77.3**	20.6	13.7, 27.5	33.55	**<0.001**
Death and dying	291	**41.9**	123	**37.5**	168	**45.9**	8.4	1.1, 15.7	5.015	**0.025**

*Total numbers of questionnaire respondents – the number and percentage of respondents to individual questions may differ due to question non-response.

Table 3.32: Comparison of Self-Reported Health Concerns by Age

(based on proportion reporting worry either all or some of the time)

	Age 13 n=240*		Age 14 n=236*		Age 15 n=237*		Chi-square for difference	p-value	Chi-square for trend	p-value
	No.	%	No.	%	No.	%				
Skin problems	150	**63.6**	154	**65.8**	163	**70.0**	2.212	0.331	2.146	0.143
Breathing problems	90	**38.8**	91	**39.2**	92	**40.2**	0.096	0.953	0.092	0.762
Headaches	152	**65.8**	159	**69.1**	155	**66.8**	0.610	0.737	0.053	0.818
Being bullied	101	**43.7**	86	**37.2**	76	**32.6**	6.137	**0.046**	6.070	**0.014**
Problems with sleep	87	**37.8**	92	**39.7**	103	**44.4**	2.205	0.332	2.067	0.151
Problems with weight	109	**47.6**	93	**40.3**	91	**39.2**	3.926	0.140	3.295	0.069
Tiredness	129	**56.6**	140	**60.3**	156	**67.5**	6.013	**0.049**	5.814	**0.016**
Painful joints	139	**59.9**	123	**53.5**	128	**55.4**	2.050	0.359	0.955	0.328
Feeling down or stressed	138	**60.0**	158	**68.4**	173	**74.2**	10.832	**0.004**	10.702	**0.001**
Death and dying	97	**42.0**	96	**41.7**	98	**42.1**	0.005	0.997	0.000	0.988

*Total numbers of questionnaire respondents – the number and percentage of respondents to individual questions may differ due to question non-response.

Table 3.33: Comparison of Self-Reported Health Concerns by Practice

(based on proportion of respondents reporting worry either some or all of the time)

Practice	A n=272*		B n=62*		C n=194*		D n=90*		E n=95*		Chi-square for difference	p-value
	No.	%	No.	%	No.	%	No.	%	No.	%		
Skin problems	185	**69.3**	46	**74.2**	119	**62.6**	54	**60.7**	63	**66.3**	5.206	0.267
Breathing problems	125	**47.2**	26	**44.1**	61	**32.8**	33	**37.1**	28	**29.8**	14.476	**0.006**
Headaches	186	**69.4**	45	**76.3**	123	**66.5**	54	**62.1**	58	**61.7**	5.167	0.271
Being bullied	111	**41.7**	15	**25.4**	72	**38.1**	31	**35.2**	34	**36.6**	5.903	0.207
Problems with sleep	119	**44.7**	28	**46.7**	65	**34.9**	36	**40.9**	34	**36.2**	6.035	0.197
Problems with weight	102	**38.5**	30	**49.2**	71	**38.8**	39	**43.8**	51	**54.3**	9.264	0.055
Tiredness	173	**65.3**	42	**68.9**	106	**57.6**	58	**65.9**	46	**49.5**	10.586	**0.032**
Painful joints	153	**57.7**	38	**64.4**	102	**54.3**	49	**55.7**	48	**51.6**	2.961	0.564
Feeling down or stressed	182	**68.7**	44	**73.3**	114	**60.6**	68	**77.3**	61	**65.6**	0.129	0.058
Death and dying	110	**41.5**	29	**49.2**	69	**36.9**	37	**41.6**	46	**48.9**	5.127	0.274

*Total numbers of questionnaire respondents – the number and percentage of respondents to individual questions may differ due to question non-response.

Table 3.34: Comparison of Self-Reported Health Concerns by Ethnicity

(based on proportion of respondents reporting worry either some or all of the time)

	White n=656*		Other n=53*		Chi-square for difference	p-value
	No.	%	No.	%		
Skin problems	427	**66.1**	40	**70.2**	0.390	0.532
Breathing problems	246	**38.4**	27	**50.9**	3.206	0.073
Headaches	425	**66.6**	41	**74.5**	1.446	0.229
Being bullied	249	**38.9**	14	**25.5**	3.896	**0.048**
Problems with sleep	255	**39.9**	27	**49.1**	1.771	0.183
Problems with weight	263	**41.2**	30	**55.6**	4.189	**0.041**
Tiredness	389	**61.1**	36	**66.7**	0.659	0.417
Painful joints	355	**55.6**	35	**63.6**	1.315	0.252
Feeling down or stressed	428	**66.9**	41	**75.9**	1.862	0.172
Death and dying	265	**41.5**	26	**47.3**	0.700	0.403

*Total numbers of questionnaire respondents – the number and percentage of respondents to individual questions may differ due to question non-response.

Table 3.35: Factors associated with Self-reported Health Concerns: Results from Logistic Regression Analysis

	Sex		Age		Ethnicity		Practice	
	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)
Skin problems	<0.001	0.271 (0.194, 0.378)	-	-	-	-	-	-
Breathing problems	-	-	-	-	-	-	0.001	1.207 (1.083, 1.346)
Headaches	-	-	-	-	-	-	-	-
Being bullied	0.019	0.688 (0.503, 0.942)	0.009	1.293 (1.068, 1.565)	-	-	-	-
Problems with sleep	0.007	0.657 (0.484, 0.893)	-	-	-	-	-	-
Problems with weight	<0.001	0.194 (0.138, 0.272)	0.010	1.311 (1.068, 1.609)	-	-	0.014	0.866 (0.773, 0.971)
Tiredness	0.029	0.705 (0.515, 0.965)	0.022	0.798 (0.658, 0.968)	-	-	0.013	1.146 (1.029, 1.276)
Painful joints	-	-	-	-	-	-	-	-
Feeling down or stressed	<0.001	0.378 (0.270, 0.530)	0.003	0.730 (0.594, 0.898)	0.024	0.813 (0.680, 0.973)	-	-
Death and dying	0.025	0.706 (0.521, 0.958)	-	-	-	-	-	-

3.2.8 Help Seeking Attitudes

In the questionnaire survey teenagers were asked to identify the people they would be most likely to talk to if they had specified health problems. I have presented the overall results from this question in table 3.36.

Friends and family members were identified most frequently for all types of health issue, with the practice nurse identified least frequently except for contraception and skin problems. School nurses were cited as a source of help more frequently than practice nurses for all issues except skin problems, and GPs were selected more frequently than school nurses for all issues except smoking and relationships.

Health professionals (GP, practice nurse or school nurse) were identified relatively infrequently as a source of discussion about health related behaviours (smoking, drugs, alcohol), stress or relationships. They were more frequently selected in relation to weight, contraception / pregnancy, and skin problems.

There were marked gender differences in the frequency of selection of people to discuss health issues (table 3.37). Boys were more likely to indicate that they would talk to 'no-one' when compared with girls about all issues, and this difference was statistically significant for all except alcohol, drugs and skin problems. Girls were significantly more likely to talk to a friend for all specified health issues. In addition, they indicated that they were more likely to talk to a nurse (school nurse or practice nurse) than boys, the difference being statistically different for most issues. There were fewer gender differences in relation to talking with family members or the GP except for contraceptive / pregnancy issues, weight, and relationships.

Age related differences mainly occurred with reference to friends and family members. Table 3.38 shows the increase in frequency of selection of friends with age, whilst in contrast family members were less frequently selected, with the exception of talking about relationships. There were no significant age differences in selection of health professionals, with the exception of increasing identification of the GP with respect to skin problems, from 39.6% at age 13 to 49.5% at age 15 (p-value for difference = 0.017, p-value for trend=0.048).

Teenagers registered with Practice B were significantly more likely to indicate that they would talk to the school nurse about stress than in other practices: 16.1% of teenagers in this practice selected the school nurse for discussion about stress, compared with 6.6% overall (χ^2=10.3, df=1, p=0.002). There was also a significant difference between teenagers registered with different practices in relation to those indicating that they would talk to the school nurse about weight: rates were 14.7%, 21.0%, 9.3%, 20.0%, and 10.5%, for practices A to E respectively (χ^2=9.910, df=4, p=0.042). There were no other significant differences between practice populations in terms of help seeking attitudes.

The only statistical association that I identified between ethnicity and help seeking was in relation to weight problems: white caucasian respondents were significantly more likely to be willing to talk to family members about weight compared with other ethnic groups (58.5% compared with 42.1% respectively; χ^2=5.133, df=1, p=0.023); whilst other ethnic respondents were more likely to be willing to discuss this with a GP than white respondents (38.6% compared with 22.6% respectively; χ^2=6.570, df=1, p=0.010).

Table 3.36: Help Seeking Attitudes of Teenagers: proportion of respondents identifying each person as a potential source of help

n = 713	Family Member		Family Doctor		Practice Nurse		School Nurse		Friend		No-one		Other	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Smoking cigarettes	368	**51.6**	52	**7.3**	18	**2.0**	59	**8.3**	429	**60.2**	65	**9.1**	15	**2.1**
Feeling down or stressed	409	**57.4**	58	**8.1**	13	**1.8**	47	**6.6**	397	**55.7**	68	**9.5**	12	**1.7**
Relationships	288	**40.4**	8	**1.1**	3	**0.4**	12	**1.7**	562	**78.8**	46	**6.5**	10	**1.4**
Illegal drugs	294	**41.2**	98	**13.7**	25	**3.5**	79	**11.1**	383	**53.7**	74	**10.4**	37	**5.2**
Weight problems	408	**57.2**	170	**23.8**	55	**7.7**	99	**13.9**	199	**27.9**	112	**15.7**	12	**1.7**
Contraception and pregnancy	296	**41.5**	175	**24.5**	80	**11.2**	108	**15.1**	285	**40.0**	78	**10.9**	26	**3.6**
Alcohol	404	**56.7**	63	**8.8**	20	**2.8**	42	**5.9**	391	**54.8**	57	**8.0**	23	**3.2**
Skin problems	482	**67.6**	295	**41.4**	77	**10.8**	75	**10.5**	157	**22.0**	59	**8.3**	8	**1.1**

Table 3.37: Help Seeking Attitudes by Gender

	GP			School Nurse		
	Male (n=340)	**Female (n=373)**	**Gender Difference (%) (95% CI)**	**Male (n=340)**	**Female (n=373)**	**Gender Difference (%) (95% CI)**
Smoking cigarettes	7.9	6.7	1.2 (-2.6, 5.2)	7.1	9.4	2.3 (-1.7, 6.3)
Feeling down or stressed	7.1	9.1	2.1 (-2.0, 6.1)	3.5	9.4	5.8 (2.3, 9.4)
Relationships	0.9	1.3	0.5 (-1.4, 2.3)	0.6	2.7	2.1 (0.3, 3.9)
Illegal drugs	14.1	13.4	0.7 (-4.4, 5.9)	8.8	13.1	4.3 (-0.3, 8.9)
Weight problems	20.3	27.1	6.8 (0.5, 12.9)	5.9	21.2	15.3 (10.5, 20.1)
Contraception and pregnancy	18.2	30.3	12.1 (5.8, 18.2)	10.0	19.8	9.8 (4.7, 15.0)
Alcohol	8.2	9.4	1.2 (-3.1, 5.3)	3.8	7.8	3.9 (0.6, 7.3)
Skin problems	38.5	44.0	5.4 (-1.8, 12.6)	7.9	12.9	4.9 (0.5, 9.4)
	Friend			**No-one**		
	Male (n=340)	**Female (n=373)**	**Gender Difference (%) (95% CI)**	**Male (n=340)**	**Female (n=373)**	**Gender Difference (%) (95% CI)**
Smoking cigarettes	49.1	70.2	21.1 (14.1, 28.2)	12.9	5.6	-7.3 (-11.6, -3.0)
Feeling down or stressed	43.8	66.5	22.7 (15.5, 29.8)	12.1	7.2	-4.8 (-9.2, -0.5)
Relationships	69.1	87.7	18.5 (12.6, 24.5)	10.3	2.9	-7.3 (11.0, -3.7)
Illegal drugs	48.5	58.4	9.9 (2.6, 17.2)	11.8	9.1	-2.6 (-7.1, 1.8)
Weight problems	12.9	41.6	28.6 (22.5, 34.8)	19.7	12.1	-7.6 (-13.0, -2.3)
Contraception and pregnancy	27.9	50.9	23.0 (16.0, 30.0)	16.5	5.9	-10.6 (-15.2, -6.0)
Alcohol	44.1	64.6	20.5 (13.3, 27.7)	10.0	6.2	-3.8 (-7.8, 0.2)
Skin problems	10.9	32.2	21.3 (15.5, 27..1)	9.4	7.2	-2.2 (-6.2, 1.9)

Table 3.38: Help Seeking Attitudes by Age

Friend					
Age	**13** (n=240)	**14** (n=236)	**15** (n=237)	**p-value for difference (χ^2-test)**	**p-value for trend (χ^2-test)**
Smoking cigarettes	51.3	64.8	64.6	0.002	0.003
Feeling down or stressed	48.8	54.2	64.1	0.002	<0.001
Relationships	73.8	80.5	82.3	0.055	0.023
Illegal drugs	46.3	55.1	59.9	0.010	0.003
Weight problems	27.5	25.8	30.4	0.539	0.486
Contraception and pregnancy	33.3	40.7	46.0	0.018	0.005
Alcohol	46.7	52.1	65.8	<0.001	<0.001
Skin problems	20.0	19.1	27.0	0.074	0.066
Family Member					
Age	**13** (n=240)	**14** (n=236)	**15** (n=237)	**p-value for difference (χ^2-test)**	**p-value for trend (χ^2-test)**
Smoking cigarettes	59.6	48.7	46.4	0.009	0.004
Feeling down or stressed	59.2	58.9	54.0	0.441	0.256
Relationships	39.2	41.9	40.1	0.820	0.837
Illegal drugs	49.2	42.4	32.1	0.001	<0.001
Weight problems	60.4	56.4	54.9	0.446	0.219
Contraception and pregnancy	50.0	43.6	30.8	<0.001	<0.001
Alcohol	59.2	61.0	49.8	0.030	0.039
Skin problems	69.2	70.8	62.9	0.152	0.143

3.2.9 Health Locus of Control

In the questionnaire survey teenagers were asked to respond to the nine questions from the HLOC scale by either agreeing or disagreeing. Responses were scored as 0 (disagree) or 1 (agree). I then summated the scores for the three questions in each dimension (*chance*, *internal*, and *powerful others*), resulting in a range of scores from 0 to 3 for each. Table 3.38 shows the responses to component questions and the derivation of scores for each dimension.

The distribution of scores in each dimension is shown in table 3.39. Higher scores correspond to greater belief in that particular dimension (see Chapter 1: section 1.4.6c); for example, a score of three on *chance* corresponds to a strong belief in the influence of *chance* on health. More than half of respondents scored three on the internal dimension. This is consistent with the belief that they are in control of their own health.

Girls had significantly higher scores on the *chance* scale than boys, whilst the reverse was true for *internal* locus of control (table 3.40). Mean scores on the *powerful others* scale decreased significantly with age between 13 and 14 but there were no other significant differences by age (table 3.41). There were no significant differences by practice population, but white respondents scored significantly lower on the *powerful others* dimension than respondents from other ethnic groups (table 3.42).

Table 3.38: Component Questions and Derivation of Dimension Scores from the Multidimensional Health Locus of Control Scale

Q	n*=713 Statement	Domain	Agree		Disagree	
			No.	%	No.	%
1	My good health is mainly due to luck	Chance	102	14.4	605	85.6
2	Seeing my doctor regularly is the best way for me to avoid being ill	Others	206	29.0	504	71.0
3	The main thing that affects my health is what I do	Internal	561	79.5	145	20.5
4	No matter what I do, if I am going to be ill, I will be ill	Chance	314	44.5	392	55.0
5	Health professionals such as doctors and nurses, control my health	Others	86	12.2	619	87.8
6	If I do the right things, I can stay healthy	Internal	593	83.2	114	16.1
7	I will stay healthy if it is meant to be	Chance	215	30.7	486	69.3
8	If I take care of myself I can avoid being ill	Internal	501	71.0	205	29.0
9	Whenever I don't feel well, I should see a medically trained professional	Others	305	43.3	400	56.7

*The total number of responses to individual questions will differ from this due to missing values.

Dimension Scores:

Chance = Q1 + Q4 + Q7

Internal = Q3 + Q6 + Q8

Powerful Others = Q2 + Q5 + Q9

Table 3.39: Overall Distribution of Health Locus of Control Dimension Scores

	0		1		2		3	
Dimension	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Chance	277	**39.9**	249	**35.8**	135	**19.4**	34	**4.9**
Internal	23	**3.3**	79	**11.3**	229	**32.8**	367	**52.6**
Powerful Others	299	**42.8**	243	**34.8**	125	**17.9**	31	**4.4**

Table 3.40: Health Locus of Control Scores by Gender: median (& mean) scores

	All n=695	**Male** (n=331)	**Female** (n=364)	**p-value for difference***
Chance	1.0 (0.89)	1.0 (0.81)	1.0 (0.97)	0.033
Internal	3.0 (2.35)	3.0 (2.45)	2.0 (2.26)	0.009
Powerful Others	1.0 (0.84)	1.0 (0.87)	1.0 (0.82)	0.288

* Mann Whitney U Test

Table 3.41: Health Locus of Control Scores by Age: median (and mean) scores

	All n=695	**Age 13** n=233	**Age 14** n=230	**Age 15** n=232	**p-value for difference***
Chance	1.0 (0.89)	1.0 (0.83)	1.0 (0.92)	1.0 (0.92)	0.819
Internal	3.0 (2.35)	3.0 (2.40)	2.0 (2.30)	3.0 (2.35)	0.301
Powerful Others	1.0 (0.84)	1.0 (0.99)	1.0 (0.77)	1.0 (0.78)	0.007

*Kruskal-Wallis Test

Table 3.42: Health Locus of Control Scores by Ethnicity: median (& mean)

	Overall n=695	**White** (n=641)	**Other** (n=54)	**p-value for difference***
Chance	1.0 (0.89)	1.0 (0.87)	1.0 (1.15)	0.051
Internal	3.0 (2.35)	3.0 (2.35)	2.0 (2.31)	0.476
Powerful Others	1.0 (0.84)	1.0 (0.81)	1.0 (1.20)	0.003

* Mann Whitney U Test

3.2.10 Attitudes to Confidentiality & Embarrassment

In the questionnaire survey teenagers were asked to indicate their agreement or otherwise with a series of statements about practice confidentiality. I explained confidentiality as follows: "what you tell your doctor should not be discussed with other people without you knowing".

Results are presented in table 3.43. Overall more than 90% of respondents believed that their GP should keep information about them confidential. However only two-thirds believed that they actually did so and the majority of the others were uncertain. One-fifth of respondents claimed that they may not reveal health or emotional problems because they believed confidentiality would not be maintained whilst 6% would not visit their GP at all due to lack of trust. However a greater proportion claimed that they may not discuss certain things because of embarrassment rather than confidentiality.

Although similar responses were obtained from boys and girls in relation to questions about confidentiality, there was a significant difference in relation to embarrassment with nearly half of female respondents indicating that they might be too embarrassed to discuss problems with their GP (table 3.44). In relation to this question, a significantly greater proportion of non-white respondents expressed uncertainty about disclosure and embarrassment compared with white respondents (table 3.44).

There was also a gender difference in relation to the proportion of respondents who claimed that they did not attend their GP because of lack of trust. However this

association was complicated in that more boys agreed with the statement whilst more girls expressed uncertainty (table 3.45).

There were no other statistically significant differences in relation to age, gender, practice or ethnicity.

Table 3.43: Responses to Questions about Confidentiality

	Agree		Disagree		Not sure	
	No.	**%**	**No.**	**%**	**No.**	**%**
Doctors (GPs) should treat everything I tell him/her as confidential	649	91.8	14	2.0	44	6.2
I believe my doctor (GP) does keep everything I tell him/her confidential	480	67.8	43	6.1	185	26.1
I might not tell my doctor (GP) about some health problems because I would worry about other people finding out	156	22.1	433	61.2	118	16.7
I might not tell my doctor (GP) about emotional problems because I would worry about other people finding out	148	21.0	389	55.3	167	23.7
I might be too embarrassed to talk to my doctor (GP) about my problems	306	43.3	235	33.2	166	23.5
I do not go to see my doctor (GP) about all of my health problems because I do not trust him/her	43	6.1	587	82.9	78	11.0

Table 3.44: Comparison of Responses to the Statement 'I might be too embarrassed to talk to my doctor (GP) about my problems' by gender and ethnicity.

Gender	**Agree**		**Disagree**		**Not sure**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Male (n=337)	132	**39.3**	134	**39.9**	70	**20.8**
Female (n=371)	174	**46.9**	101	**27.2**	96	**25.9**
	χ^2= 12.77 df=2 p=0.002					
Ethnicity	**Agree**		**Disagree**		**Not sure**	
	No.	**%**	**No.**	**%**	**No.**	**%**
White (n=651)	284	**43.6**	222	**34.1**	145	**22.3**
Other (n=56)	22	**39.3**	13	**23.2**	21	**37.5**
	χ^2= 7.155 df=2 p=0.028					

Table 3.45: Comparison of Responses to the Statement 'I do not go to see my doctor (GP) about all of my health problems because I do not trust him/her' by gender.

	Agree		**Disagree**		**Not sure**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Male (n=337)	26	**7.7**	287	**85.2**	24	**7.1**
Female (n=371)	17	**4.6**	300	**80.9**	54	**14.6**
	χ^2= 12.11 df=2 p=0.002					

3.2.11 Attitudes to the Practice and Medical Care

In the questionnaire survey teenagers were asked about their experiences, preferences, and attitudes to aspects of care provided by inviting them to respond to two series of statements. The first series related mostly to their experience of going to their practice and required a response of *Agree*, *Disagree* or *Not Sure*. In the second series respondents were asked to rate a series of factors on a three point Likert scale in terms of importance.

I have presented the responses to the first series of statements in table 3.46. More than two-thirds of respondents responded positively about the surgery premises, receptionist attitudes, attitude of the GP, access, and overall satisfaction. There was least satisfaction with reception privacy, telephoning the surgery, and availability of appointments.

For subsequent analyses I combined the responses from *Disagree* and *Not Sure* categories. There were some statistically significant differences by gender, with girls tending to be less satisfied overall, feeling less able to confide in the GP, taken less seriously, and experiencing more difficulty getting to the surgery (table 3.47). There were no significant differences in response by age or ethnicity. However there were marked differences between practices in relation to a number of factors, with the greatest ones being surgery privacy, telephone access, waiting times, and continuity of care (table 3.48).

Table 3.46: Responses to Questions about Previous Experience of Consulting in General Practice and Attitudes to the Care Provided

	Agree		Disagree		Not Sure	
	No.	%	No.	%	No.	%
My doctor's surgery is modern and up to date	546	**76.9**	30	**4.2**	134	**18.9**
The receptionists at the surgery are always friendly and helpful	479	**67.5**	92	**13.0**	139	**19.6**
The surgery is private enough to talk to the receptionists	117	**16.5**	436	**61.5**	156	**22.0**
If I go to the surgery I will always have to wait a long time	274	**38.7**	269	**38.0**	165	**23.3**
It can be difficult to get through to the surgery by telephone	122	**17.2**	366	**51.7**	220	**31.1**
I am always satisfied with the care I get at my doctor's surgery	492	**69.6**	96	**13.6**	119	**16.8**
It can be hard to get an appointment to see the doctor	214	**30.3**	306	**43.3**	186	**26.3**
Getting to my doctor's surgery can be a problem for me	83	**11.7**	592	**83.5**	34	**4.8**
I would like to see the same doctor every time I go to the surgery	445	**62.9**	148	**20.9**	115	**16.2**
I see the same doctor almost every time I go to the surgery	349	**49.2**	291	**41.0**	69	**9.7**
I feel able to talk to the doctor about very personal things	183	**25.8**	291	**41.0**	235	**33.1**
I feel the doctor takes me seriously	513	**72.4**	43	**6.1**	153	**21.6**
When I see the doctor I am given enough time to talk about everything I want	451	**63.7**	112	**15.8**	145	**20.5**

Table 3.47: Responses to Questions about Previous Experience of Consulting in General Practice and Attitudes to the Care Provided by Gender *(based on numbers of respondents agreeing with each statement)*

All n=713*	**Males n=340***		**Females n=373***		**Gender Difference (%)**	**95% Confidence Interval**	**Chi-square for difference**	**p-value**
	No.	**%**	**No.**	**%**				
My doctor's surgery is modern and up to date	274	**80.8**	272	**73.3**	7.4	1.4, 13.7	5.665	0.017
The receptionists at the surgery are always friendly and helpful	240	**70.8**	239	**64.4**	6.4	-0.5, 13.2	3.290	0.070
The surgery is private enough to talk to the receptionists	56	**16.5**	61	**16.5**	0.0	-5.4, 5.5	0.000	0.991
If I go to the surgery I will always have to wait a long time	130	**38.5**	144	**38.9**	0.4	-7.3, 10.2	0.016	0.901
It can be difficult to get through to the surgery by telephone	49	**14.5**	73	**19.7**	5.2	-0.3, 10.7	3.391	0.066
I am always satisfied with the care I get at my doctor's surgery	251	**74.3**	241	**65.3**	9.0	2.4, 15.8	6.675	0.010
It can be hard to get an appointment to see the doctor	90	**26.6**	124	**33.7**	6.9	0.2, 13.6	4.167	0.041
Getting to my doctor's surgery can be a problem for me	29	**8.6**	54	**14.6**	6.0	1.3, 10.7	6.110	0.013
I would like to see the same doctor every time I go to the surgery	216	**63.7**	229	**62.1**	1.6	-5.1, 9.1	0.208	0.648
I see the same doctor almost every time I go to the surgery	170	**50.3**	179	**48.2**	1.9	-5.5, 9.3	0.297	0.586
I feel able to talk to the doctor about very personal things	106	**31.3**	77	**20.8**	10.5	-4.1, 16.9	10.104	<0.001
I feel the doctor takes me seriously	272	**80.2**	241	**65.1**	15.3	-8.8, 21.7	20.169	<0.001
When I see the doctor I am give enough time to talk about everything I want	227	**67.2**	224	**60.5**	5.7	-0.4, 13.6	3.347	0.067

Table 3.48: Responses to Questions about Previous Experience of Consulting in General Practice and Attitudes to the Care Provided by Practice (based on numbers of respondents agreeing with each statement)

Practice		A (n=272)	B (n=62)	C (n=194)	D (n=90)	E (n=95)	χ^2	p-value
My doctor's surgery is modern and up to date	**No.**	212	38	155	79	62	20.907	<0.001
	%	**78.2**	**62.3**	**79.9**	**87.8**	**66.0**		
The receptionists at the surgery are always friendly and helpful	**No.**	172	47	140	61	59	7.983	0.092
	%	**63.2**	**77.0**	**72.5**	**67.8**	**62.8**		
The surgery is private enough to talk to the receptionists	**No.**	30	6	42	26	13	22.154	<0.001
	%	**11.1**	**9.8**	**21.8**	**28.9**	**13.8**		
If I go to the surgery I will always have to wait a long time	**No.**	123	28	45	27	51	38.427	<0.001
	%	**45.4**	**46.7**	**23.3**	**30.0**	**54.3**		
It can be difficult to get through to the surgery by telephone	**No.**	69	10	20	4	19	29.993	<0.001
	%	**25.5**	**16.4**	**10.4**	**4.5**	**20.2**		
I am always satisfied with the care I get at my doctor's surgery	**No.**	184	35	144	64	65	6.967	0.138
	%	**68.1**	**57.4**	**74.6**	**71.1**	**69.9**		
It can be hard to get an appointment to see the doctor	**No.**	92	21	48	19	34	10.445	0.034
	%	**34.2**	**34.4**	**24.9**	**21.1**	**36.6**		
Getting to my doctor's surgery can be a problem for me	**No.**	30	4	19	13	17	6.697	0.153
	%	**11.1**	**6.6**	**9.8**	**14.4**	**18.1**		
I would like to see the same doctor every time I go to the surgery	**No.**	167	47	125	47	59	9.589	0.048
	%	**61.6**	**77.0**	**64.8**	**52.8**	**62.8**		
I see the same doctor almost every time I go to the surgery	**No.**	103	30	126	45	45	32.534	<0.001
	%	**38.1**	**49.2**	**64.9**	**50.0**	**47.9**		
I feel able to talk to the doctor about very personal things	**No.**	75	21	40	22	25	5.759	0.218
	%	**27.8**	**34.4**	**20.6**	**24.4**	**26.6**		
I feel the doctor takes me seriously	**No.**	211	38	139	62	63	8.899	0.064
	%	**77.9**	**62.3**	**71.6**	**69.7**	**67.0**		
When I see the doctor I am given enough time to talk about everything I want	**No.**	181	39	121	59	51	5.335	0.255
	%	**67.0**	**63.9**	**62.4**	**66.3**	**54.3**		

I have presented the responses to the second series of statements in table 3.49. Respondents rated confidentiality as the most important aspect of those listed, followed by having a doctor with an interest in teenage health. Same day appointments, 'drop-in' clinics, anonymous telephone advice, and friendly reception staff were next in order of importance. Relatively less importance was attached to the choice of gender of doctor, continuity of care, and access to a nurse instead of a doctor.

For subsequent analyses I have compared numbers of respondents rating factors as *Important* and *Very Important* with those rating them as *Not Important*.

There were significant gender differences in response for several factors as shown in table 3.50. In particular girls rated the choice of gender of doctor, 'drop-in' clinics, and access to a nurse instead of doctor, as more important than boys.

There were no significant differences in response by age or practice. The only significant difference in relation to ethnicity was in relation to continuity of care: 486 (74.5%) of white respondents rated this as Important or Very Important compared with 50 (89.3%) of other ethnic groups (χ^2=6.097, df=1, p=0.014).

Table 3.49: Responses to Statements about Various Aspects of Service Provision.

	Very Important		Important		Not Important	
	No.	%	No.	%	No.	%
Confidentiality (knowing that if you tell the doctor something, other people will not find out)	579	**81.4**	118	**16.6**	14	**2.0**
Seeing the same doctor or nurse on every visit	143	**20.2**	393	**55.5**	172	**24.3**
Being able to choose to see a male or female doctor	233	**32.8**	301	**42.3**	177	**24.9**
Having a friendly receptionist	212	**29.9**	385	**54.3**	112	**15.8**
Having a doctor who is interested in teenage problems	364	**51.3**	300	**42.3**	46	**6.5**
Being able to ask for advice over the phone without having to give your name	223	**31.5**	391	**55.2**	94	**13.3**
Having a special teenage clinic which you can 'drop into' if you have a problem	273	**38.6**	354	**50.1**	80	**11.3**
Being invited to a special health check with a doctor or nurse	120	**17.0**	372	**52.6**	215	**30.4**
Being able to discuss problems with a nurse instead of a doctor	121	**17.0**	327	**46.1**	262	**36.9**
Being able to see a doctor on the same day you make the appointment	274	**38.6**	355	**50.1**	80	**11.3**

Table 3.50: Responses to Statements about Various Aspects of Service Provision by Gender

(based on combined numbers rating factor as Important or Very Important).

All n=713*	Males n=340*		Females n=373*		Gender Difference (%)	95% Confidence Interval	Chi-square for difference	p-value
	No.	%	No.	%				
Confidentiality	328	**96.8**	369	**99.2**	2.4	0.3, 4.5	5.463	0.019
Seeing the same doctor or nurse on every visit	256	**75.9**	280	**75.5**	0.5	-5.8, 6.8	0.023	0.879
Being able to choose to see a male or female doctor	209	**61.6**	325	**87.3**	25.7	19.5, 31.9	62.723	<0.001
Having a friendly receptionist	272	**80.5**	325	**87.6**	7.1	1.7, 12.5	6.755	0.009
Having a doctor who is interested in teenage problems	310	**91.5**	354	**95.5**	4.0	0.3, 7.6	4.613	0.032
Being able to ask for advice over the phone without having to give your name	281	**83.4**	333	**89.7**	6.4	1.3, 11.4	6.232	0.013
Having a special teenage clinic which you can 'drop into' if you have a problem	281	**83.4**	346	**93.5**	10.1	5.4, 14.8	18.037	<0.001
Being invited to a special health check with a doctor or nurse	225	**67.0**	267	**72.0**	5.0	-1.8, 11.8	2.086	0.149
Being able to discuss problems with a nurse instead of a doctor	167	**49.4**	281	**75.6**	26.1	19.2, 33.0	51.927	<0.001
Being able to see a doctor on the same day you make the appointment	294	**87.3**	335	**90.1**	2.8	-1.9, 7.5	1.398	0.237

3.3 COMBINED RESULTS FROM STUDIES ONE AND TWO

In the previous two sections I have presented the results from the case-note abstraction and the questionnaire survey separately. In this section I will be presenting the analysis collating the results from the two sources. This has three purposes: the first is to validate some of the questionnaire results against recorded consultation data; the second is to explore some of the responses from the survey by demographic characteristics obtained from the medical records (such as deprivation and distance from the surgery); and the third is to determine whether there are associations between self-reported attitudes and behaviour with recorded behaviour which give insights into the use of general practice services by teenagers.

3.3.1 Cross-Validation of Items from the two Sources

No single data item was extracted from both the questionnaire and the medical records that would allow direct validation between the two. However there are some items that would be expected to demonstrate a degree of correlation between the two. These include self-reported consultations in the previous 12 months compared with recorded consultations from the medical record, and medically treated health conditions such as asthma and skin problems where ongoing treatment may be required necessitating consultation.

a) Self-Reported versus Recorded Consultations

In the questionnaire survey teenagers were asked when they had last visited their doctor. This was compared with the recording of consultation in the case note abstraction.

Of the 468 teenagers who had completed a questionnaire and who reported having consulted a GP within the past 12 months, 411 (87.8%) had at least one recorded consultation. Conversely, of the 93 teenagers who had completed a questionnaire and who reported having had no consultations within the past 12 months, 20 (21.5%) had at least one recorded consultation, but 18 of these had only consulted once. Some of these differences may be due to the fact that the reference periods for the two data collection methods did not exactly coincide, depending on the date at which the questionnaire was completed.

I also explored the possibility that teenagers who consulted more frequently might be more likely to complete the questionnaire. Of the 601 teenagers who had consulted at least once, 500 (83.2%) responded to the questionnaire, which was significantly higher than the 174 (75.7%) out of 230 who responded but had not consulted (χ^2=6.176; df=1; p=0.013).

b) Self-Reported Illness versus Consultation for Illness

(i) Asthma

A total of 153 teenagers reported having asthma in their questionnaire responses. Of these only 71 (48.3%) had a recorded consultation for asthma (GP or nurse) within the preceding 12 months. Of the 529 who reported that they did not have asthma, only 4 (0.8%) had a recorded consultation for asthma.

68 (44.4%) of those who said that they had asthma indicated that they were using an inhaler every day and none of those who denied asthma were using an inhaler.

However of those using an inhaler one-quarter had no recorded consultations for asthma in the previous 12 months, suggesting a lack of follow up.

(ii) Skin Problems

A total of 155 teenagers reported having either eczema or acne. Of these 76 (49.0%) had a reported consultation for a dermatological problem. Of the 521 who did not report either eczema or acne, 128 (24.6%) had a recorded consultation for a dermatological problem, although it is important to note that this category includes conditions other than eczema and acne.

3.3.2 Survey Responses by Demographic Characteristics

I undertook further analysis of the variables described in section 3.2 by both deprivation and by distance of home from the surgery but only in relation to those variables with which there was a possible association.

Analysis by distance from the surgery was limited to variables relating to use of general practice and other health services, whilst analysis by deprivation was also performed in relation to health status, concerns, behaviours and attitudes.

a) Distance from Surgery

There was no association between the distance of home from the surgery and self-reported timing of last visit, who made the appointment, who accompanied the teenager to the surgery, or who went into the GP with them. Neither was there any association between the reported use of other health services and distance from the surgery. However there was a statistically significant association with the response

to the statement 'Getting to the surgery can be difficult for me': 24 (20.9%) of the 115 teenagers who lived further than two miles agreed with this statement compared with 28 (15.7%) of the 178 who lived between one and two miles, and only 29 (7.1%) of the 406 who lived within one mile (χ^2 for difference=20.48; df=2; $p<0.001$; χ^2 for trend = 20.11, df=1, $p<0.001$)

b) Deprivation

For further analyses by deprivation I limited comparisons to the three deprivation variables derived from 1991 census data, as previous analysis had not shown any greater benefit or significant differences in using the 2001 data. In order to make an allowance for multiple hypothesis testing, I applied the Bonferonni correction within each set of comparisons (see introduction to methodology for more details), therefore using a statistical probability of 0.05 divided by 3 (0.017) as a cut-off. Finally I have only reported associations further where there was also a statistically significant trend across the five deprivation quintiles for at least one of the deprivation indices.

Using the above criteria I found significant associations with the following variables:

- Questionnaire response rates
- Self-reported cigarette smoking
- Self-reported tiredness
- Health locus of control

Questionnaire response rates were lowest from teenagers in the most deprived quintiles, with rates being highest in quintiles 2 and 3 (table 3.51). Differences were

statistically significant using the Jarman and Townsend Indices but not the Carstairs Index.

Self-reported cigarette smoking rates were inversely related to deprivation with teenagers in the most deprived areas being most likely to smoke. Figure 3.5 illustrates the trends and also compares smoking with self-reported alcohol intake and drug use. The association between cigarette smoking was statistically significant using the Jarman and Townsend Indices and a similar trend was observed in relation to the Carstairs Index. Most of the difference was due to the higher smoking rates (up to 32%) in the most deprived quintile with little difference observed between the other four quintiles.

There was no statistical association between self-reported alcohol intake and deprivation, although highest rates were reported in the middle quintile. Self-reported drug use was highest in the most deprived quintile, although this did not meet the criteria for statistical significance for any of the deprivation indices.

Self-reported tiredness (either *all of the time* or *some of the time*) was greatest in the least deprived quintile with rates of up to 72% (table 3.52). It was lowest (52%) in the 3rd or 4th quintiles depending on the Deprivation Index used. Differences were statistically significant for Jarman and Townsend Indices but not for the Carstairs Index.

There was a statistically significant association between the *internal* dimension of the health locus of control scale and deprivation, with teenagers in the most deprived

quintile having the lowest scores (consistent with lower belief in their ability to control their own health). Mean and median scores for all of the dimensions are shown in table 3.53 but there were no differences in relation to the *chance* or *powerful others* dimensions.

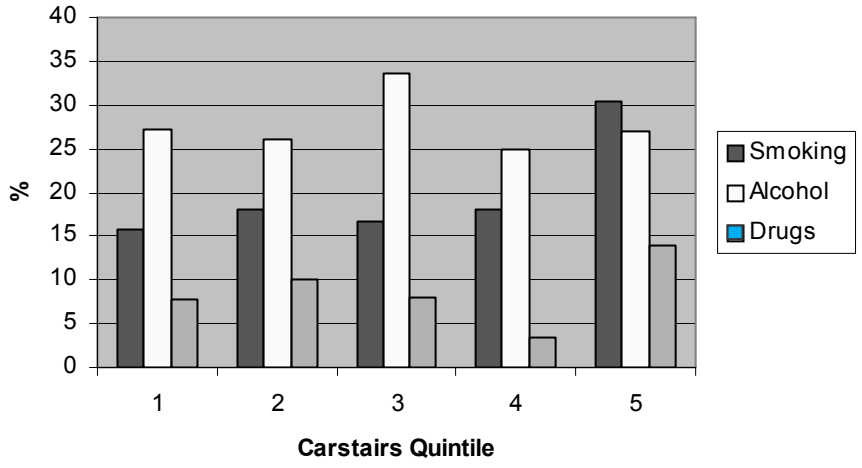
I performed the same analysis on the component questions of the health locus of control scale. There was only one question for which there was a statistically significant difference with deprivation, and this was the response to the statement 'The main thing that affects my health is what I do'. Only 67.0% (73) of teenagers in the most deprived Townsend Index quintile agreed with this statement compared with 85.1% (131) in the least deprived and 79.3%, 83.8% and 79.1% in the middle three quintiles respectively (χ^2 for difference = 14.993; p=0.005; χ^2 for trend = 9.179; p=0.002). A similar but non-significant trend was found using the Carstairs and Jarman Indices.

Table 3.51: Questionnaire Response Rates by Deprivation

		Deprivation Quintile									
		1	**2**	**3**	**4**	**5**	**All**	**Chi-square for difference**	**p-value**	**Chi-square for trend**	**p-value**
Deprivation Index		**Most Affluent**			**Least Affluent**						
Carstairs 1991	No.	141	140	150	149	123	703	11.16	0.025	3.739	0.053
N=873	**%**	**82.0**	**80.9**	**85.2**	**82.3**	**71.9**	**80.5**				
Jarman 1991	No.	151	139	159	135	119	703	13.58	**0.009**	7.869	**0.005**
N=873	**%**	**81.6**	**86.9**	**83.7**	**78.0**	**72.1**	**80.5**				
Townsend 1991	No.	155	146	137	155	110	703	13.65	**0.009**	5.133	0.023
N=873	**%**	**81.6**	**83.4**	**83.5**	**82.9**	**70.1**	**80.5**				

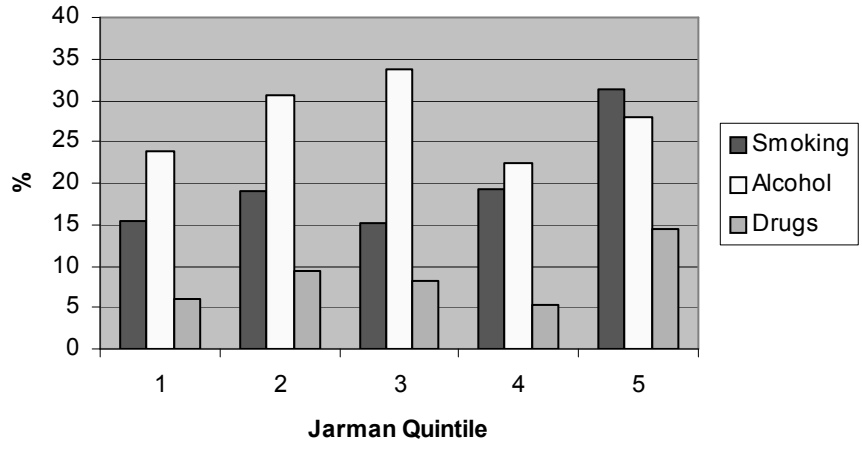
Figure 3.5: Relationship between Self-Reported Health Behaviours and Deprivation

Figure 3.5(a): Regular smoking, alcohol and drug use by deprivation (Carstairs Index)



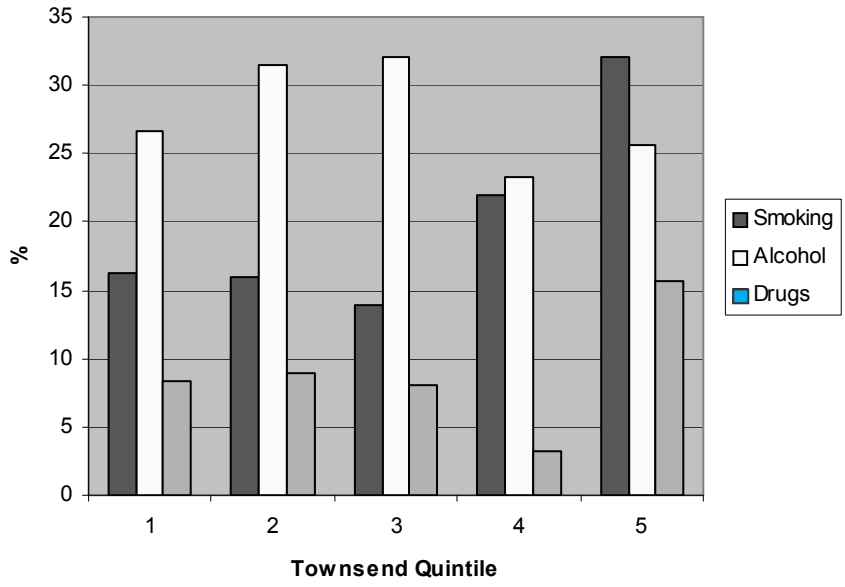
Carstairs Index	χ^2 for difference	p-value	χ^2 for trend	p-value
Smoking[1]	11.429	0.022	6.368	**0.012**
Alcohol[2]	3.302	0.509	0.012	0.914
Drugs[3]	10.251	0.036	0.295	0.587

Figure 3.5(b): Distribution of Self-Reported Smoking, Alcohol and Drug Use by Jarman Index



Jarman Index	χ^2 for difference	p-value	χ^2 for trend	p-value
Smoking[1]	14.137	**0.007**	7.814	**0.005**
Alcohol[2]	6.465	0.167	0.005	0.951
Drugs[3]	8.617	0.071	2.464	0.116

Figure 3.5(c): Distribution of Self-Reported Smoking, Alcohol, and Drug Use by Townsend Index



Townsend Index	χ^2 for difference	p-value	χ^2 for trend	p-value
Smoking[1]	16.520	**0.002**	10.064	**0.002**
Alcohol[2]	4.077	0.396	0.628	0.428
Drugs[3]	12.701	**0.013**	0.481	0.488

[1] Smoking = Current smokers – *sometimes* or *every day*
[2] Alcohol = Regular alcohol –including *less than once a week* and *more than weekly*
[3] Drugs = Current drug use – either *occasional* or *regular*

Table 3.52: Self-Reported Tiredness (*some of the time* or *all of the time*) by Deprivation

Deprivation Quintile		1	2	3	4	5	All	χ^2 for difference	p-value	χ^2 for trend	p-value
Deprivation Index		**Most Affluent**			**Least Affluent**						
Carstairs 1991	No.	94	86	92	75	70	417	8.809	0.066	5.647	**0.017**
n=681	**%**	**68.1**	**64.2**	**63.0**	**52.1**	**58.8**	**61.2**				
Jarman 1991	No.	105	76	98	68	70	417	12.586	**0.013**	4.837	0.028
n=681	**%**	**71.4**	**57.1**	**63.6**	**51.9**	**60.3**	**61.2**				
Townsend 1991	No.	110	89	68	92	58	417	15.293	**0.004**	8.840	**0.003**
n=681	**%**	**72.4**	**63.6**	**51.9**	**60.9**	**54.2**	**61.2**				

Table 3.53: Health Locus of Control Scores by Deprivation: median (and mean) scores

		Deprivation Quintile						
HLOC Dimension	**Deprivation Index**	**1**	**2**	**3**	**4**	**5**	**χ^2**	**p-value for difference***
Chance	Carstairs Index	1.0 (0.73)	1.0 (0.84)	1.0 (0.93)	1.0 (0.99)	1.0 (0.97)	7.651	0.105
	Jarman Index	1.0 (0.73)	1.0 (0.90)	1.0 (0.92)	1.0 (0.95)	1.0 (0.99)	6.771	0.148
	Townsend Score	1.0 (0.73)	1.0 (0.85)	1.0 (0.92)	1.0 (0.98)	1.0 (1.03)	8.191	0.085
Powerful Others	Carstairs Index	1.0 (0.85	1.0 (0.76)	1.0 (0.83)	1.0 (0.90)	1.0 (0.84)	1.861	0.761
	Jarman Index	1.0 (0.80)	1.0 (0.93)	1.0 (0.78)	1.0 (0.85)	1.0 (0.84)	2.861	0.581
	Townsend Score	1.0 (0.78)	1.0 (0.89)	1.0 (0.73)	1.0 (0.92)	1.0 (0.88)	3.577	0.466
Internal	Carstairs Index	3.0 (2.42)	3.0 (2.50)	3.0 (2.32)	2.0 (2.20)	2.0 (2.28)	13.333	**0.010**
	Jarman Index	3.0 (2.45)	3.0 (2.37)	3.0 (2.38)	2.0 (2.24)	2.0 (2.23)	11.291	0.023
	Townsend Score	3.0 (2.42)	3.0 (2.48)	3.0 (2.31)	2.0 (2.28)	2.0 (2.19)	15.216	**0.004**

*Kruskal-Wallis Test

3.3.3 Questionnaire Responses and Recorded Consultation Patterns

In the following section I report the results of analyses in which I tested for associations between questionnaire responses and recorded consultations. I analysed the data in relation to overall consultation rates and also consultation for specific conditions where appropriate. I investigated the following variables:

- Use of non-general practice based health services
- Health status (chronic conditions and Dartmouth COOP charts)
- Health related behaviours (smoking, alcohol and drugs)
- Health concerns
- Help-seeking attitudes
- Health locus of control
- Attitudes to confidentiality and embarrassment
- Attitudes to the practice and medical care

a) Use of Other Health Services

The association between the self-reported use of non-general practice based health services and recorded general practice consultations in the previous 12 months is shown in table 3.54. There was a statistically significant association between the use of all hospital based services (inpatient, outpatient and Accident & Emergency) and general practice consultations. The use of all of these services was associated with higher GP consultation rates and a statistically significant trend. In contrast, there was no association between the use of family planning services and teenage clinics and GP consultation rates.

Table 3.54: Self-Reported Use of Non-General Practice Based Health Services and Recorded General Practice Consultations

		Annual Consultation Rate					χ^2 for difference	p-value	χ^2 for trend	p-value
		0	**1**	**2-3**	**4+**	**All**				
Hospital Inpatient (n=653)	No.	11	19	12	25	67	13.227	**0.004**	6.151	**0.013**
	%	**6.9**	**10.6**	**6.8**	**18.0**	**10.3**				
Hospital Outpatient (n=649)	No.	26	37	67	62	192	42.081	**<0.001**	39.858	**<0.001**
	%	**16.3**	**21.0**	**38.1**	**45.3**	**29.6**				
Accident & Emergency (n=653)	No.	26	46	42	58	172	25.781	**<0.001**	19.827	**<0.001**
	%	**16.4**	**25.8**	**23.7**	**41.7**	**26.3**				
Family Planning Clinic (n=654)	No.	9	9	6	10	34	2.365	0.500	0.074	0.786
	%	**5.6**	**5.1**	**3.4**	**7.2**	**5.2**				
Teenage Clinic (n=652)	No.	6	9	6	9	30	2.046	0.563	0.576	0.448
	%	**3.8**	**5.1**	**3.4**	**6.5**	**4.6**				

Table 3.55: Self-Reported Asthma and Eczema and Recorded General Practice Consultations

n=676		Annual Consultation Rate					χ^2 for difference	p-value	χ^2 for trend	p-value
		0 n=166	**1** n=182	**2-3** n=184	**4+** n=144	**All** n=676				
Asthma	No.	18	31	41	57	147	40.927	**<0.001**	36.992	**<0.001**
	%	**10.8**	**17.0**	**22.3**	**39.6**	**21.7**				
Eczema	No.	16	22	28	31	97	9.905	**0.019**	9.342	**0.002**
	%	**9.6**	**12.1**	**15.2**	**21.5**	**14.3**				

b) Health Status

This section explores the relationship between consultation patterns, self-reported chronic illnesses (asthma and eczema), and self-reported health status on the Dartmouth COOP charts.

There was a statistically significant association between annual consultation rate and both self-reported asthma and eczema (table 3.55).

The median annual consultation rate of those with asthma was 3.0 (mean 3.38) compared with 1.0 (mean 1.83) for those without asthma (Mann Whitney U test: $p<0.001$). The difference in consultation was partly, but not entirely, due to an increased likelihood of consulting for respiratory problems: table 3.56 shows the proportion of teenagers with and without asthma consulting at least once for various categories of condition. In addition to respiratory conditions, teenagers with asthma were significantly more likely to have consulted for otorhinological conditions (OR 2.02; 95% CI: 1.32, 3.11) and musculoskeletal conditions (OR 1.75; 95% CI: 1.17, 2.64). Although there was also a borderline statistically significant association with consultations for gastrointestinal conditions, the 95% confidence interval of the odds ration included 1 and so was not significant.

The median annual consultation rate of those with eczema was 2.0 (mean 3.34) compared with 2.0 (mean 2.30) for those without eczema (Mann Whitney U test: $p=0.001$). Because I had already identified an association between self-reported eczema and gender I repeated the analysis separately amongst boys and girls. The

increased consultation rate for eczema remained statistically significant amongst boys but not girls.

The difference in consultation rate was partly, but not entirely, due to an increased likelihood of consulting for dermatological problems: table 3.57 shows the proportion of teenagers with and without eczema consulting at least once for various categories of condition. In addition to dermatological conditions, teenagers with eczema were significantly more likely to have consulted for urogenital conditions (OR 2.69; 95% CI:1.52, 4.76) and psychological conditions (OR 3.77; 95% CI: 1.73, 8.20).

After controlling for gender, teenagers with eczema were still significantly more likely to have consulted for dermatological problems (OR 2.18, 95% CI 1.39, 3.44) and psychological problems (OR 2.75, 95% CI 1.22, 6.17), but not for urogenital problems (OR 1.75, 95% CI 0.95, 3.25).

Dartmouth COOP Charts

The Dartmouth COOP Charts provide a short self-report assessment of six domains of health over the previous month. The only statistically significant relationship with each of the domains and overall consultation rate was in relation to the emotional feelings domain, for the median consultation rate was four times higher in the category associated with poorest compared with the best emotional health. In view of the previously described associations between gender and the emotional domain of the COOP chart, and between gender and consultation rate, I undertook separate analysis by gender. The results are presented in table 3.58. This shows that

the association between self-reported emotional health and consultation rate persisted, but only amongst girls.

Girls who scored highly on the emotional domain of the COOP charts consulted more frequently for both urogenital and psychological problems: 22 of 72 (30.6%) girls who rated themselves as feeling depressed most of the time or all of the time consulted with urogenital problems compared with 39 of 276 (14.1%) who reported less frequent depression (χ^2=10.657; p=0.001); 11 of 72 (15.3%) girls who rated themselves as feeling depressed most of the time or all of the time consulted with psychological problems compared with 9 of 276 (3.6%) of the others (Fishers exact test p=0.001). There were no other significant differences in consultation by condition.

Table 3.56: Consultation by Condition by Self-Reported Asthma

Consultation Category	All Teenagers		Asthma n=147		No Asthma n=529		χ^2 for difference	p-value
n=676	No.	%	No.	%	No.	%		
Respiratory	244	**36.1**	95	**64.6**	149	**28.2**	66.293	**<0.001**
Dermatological	204	**30.2**	48	**32.7**	156	**29.5**	0.546	0.460
Musculoskeletal	155	**22.9**	46	**31.3**	109	**20.6**	7.436	**0.006**
Otorhinological	126	**18.6**	41	**27.9**	85	**16.1**	10.604	**0.001**
Ophthalmic	28	**4.1**	8	**5.4**	20	**3.8**	0.800	0.371
Urogenital	71	**10.5**	21	**14.3**	50	**9.5**	2.860	0.091
Gastrointestinal	56	**8.3**	147	**12.2**	38	**7.2**	3.879	**0.049**
Psychological	30	**4.4**	9	**6.1**	21	**4.0**	1.257	0.262
Miscellaneous	96	**14.2**	24	**16.3**	72	**13.6**	0.696	0.404

Table 3.57: Consultation by Condition by Self-Reported Eczema

Consultation Category	All Teenagers		Eczema n=97		No Eczema n=579		χ^2 for difference	p-value
n=676	No.	%	No.	%	No.	%		
Respiratory	244	**36.1**	41	**42.3**	203	**35.1**	1.871	0.171
Dermatological	204	**30.2**	47	**48.5**	157	**27.1**	17.953	**<0.001**
Musculoskeletal	155	**22.9**	20	**20.6**	135	**23.3**	0.342	0.559
Otorhinological	126	**18.6**	21	**21.6**	105	**18.1**	0.677	0.411
Ophthalmic	28	**4.1**	4	**4.1**	24	**4.1**	0.000	0.992
Urogenital	71	**10.5**	20	**20.6**	51	**8.8**	12.328	**<0.001**
Gastrointestinal	56	**8.3**	8	**8.2**	48	**8.3**	0.000	0.989
Psychological	30	**4.4**	11	**11.3**	19	**3.3**	12.722	**0.002***
Miscellaneous	96	**14.2**	17	**17.5**	79	**13.6**	1.027	0.311

*Fishers exact test as 25% of cells had expected count less than 5

Table 3.58: Consultation Rates by the Emotional Domain of Dartmouth COOP Charts and by Gender

Scale	Median (& Mean) Annual Consultation Rate by Response to Emotional Domain of COOP Chart					p-value for difference
	1	2	3	4	5	(Kruskal-Wallis test)
Male	1.0 (1.89)	2.0 (2.09)	1.0 (1.76)	1.5 (2.78)	2.0 (4.00)	χ^2=4.790 p=0.310
Female	1.0 (2.00)	2.0 (2.48)	2.0 (2.77)	2.0 (3.56)	4.0 (5.69)	χ^2=13.822 **p=0.008**

c) Health Related Behaviours

I undertook analyses to determine whether teenagers who smoked regularly, drank alcohol regularly, or used drugs occasionally or regularly consulted more or less frequently than others. Although regular smokers tended to consult more frequently overall than non-smokers, and teenagers using drugs tended to be frequent attenders than non-users, differences were not statistically significant. There were no differences at all in relation to overall consultations and alcohol intake.

Despite the lack of an association with overall consultation rate I undertook further analyses to determine whether regular smokers were more likely to have consulted for specific types of condition. Regular smokers were significantly more likely to have consulted with respiratory symptoms in the previous 12 months: 60 of 128 (46.9%) regular smokers consulted with a respiratory problem compared with 183 of 543 (33.7%) non-smokers (χ^2=7.782; p=0.005).

In addition, regular smokers were more likely to have consulted about psychological problems and for urogenital conditions: 16 of 128 (12.5%) of regular smokers had at least one recorded consultation for a psychological problem compared with 14 of 543 (2.6%) non-smokers (χ^2=23.874; p<0.001); 21 of 128 (16.4%) of regular smokers had at least one recorded consultation for a urogenital problem compared with 50 of 543 (9.2%) non-smokers (χ^2=5.672; p<0.017);

d) Health Concerns

Teenagers were asked to rate a series of potential health concerns according to whether they were worried about them 'none of the time', 'some of the time' or 'all

of the time'. For each of these categories I determined the proportion of respondents who had a recorded consultation for that problem (or a similar category of problem) over the previous 12 months. The results are presented in table 3.59.

For the majority of health concerns there was a statistically significant association between the amount of concern expressed and the proportion of teenagers consulting. However, less than approximately half of teenagers who reported experiencing a problem 'all of the time' had consulted about it, with a much lower proportion for some problems. Teenagers reporting physical problems such as respiratory, dermatological or musculoskeletal problems were more likely to consult than those reporting psychological problems such as stress or potential somatic problems such as headaches.

There was also an association between some types of health concern and consultation for other types of apparently unrelated problems: teenagers with concerns about breathing consulted more frequently for respiratory problems, but also for headaches and psychological problems; those with concerns about joint problems also consulted more frequently about asthma; whilst those with stress consulted more frequently about dermatological, urogenital, and otorhinological problems. In contrast, those who were concerned about tiredness, skin problems and headaches only consulted about these types of problems specifically.

Table 3.59: Self-Reported Health Concerns And Recorded Consultation For These Conditions

Health Concern		Not worried	Worried "some of the time"	Worried "all of the time"	χ^2 for difference	p-value	χ^2 for trend	p-value
Breathing	Overall No.	398	219	40				
	No (%) consulting	116 (29.1%)	104 (47.5%)	21 (52.5%)	25.053	**<0.001**	23.346	**<0.001**
Headaches	Overall No.	218	397	39				
	No (%) consulting	2 (0.9%)	12 (3.0%)	9 (23.1%)	48.764	**<0.001**	24.989	**<0.001**
Skin	Overall No.	224	376	68				
	No (%) consulting	49 (21.9%)	119 (31.6%)	33 (48.5%)	18.787	**<0.001**	5.585	**<0.001**
Joints	Overall No.	282	332	43				
	No (%) consulting	51 (18.1%)	83 (25.0%)	16 (37.2%)	9.537	**0.008**	9.114	**0.003**
Weight	Overall No.	317	213	63				
	No (%) consulting	1 (0.3%)	1 (0.5%)	3 (4.8%)	N/A		N/A	
Stress	Overall No.	219	383	55				
	No (%) consulting	9 (4.1%)	9 (2.4%)	12 (22%)	41.987	**<0.001**	10.815	**0.001**
Sleep	Overall No.	393	222	39				
	No (%) consulting	1 (0.3%)	2 (0.9%)	1 (2.6%)	N/A		N/A	
Tiredness	Overall No.	252	331	69				
	No (%) consulting	3 (1.2%)	8 (2.4%)	3 (4.3%)	2.738	0.254	2.666	0.103
Being Bullied	Overall No.	412	218	29				
	No (%) consulting	15 (3.6%)	10 (4.6%)	4 (13.8%)	6.665	**0.036**	3.724	0.054
Dying	Overall No.	381	216	61				
	No (%) consulting	20 (5.2%)	5 (2.3%)	5 (8.2%)	4.772	0.092	0.013	0.908

e) Help Seeking Attitudes

Teenagers were asked to indicate their intent of seeking help from a range of sources including GPs and practice nurses about a series of issues. I compared the overall consultation rates of those who expressed intent to consult a GP for any issue with those who did not. The results are shown in table 3.60.

Stated intent to seek help from a GP for any problem was associated with a higher overall annual consultation rate. The difference was statistically significant for depression, relationships (although small numbers), weight problems and skin problems.

In order to explore whether intent to seek help from a GP was a general association or specific to certain issues I determined the proportion of teenagers who had consulted for specific issues in the previous 12 months relative to their stated intent. This was only possible for those issues for which there was a specific category of consultation.

Of the 54 respondents who had expressed intent to talk to a GP about feeling depressed, 8 (14.8%) had consulted with psychological problems in the previous 12 months compared with only 22 (3.5%) of the 622 who expressed no such intent (Fisher's exact test p=0.001). This group was also significantly more likely to have consulted about respiratory problems but not about any other category of problem: 29 (53.7%) of those with intent to consult about depression had consulted with respiratory problems compared with 205 (34.6%) of those who had no intent (χ^2=7.889, p=0.005).

With respect to weight problems, only five teenagers had a recorded consultation for such problems in the previous 12 months despite 161 expressing intent to discuss it with a GP. Of these five, three expressed intent to discuss weight issues whilst two did not, and the association was not statistically significant. However respondents who expressed intent to consult about weight problems were more likely to have consulted for both urogenital and respiratory problems: of the 162 respondents who had expressed intent to talk to a GP about feeling weight problems, 25 (15.4%) had consulted with urogenital problems in the previous 12 months compared with only 46 (8.9%) of the 514 who expressed no such intent (χ^2=5.507, p=0.019); similarly, 72 (44.4%) of those with intent consulted with respiratory problems compared with 172 (33.5%) of those without intent (χ^2=6.440, p=0.011).

Amongst the 279 respondents who expressed intent to consult about skin problems, there was a slightly higher consultation rate for dermatological problems than amongst the 379 without such intent: 97 (34.8%) of the former consulted for dermatological problems compared with 107 (27.0%) of the latter (χ^2=4.749, p=0.029). There was also an association with consulting for respiratory problems: 116 (41.6%) of those with intent to consult about skin problems had consulted for respiratory problems compared with 128 (32.2%) of the others (χ^2=6.190, p=0.013).

Finally, although there was no association with overall consultation rate, I explored the relationship between intent to consult for contraception and recorded consultations for contraception amongst girls only. There was a weak association, with 10 (9.6%) of the 104 girls who expressed intent to talk to a GP about contraception having specifically consulted for this purpose compared with 10

(4.1%) of the 244 others (χ^2=4.097, p=0.043). However there was a much stronger association with consulting for the wider category of urogenital problems with 29 (27.9%) girls with intent to consult about contraception having a recorded consultation for urogenital problems compared with 32 (13.1%) of the others (χ^2=11.004, p=0.001). There was no association with other categories of consultation.

Table 3.60: Overall Consultation Rates by Intent to Seek Help from GP for Specified Issues

	Expressed intent to discuss with GP		**No intent to discuss with GP**		
Issue	No.	Median (mean) consultation rate	No.	Median (mean) consultation rate	p-value
Smoking	49	2.0 (2.90)	627	2.0 (2.42)	0.241
Feeling depressed	54	2.0 (3.43)	622	2.0 (2.37)	**0.004**
Relationships	7	5.0 (5.00)	669	2.0 (2.42)	**0.030**
Drugs	93	2.0 (2.87)	583	2.0 (2.38)	0.101
Weight problems	162	2.0 (3.15)	514	1.0 (2.13)	**<0.001**
Contraception	160	2.0 (2.86)	516	2.0 (2.32)	0.116
Alcohol	63	2.0 (2.92)	613	2.0 (2.40)	0.120
Skin problems	279	2.0 (2.87)	397	1.0 (2.16)	**0.002**

f) Health Locus of Control

I compared the consultation rates of teenagers on each of the dimensions of the multidimensional health locus of control scale. There were no significant differences or trends either in terms of overall consultation rate for recorded consultations or for specific categories of problem.

g) Attitudes to Confidentiality and Embarrassment

I compared the overall recorded consultation rates of teenagers according to their responses to statements about confidentiality and embarrassment, adjusting for gender and practice. Results are shown in table 3.61.

Teenagers who did not believe that their GP kept everything confidential had lower consultation rates than others, as did respondents who would not reveal emotional problems because of fear of others finding out, and those who did not trust their GP. However none of these differences were statistically significant.

In view of the fact that attitudes to confidentiality and embarrassment might only affect decisions to consult about more sensitive issues I undertook further analysis to determine whether there was an association with recorded consultations for specific categories of problem, particularly urogenital and psychological.

Teenagers who agreed with the statements that they might not tell their GP about health problems and about emotional problems were more likely to have consulted about psychological problems as were those who claimed that they did not trust their GP: 13 (8.7%) of the 150 who agreed that they might not tell their GP about some

health problems because of being afraid other people might find out had consulted with psychological problems compared with 15 (3.7%) of 248 who disagreed (X2=8.716, p=0.013); similarly 11 (7.8%) of the 141 who agreed that they might not tell their GP about some emotional problems because of being afraid that other people might find out had consulted with psychological problems compared with 16 (4.3%) of 248 who disagreed (X2=6.134, p=0.047);

There were no overall associations between attitudes and consultation for urogenital problems. However amongst girls, only 22 (13.5%) of the 163 who agreed that they might be too embarrassed to speak to their GP about their problems had a recorded consultation for a urogenital problem compared with 23 (24.7%) of 93 who disagreed (χ^2=5.158; p=0.023). A similar trend was present for consultations for contraception with only 6 (3.7%) of those expressing concerns about embarrassment consulting for contraception compared with 10 (10.8%) of the remainder (Fishers exact test p=0.032).

Table 3.61: Relationship between Attitudinal Responses to Statements about Confidentiality and Embarrassment, and Annual Consultation Rates, controlling for Gender and Practice[a]

Statement (n)	Response	%	Annual Consultation Rate Mean / Median	Incidence Rate Ratio [b]	95% Confidence Interval	p-value
I might not tell my GP about some health problems because I would worry about other people finding out (673)	Agree	22.3	2.1 / 1.0	1.00		
	Disagree	60.8	2.1 / 1.0	0.97	0.85, 1.11	0.656
	Not sure	16.9	2.5 / 2.0	1.12	0.95, 1.31	0.167
I might not want to tell my GP about emotional problems because I would worry about other people finding out (670)	Agree	21.3	2.0 / 1.0	1.00		
	Disagree	54.9	2.2 / 1.0	1.11	0.98, 1.28	0.100
	Not sure	23.7	2.2 / 1.0	1.08	0.92, 1.26	0.340
I might be too embarrassed to talk to my GP about my problems (673)	Agree	43.1	2.2 / 1.0	1.00		
	Disagree	33.0	2.1 / 1.0	0.96	0.85, 1.08	0.465
	Not sure	23.9	2.2 / 1.0	0.96	0.84, 1.09	0.499
I do not go to see my doctor about all my health problems because I do not trust him / her (650)	Agree	6.1	1.7 / 1.0	1.00		
	Disagree	82.9	2.2 / 1.0	1.20	0.93, 1.53	0.154
	Not sure	11.0	2.5 / 2.0	1.30	0.98, 1.72	0.073

[a] Poisson regression analysis
[b] Adjusted for gender and practice

h) Attitudes to the Practice & Medical Care

Teenagers were asked to rate satisfaction with various aspects of their practice by responding to a series of statements. For each I compared the overall consultation rate of those agreeing with those who disagreed, adjusting for gender and practice. Results are presented in table 3.62.

Teenagers who agreed that it was difficult to get an appointment with a GP had statistically significantly higher consultation rates than others, as did those who agreed that they were given enough time to talk about everything they wanted.

There were no other significant differences. After adjustment for gender differences in attitudes, trends remained the same but differences were only statistically significant amongst girls.

Table 3.62: Relationship between Attitudes to General Practice, and Annual Consultation Rates, controlling for Gender and Practice[a]

Statement (n)	Response	%	Annual Consultation Rate: Mean / Median	Incidence Rate Ratio [b]	95% Confidence Interval	p-value
My doctors surgery is modern and up to date (675)	Agree	76.6	2.2 / 1.0	1.00		
	Disagree	4.3	2.6 / 2.0	1.17	0.92, 1.48	0.194
	Not sure	19.1	2.0 / 1.0	0.91	0.79, 1.05	0.186
The receptionists at the surgery are always friendly and helpful (675)	Agree	67.6	2.3 / 1.0	1.00		
	Disagree	12.6	2.4 / 2.0	1.06	0.92, 1.24	0.403
	Not sure	19.8	1.7 / 1.0	0.75	0.65, 0.87	**<0.001**
The surgery is private enough to talk to the receptionists (674)	Agree	16.5	2.3 / 1.0	1.00		
	Disagree	60.7	2.1 / 1.0	0.93	0.80, 1.07	0.307
	Not sure	22.8	2.2 / 1.0	0.95	0.80, 1.12	0.514
If I go to the surgery I will always have to wait a long time (673)	Agree	38.3	2.2 / 1.0	1.00		
	Disagree	38.3	2.2 / 1.0	0.96	0.85, 1.08	0.475
	Not sure	23.3	2.1 / 1.0	0.88	0.76, 1.01	0.061
It can be difficult to get through to the surgery by telephone (673)	Agree	17.2	2.5 / 1.5	1.00		
	Disagree	51.6	2.2 / 2.0	0.96	0.83, 1.10	0.555
	Not sure	31.2	1.9 / 1.0	0.83	0.71, 0.96	**0.016**
I am always satisfied with the care I get at my doctor's surgery (672)	Agree	69.7	2.1 / 1.0	1.00		
	Disagree	14.9	2.5 / 2.0	1.15	1.00, 1.33	0.051
	Not sure	15.5	2.1 / 1.0	0.94	0.81, 1.08	0.377
It can be hard to get an appointment to see the doctor (671)	Agree	31.2	2.6 / 2.0	1.00		
	Disagree	43.9	2.1 / 1.0	0.84	0.75, 0.94	**0.004**
	Not sure	24.9	1.7 / 1.0	0.68	0.59, 0.78	**<0.001**
Getting to my doctor's surgery can be a problem for me (674)	Agree	11.6	2.0 / 1.0	1.00		
	Disagree	83.4	2.2 / 1.0	1.14	0.97, 1.35	0.115
	Not sure	5.0	1.7 / 1.0	0.83	0.62, 1.13	0.239
I feel able to talk to the doctor about very personal things (674)	Agree	26.0	2.5 / 2.0	1.00		
	Disagree	40.9	2.1 / 1.0	0.82	0.72, 0.93	**0.002**
	Not sure	33.1	2.0 / 1.0	0.80	0.70, 0.91	**0.001**
I feel the doctor takes me seriously (674)	Agree	71.1	2.2 / 1.0	1.00		
	Disagree	6.2	2.6 / 2.0	1.12	0.92, 1.37	0.266
	Not sure	22.1	2.0 / 1.0	0.87	0.76, 0.99	**0.032**
When I see the doctor I am given enough time to talk about everything I want (673)	Agree	63.3	2.3 / 1.0	1.00		
	Disagree	16.0	1.9 / 1.0	0.80	0.68, 0.93	**0.003**
	Not sure	20.7	1.9 / 1.0	0.80	0.70, 0.92	**0.002**

[a] Poisson regression analysis
[b] Adjusted for gender and practice

3.4 RESULTS: STUDY THREE

This chapter describes the results of the case–control study comparing the characteristics and consultations of teenagers who had a recorded pregnancy with age-matched controls who had no record of conception.

3.4.1 Characteristics of the Case Series

A total of 240 cases were identified from the 14 participating practices. I have presented the characteristics of participating practices in table 3.63 and the numbers of cases identified from each practice in table 3.64. The number of cases as a proportion of registered teenagers does not represent a true teenage pregnancy rate since the numerator is based on conceptions over the defined ascertainment period whilst the number of teenagers was based on current registrations. However this figure does allow comparison between practices. Rates were highest in practices 13 and 14, which were inner city or urban practices with only male GPs, compared with the lowest rates in practices 10 and 12 which were rural or semi-rural with at least one female GP in each.

The characteristics of cases and pregnancy outcomes in relation to practice are presented in table 3.65. Overall 70% of index pregnancies resulted in delivery, 22% in a termination, and 8% in miscarriage. Practice 3, an urban practice in Leicester, had the highest proportion of recorded conceptions under the age of 16 (29%) There were no significant differences in outcome in relation to age at conception (table 3.66).

The mean age of cases at conception (index LMP) was 17 years, 9 months and ranged from 13 years, 9 months to 19 years, 11 months. Thirty-four (14%) were below the age of 16. The age distribution of cases is shown in table 3.68.

Forty-eight cases (20%) had been pregnant at least once previously, 10 (4.2%) twice, and one (0.4%) three times. Of the 59 identified previous pregnancies, 12 (20%) had resulted in miscarriage, 12 (20%) in termination, and the remainder in delivery.

Table 3.63: Characteristics of Participating Practices

Practice No.	Area	FH	DP	TP	Rurality	No. GPs	WTE GPs	Male GPs	Nurse WTE	List Size	Townsend Score
1	Southern Derbyshire	Yes	No	No	Urban	11	10.25	7	3.0	18,294	n/a
2	Southern Derbyshire	Yes	No	No	Urban	1	1.0	1	0.6	2,434	n/a
3	Leicester	Yes	No	Yes	Urban	7	5.5	6	1.6	9,866	4.59
4	Nottingham	No	No	No	Urban	4	3.0	2	1.5	6,770	7.02
5	Nottingham	Yes	No	Yes	Inner City	5	4.0	3	1.9	7,500	6.36
6	Doncaster	Yes	Yes	Yes	Urban	7	6.0	6	2.8	12,237	3.34
7	Doncaster	Yes	No	No	Urban	1	1.00	1	0.5	2,811	4.85
8	North Nottinghamshire	No	No	No	Urban	3	3.0	2	0.8	7,135	n/a
9	Newark	Yes	No	Yes	Urban	10	9.25	7	3.5	16,409	1.89
10	Lincolnshire	Yes	Yes	Yes	Semi-rural	6	5.5	5	2.8	10,421	-2.75
11	Lincolnshire	Yes	No	Yes	Urban	5	4.5	2	1.8	7,635	2.92
12	Lincolnshire	Yes	Yes	No	Rural	3	3	2	1.1	6,715	-2.13
13	Sheffield	No	No	No	Inner City	4	2.5	4	1.2	3,800	2.3
14	Barnsley	Yes	No	No	Urban	2	2	2	1.0	4,827	n/a

FH=Fundholding Practice *DP=Dispensing Practice* *TP=Training Practice* *n/a=Not available*

Table 3.64: Numbers of Cases Identified in Relation to Practice List Size and Registered Teenage Population

Practice Identification No.	List Size	Registered Teenagers			Teenagers as proportion of list size	No. of Cases	Cases as a proportion of registered teenagers
		13-15	16-19	Total			
1	18,294	28	350	378	2.1%	35	9.3%
2	2,434	33	30	63	2.6%	4	6.3%
3	9,866	235	249	484	4.9%	28	5.8%
4	6,770	346	386	732	10.8%	26	3.6%
5	7,500	259	307	566	7.5%	16	2.8%
6	12,237	239	286	525	4.3%	20	3.8%
7	2,811	62	75	137	4.9%	3	2.2%
8	7,135	156	168	324	4.5%	13	4.0%
9	16,409	303	399	702	4.3%	21	3.0%
10	10,421	158	293	451	4.3%	8	1.8%
11	7,635	145	202	347	4.5%	21	6.1%
12	6,715	147	155	302	4.5%	5	1.7%
13	3,800	78	84	162	4.3%	20	12.3%
14	4,827	41	61	102	2.1%	20	19.6%

Table 3.65: Age and Outcome of Cases by Relation to Practice

Surgery Code	No. of Cases	Age at Index LMP		Outcome		
		13-15	16-19	Miscarriage	Termination	Delivery
1	35	4 (11%)	31 (89%)	3 (9%)	11 (31%)	21 (60%)
2	4	0 (0%)	4 (100%)	0 (0%)	1 (25%)	3 (75%)
3	28	8 (29%)	20 (71%)	4 (14%)	0 (0%)	24 (86%)
4	26	5 (19%)	21 (81%)	2 (8%)	5 (19%)	19 (73%)
5	16	4 (25%)	12 (75%)	1 (6%)	5 (31%)	10 (63%)
6	20	5 (25%)	15 (75%)	0 (0%)	3 (15%)	17 (85%)
7	3	0 (0%)	3 (100%)	0 (0%)	0 (0%)-	3 (100%)
8	13	1(8%)	12 (92%)	1 (8%)	3 (23%)	9 (69%)
9	21	1(5%)	20 (95%)	3 (14%)	5 (24%)	13 (62%)
10	8	0 (0%)	8 (100%)	2 (25%)	3 (38%)	3 (38%)
11	21	2 (10%)	19 (91%)	0 (0%)	7 (33%)	14 (67%)
12	5	0 (0%)	5 (100%)	1 (20%)	1 (20%)	3 (60%)
13	20	2 (10%)	18 (90%)	1 (5%)	6 (30%)	13 (65%)
14	20	2 (10%)	18 (90%)	2 (10%)	3 (15%)	15 (75%)
TOTAL	**240**	**34 (14%)**	**206 (86%)**	**20 (8%)**	**53 (22%)**	**167 (70%)**

Table 3.66: Outcomes of Index Pregnancy in Relation to Age at Conception

Outcome	Age at Conception							Total
	13	**14**	**15**	**16**	**17**	**18**	**19**	
Miscarriage	0 (0%)	1 (14%)	3 (12%)	3 (8%)	4 (8%)	3 (5%)	6 (11%)	**20 (8%)**
Termination	2 (100%)	0 (0%)	7 (28%)	9 (24%)	13 (26%)	13 (20%)	9 (17%)	**53 (22%)**
Delivery	0 (0%)	6 (86%)	15 (60%)	25 (68%)	34 (67%)	49 (75%)	38 (72%)	**167 (70%)**
Total	2 (100%)	7 (100%)	25 (100%)	37 (100%)	51 (100%)	65 (100%)	53 (100%)	**240 (100%)**

3.4.2 Consultation Rates and Contraceptive Provision for Cases

In this section I describe the recorded consultations for the cases in the 12 months prior to the index conception date and also recorded consultations for contraception at any time prior to conception.

Of the 240 cases, 223 (93%) had consulted any health professional in the year prior to conception with 219 (91%) having consulted a general practitioner and 56 (23%) having seen the practice nurse. 128 (53%) had consulted on four or more occasions. The median consultation rate for cases was four and ranged between 0 and 29.

171 (71%) had consulted for contraception at any time prior to the index pregnancy and 148 (62%) had a recorded consultation in which contraception had been discussed in the previous 12 months. 87 (36%) had been below the age of 16 at the time of the first contraceptive contact.

156 (65%) had been prescribed oral contraception at any time and 121 (50%) had received this in the previous 12 months. 27 (11%) had ever been prescribed emergency contraception and 16 (7%) had been prescribed this in the previous 12 months. Other reported forms of contraception provided for cases included depo-provera (7%), condoms (13%) and IUCD (one case only).

Of the 92 cases who had *not* consulted for contraception in the 12 months prior to conception, 76 (83%) had consulted at least once, and 24 (26%) had consulted on four or more occasions. 11 (12%) had consulted for gynaecological problems, and five (5%) had a recorded pregnancy test.

3.4.3 Comparison of Cases in Relation to Pregnancy Outcome

I compared the consultation rates of cases whose pregnancies ended in termination with those with other outcomes. There were no significant differences in terms of overall consultation rate, or the proportion consulting any health professional at least once, consulting the general practitioner at least once, or consulting frequently. However, cases resulting in a termination were half as likely to have consulted the practice nurse than others, with seven (13%) having done so compared with 49 (26%) of others (χ^2=3.899, df=1, p=0.048).

I then compared contraceptive use by teenagers whose pregnancy resulted in a termination with that of cases ending in delivery or miscarriage. Results are shown in table 3.67. Twenty-one cases resulting in termination (40%) had no recorded contraceptive consultations or provision at any time prior to the pregnancy, and 27 (51%) had not consulted for contraception in the year prior to conception. Cases resulting in termination were significantly less likely to have been prescribed oral contraception at any time but were more likely to have been prescribed emergency contraception than cases resulting in other outcomes.

Of the 27 cases whose pregnancy had ended in a termination but who had not consulted for contraception in the year prior to conception, all but two (7%) had consulted at least once and seven (26%) had consulted on four or more occasions. All but one of the consultations was with a general practitioner, and three consultations had been for gynaecological problems.

Table 3.67: Comparison of Contraceptive Provision between Cases Resulting in a Termination and those with Other Outcomes.

Contraceptive Variable	All Cases	Cases resulting in termination	Cases resulting in delivery or miscarriage	χ^2	p-value
	n=240	n=53	n=187		
Ever consulted for contraception	171 (71%)	32 (60%)	139 (74%)	3.925	0.048
Consulted for contraception in previous 12 months	148 (62%)	26 (49%)	122 (65%)	4.576	0.032
Ever prescribed oral contraception	156 (65%)	27 (51%)	129 (69%)	5.908	0.015
Prescribed oral contraception in past 12 months	121 (50%)	20 (38%)	101 (54%)	4.376	0.036
Ever prescribed emergency contraception	27 (11%)	11 (21%)	16 (9%)	6.155	0.013
Prescribed emergency contraception in past 12 months	16 (7%)	7 (13%)	9 (5%)	4.677	0.031
Ever used depo-provera	17 (7%)	2 (4%)	15 (8%)	1.132	0.287
Ever used condoms	31 (13%)	8 (15%)	23 (12%)	0.287	0.592

3.4.4 Characteristics of the Control Series

Three age-matched controls were identified for all but one case, resulting in 719 control subjects. The mean age of controls was 17 years, 8 months and ranged from 13 years, 5 months to 20 years, 10 months. Although all cases were teenagers at the date of index conception, 34 (5%) controls were aged 20 because they were the next closest in age without a recorded pregnancy. The age distribution of controls in relation to cases is shown in table 3.68.

186 (26%) case-control pairs were matched exactly for age to the nearest month, and 604 (86%) were similar to within three months or less. Cases were an average of 0.9 months older than aggregate matched controls (95% CI: 0.5, 1.6).

Table 3.68: Age Distribution of Cases & Controls at Date of Index Conception

Age	Cases	Controls
13	2 (1%)	7 (1%)
14	7 (3%)	24 (3%)
15	25 (10%)	87 (12%)
16	37 (15%)	115 (16%)
17	51 (21%)	146 (20%)
18	65 (27%)	176 (24%)
19	53 (23%)	130 (18%)
20	0 (0%)	34 (5%)
Total	**240 (100%)**	**719 (100%)**

3.4.5 Comparison of Cases and Controls in Relation to Key Outcomes

I used conditional logistic regression analysis to compare demographic and consultation outcome variables between cases and controls (see methods for full details). This technique requires variables to be in binary form and so, where necessary, variables have been grouped into two categories.

The first set of results is based on all cases and controls (tables 3.69 and 3.70). There were statistically significant differences between the two groups in relation to distance from surgery, deprivation (Townsend score), number of consultations, consultations for contraception, consultations for non-contraceptive purposes, and referral for gynaecological problems.

The second set of results is restricted to the sub-group of cases who had a termination of pregnancy and their matched controls (tables 3.71 and 3.72). In contrast to the overall analysis, these groups differed only in relation to deprivation and recorded provision of injectable progestagens or condoms.

Table 3.69: Comparison of All Cases and Matched Controls by Demographic and Consultation Variables

	Variable	Subjects with Characteristic		Odds Ratio	95% Confidence Interval		p-value
		Cases n=240	Controls n=719				
Demographic Characteristics	Lives two or more miles from surgery	59 (24.6%)	211 (29.4%)	0.67	0.45	0.99	**0.045**
	Townsend score of four or more	91 (37.9%)	207 (28.8%)	**2.25**	1.45	3.50	**<0.001**
Consultations in Year Prior to Conception	Consulted any health professional 1-3 times	101 (41.9%)	288 (40.0%)	**2.29**	1.29	4.07	**0.005**
	Consulted any health professional 4+ times	128 (53.3%)	288 (40.0%)	**3.25**	1.82	5.78	**<0.001**
	Consulted general practitioner	219 (91.3%)	586 (81.5%)	**2.37**	1.45	3.86	**0.001**
	Consulted practice nurse	56 (23.3%)	170 (23.6%)	0.98	0.69	1.39	0.905
Consultations for Reasons other than Contraception in Index Year	Consulted for any non-contraceptive reason	198 (82.5%)	547 (76.1%)	**1.51**	1.03	2.22	**0.035**
	Consulted for psychological problems	30 (12.5%)	47 (6.5%)	**2.08**	1.27	3.40	**0.004**
	Consulted with diarrhoea / sickness	34 (14.2%)	38 (5.3%)	**2.95**	1.80	4.83	**<0.001**
	Consulted for gynaecological problem	75 (31.3%)	133 (18.5%)	**2.00**	1.43	2.79	**<0.001**
	Any consultation ending in antibiotic prescription	109 (45.4%)	265 (36.9%)	**1.47**	1.08	2.00	**0.015**
Referrals	Ever referred for gynaecological problem	15 (6.3%)	20 (2.8%)	2.34	1.17	4.68	**0.016**

Table 3.70: Comparison of All Cases and Matched Controls by Contraceptive Provision and Gynaecological Referral

	Variable	Subjects with Characteristic		Odds Ratio	95% Confidence Interval		p-value
		Cases n=240	Controls n=719				
Consultations for Contraception in Index Year	Any consultation with contraception discussed	148 (61.7%)	322 (44.8%)	**2.15**	1.56	2.97	**<0.001**
	Consulted for oral contraception	121 (50.4%)	265 (36.9%	**1.87**	1.36	2.57	**<0.001**
	Had pregnancy test	35 (14.6%)	16 (2.2%)	**11.29**	5.20	24.49	**<0.001**
Types of Contraception Provided at Any Time prior to Conception	Oral contraceptive pill	156 (65.0%)	301 (41.9%)	**2.96**	2.11	4.14	**<0.001**
	Emergency contraception	27 (11.3%)	61 (8.5%	1.35	0.84	2.18	0.210
	Intra-uterine device	1 (0.4%)	3 (0.4%)	1.00	0.10	9.61	1.000
	Injectable progestogens	17 (7.1%)	23 (3.2%)	**2.36**	1.23	4.55	**0.010**
	Condoms	31 (12.9%)	38 (5.3%)	**2.73**	1.64	4.54	**<0.001**
Duration of Contraception	Ever consulted for contraception	171 (71.3%)	339 (47.1%)	**3.32**	2.33	4.73	**<0.001**
	First contraceptive contact <16 years	87 (36.3%)	113 (15.7%)	**3.32**	2.33	4.74	**<0.001**
	Any contraception in past 12 months	137 (57.1%)	277 (38.5%)	**2.37**	1.71	3.29	**<0.001**
	At least 6 months contraception in past 12 months	65 (27.1%)	202 (28.1%)	0.94	0.66	1.33	0.734
	Any emergency contraception in past 12 months	16 (6.7%)	43 (6.0%)	1.12	0.61	2.04	0.715

Table 3.71: Comparison of Cases resulting in Termination and Matched Controls by Demographic and Consultation Variables

	Variable	% Subjects with Characteristic		Odds Ratio	95% Confidence Interval		p-value
		Cases n=53	Controls n=159				
Demographic Characteristics	Lives two or more miles from surgery	17 (32.1%)	62 (39.2%)	0.68	0.33	1.38	0.280
	Townsend score of four or more	17 (32.1%)	34 (21.2%)	**2.25**	1.45	3.50	**<0.001**
Consultations in Year Prior to Conception	Consulted any health professional 1-3 times	27 (50.9%)	67 (42.1%)	3.68	0.83	16.30	0.086
	Consulted any health professional 4+ times	24 (45.3%)	72 (45.3%)	3.18	0.67	15.01	0.144
	Consulted general practitioner	50 (94.3%)	137 (86.2%)	2.68	0.77	9.33	0.110
	Consulted practice nurse	7 (13.2%)	34 (21.4%)	0.56	0.23	1.35	0.192
Consultations for Other Reasons in Index Year	Consulted for any non-contraceptive reason	45 (84.9%)	129 (81.1%)	1.32	0.56	3.13	0.528
	Consulted for psychological problems	5 (9.4%)	12 (7.5%)	1.28	0.43	3.81	0.661
	Consulted with diarrhoea / sickness	4 (7.5%)	6 (3.8%)	2.08	0.56	7.68	0.262
	Consulted for gynaecological problem	9 (17.0%)	29 (18.2%)	0.92	0.40	2.09	0.836
	Any consultation ending in antibiotic prescription	29 (54.7%)	68 (42.8%)	1.62	0.87	3.02	0.130
Referrals	Ever referred for gynaecological problem	5 (9.4%)	5 (3.1%)	3.21	0.89	11.55	0.061

Table 3.72: Comparison of Cases resulting in Termination and Matched Controls by Contraceptive Provision and Gynaecological Referral

	Variable	% Subjects with Characteristic		Odds Ratio	95% Confidence Interval		p-value
		Cases n=53	Controls n=159				
Consultations for Contraception in Index Year	Any consultation with contraception discussed	26 (49.1%)	76 (47.8%)	1.05	0.57	1.96	0.874
	Consulted for oral contraception	20 (37.7%)	64 (40.3%)	0.90	0.48	1.71	0.746
	Had pregnancy test	2 (3.8%)	2 (1.3%)	3.08	0.42	22.41	0.244
Types of Contraception Provided at Any Time prior to Conception	Oral contraceptive pill	27 (50.9%)	64 (40.3%)	1.54	0.83	2.88	0.173
	Emergency contraception	11 (20.8%)	12 (7.5%)	**3.21**	1.32	7.79	**0.007**
	Injectable progestogens	2 (3.8%)	6 (3.8%)	1.00	0.20	5.11	1.000
	Condoms	8 (15.1%)	6 (3.8%)	**4.53**	1.50	13.75	**0.004**
Duration of Contraception	Ever consulted for contraception	32 (60.4%)	73 (45.9%)	1.80	0.95	3.38	0.068
	First contraceptive contact <16 years	16 (30.2%)	31 (19.5%)	1.79	0.88	3.62	0.105
	Any contraception in past 12 months	23 (43.4%)	60 (37.7%)	1.27	0.67	2.38	0.465
	At least 6 months contraception in past 12 months	11 (20.8%)	41 (25.8%)	0.75	0.36	1.60	0.461
	Any emergency contraception in past 12 months	7 (13.2%)	9 (5.7%)	2.54	0.90	7.19	0.072

In the following sections I report the results of more detailed analysis in relation to each of the outcome measures.

a) Demographic Characteristics

Distance from Surgery

An estimated distance of residence from the GP surgery was available for 231 cases (97%), 664 controls (92%). The median distance of residence for cases was 1.1 miles and ranged from less than 0.1 to 8 miles. The median distance of residence for controls was also 1.1 and ranged from less than 0.1 to 10 miles. The mean difference in distance of residence between cases and aggregated matched controls was 0.16 miles with controls living further away than cases ($Z=3.482$, $n=231$, $p<0.001$). The proportion of controls living two or more miles from the surgery (29%) was significantly greater than the proportion of cases (24%) (table 3.69).

There was no difference in distance of residence between cases whose pregnancy ended in a termination compared with other pregnancies. The median distance of residence for cases resulting in termination of pregnancy was 1.1 miles compared with a median of 1.5 for matched controls. The mean difference between cases and aggregate matched controls of 0.17 miles was not statistically significant ($Z=1.248$, $p=0.212$). Equally there was no significant difference between the groups in terms of the proportion of teenagers living two or more miles from the surgery (table 3.71).

There were no significant differences in overall consultation rates or consultation for contraception between those cases that lived less than two miles from the surgery and those who lived two or more miles from it.

Deprivation Scores

Deprivation data, in terms of Townsend scores based on wards of residence, were available for 232 cases (97%) and 657 controls (91%). The mean score was 3.2 for cases (range -5.9 to 9.1), and 2.4 for controls (range - 6.6 to 8.8), with the difference between cases and aggregated matched controls being statistically significant (Student's t=4.866, df=231, p<0.001). Significantly more cases than controls had Townsend scores of four or more (table 3.69).

Mean Townsend scores for those teenagers whose pregnancy ended in a termination were lower than those whose pregnancy ended in delivery or miscarriage (2.7 and 3.3 respectively) although the difference was not statistically significant (Student's t=1.173, df=230, p=0.247). The mean score for matched controls of cases ending in termination was 1.7, and the difference of 1.0 between cases and aggregate matched controls was statistically significant (Student's t=2.502, df=53, p=0.016).

b) Overall General Practice Consultation Rates

Details of annual consultation rates in the year prior to the index LMP are summarised in table 3.73. Cases were significantly more likely to have a recorded consultation with any health professional in the year prior to the index pregnancy than controls, with 93% cases having consulted at least once compared with 84% of controls. The median consultation rate for cases of four was significantly higher than that of three for controls ($Z=4.185$, $p<0.001$). 128 cases (53%) were frequent attenders (four or more consultations per year) compared with 302 controls (42%).

With respect to consultations with a general practitioner, significantly more cases (91%) had consulted at least once compared with controls (81%). The median number of GP consultations for cases was four compared with three for controls ($Z=4.430$, $p<0.001$). Consultations with a practice nurse were relatively infrequent with only 23% of both cases and controls having a recorded nurse contact, and there was no significant difference in terms of frequency of nurse consultation.

When consultation rates of cases ending in termination were compared with matched controls there were no statistically significant differences, with each group having a median rate of three, and similar overall proportions who ever consulted or consulted frequently. Fewer cases (13%) had a recorded consultation with a practice nurse compared with controls (21%) although the difference did not reach statistical significance.

Table 3.73: Frequency of General Practice Consultations in the Year Preceding Conception.

		0	1	2	3	4	5+
No. of Consultations with Any Health Professional	**Cases n=240**	16 (7%)	34 (14%)	38 (16%)	24 (10%)	22 (9%)	106 (44%)
	Controls n=719	116 (16%)	107 (15%)	114 (16%)	80 (11%)	68 (10%)	234 (33%)
		χ^2=20.6, df=5, p=0.001					
No. of Consultations with General Practitioner	**Cases n=240**	21 (9%)	31 (13%)	42 (18%)	25 (10%)	26 (11%)	95 (40%)
	Controls n=719	133 (19%)	118 (16%)	119 (17%)	80 (11%)	75 (10%)	194 (27%)
		χ^2=62.43, df=5, p<0.001					
No. of Consultations with Practice Nurse	**Cases n=240**	184 (77%)	32 (13%)	15 (6%)	3 (1%)	2 (1%)	4 (2%)
	Controls n=719	549 (77%)	110 (15%)	37 (5%)	13 (2%)	6 (1%)	4 (1%)
		χ^2=4.05, df=5, p=0.542					

c) Consultations for Contraception in the Year Prior to Conception

Within the whole population significantly more cases (62%) had a recorded consultation in which contraception had been discussed compared with controls (45%). The median number of consultations for contraception amongst cases was one (range 0 to12) and amongst controls was zero (range 0 to 8) ($Z=2.874$, $p<0.004$).

Significantly more cases (50%) had at least one recorded consultation for oral contraception compared with controls (37%). The median number of consultations for oral contraception amongst cases was one (range 0 to 6) and amongst controls was zero (range 0 to 8) ($Z=-4.017$, $p=0.027$).

Cases were seven times more likely than controls to have had a recorded pregnancy test in the previous 12 months. There was no significant difference in the proportion of cases and controls who had received a prescription for emergency contraception during the index year (7% and 6% respectively).

When cases resulting in termination were compared with their matched controls there were no significant differences in terms of consultation rates for contraception, oral contraception, pregnancy tests, or emergency contraception in the year prior to conception. The median number of consultations for contraception was zero for both cases and controls. Two cases (4%) and two controls (1%) had a recorded pregnancy test but the difference was not statistically significant. However there was a significant difference between cases and controls in relation to being prescribed emergency contraception with 13% of cases having a recorded prescription in the index year compared with 6% of controls.

d) Overall Contraceptive Provision

Overall, cases were significantly more likely to have consulted for contraception at any time prior to the index pregnancy with 71% having done so compared with 47% controls. Cases were significantly more likely to have been prescribed oral contraception, injectable progestagens, or condoms, but not emergency contraception (table 3.70).

I calculated the ages of subjects at the date of first recorded consultation for contraception in the 168 cases and 336 controls for whom this was possible (in the remaining three cases and three controls there was reference to contraceptive consultations in the summary record but no specific date available). The mean age of first recorded contraceptive contact was 16.5 years for cases and 16.0 years for controls. The mean difference between matched pairs was 0.5 years (95% CI 0.23, 0.73; Student's $t=3.798$, $df=132$, $p<0.001$). The mean interval between first recorded contraceptive contact and index conception for cases was 2.3 years compared with 1.8 years for controls.

Cases resulting in termination of pregnancy were significantly more likely to have been prescribed emergency contraception at some time prior to the index pregnancy than their matched controls with 21% having had a recorded prescription compared with 8% of controls. There were no other significant differences between cases and controls in this sub-group.

e) Consultations for Non-Contraceptive Purposes

I re-calculated annual consultation rates after excluding all consultations for contraception. The median non-contraceptive consultation rate was two for both

cases and controls, and ranged between 0 and 22 for cases, and 0 and 16 for controls. Cases had a significantly higher non-contraceptive consultation rate than aggregate matched controls (Z=-2.767, n=240, p=0.006).

Significantly more cases (83%) had at least one recorded non-contraceptive consultation in the year prior to conception compared with controls (76%) (table 3.69). Cases were significantly more likely to have consulted at least once for psychological problems, gynaecological problems, or diarrhoea / sickness. They were also more likely to have had at least one consultation resulting in a prescription for an antibiotic.

The median non-contraceptive consultation rate of the 53 cases whose pregnancy resulted in termination was two and ranged between 0 and 16. This was not significantly different to that of two for the 159 matched controls, which ranged between 0 and 14. There were no significant differences between cases and controls in relation to the proportion consulting at least once for psychological, gynaecological, gastrointestinal, or any non-contraceptive problems, or the proportion with at least one consultation resulting in an antibiotic prescription (table 3.71).

3.4.6 Multivariate Analysis

I undertook multivariate analyses to adjust for potential confounding factors, particularly deprivation. I also included distance from surgery in each model because of its apparent weak association with pregnancy risk, and its theoretical association with accessibility to services. I only included variables for multivariate analysis that

had a probability level of 0.01 or less on univariate analysis. In all analyses of consultation rates and type of consultation I included consultation for contraception as a variable, since this is a powerful factor in determining consultation in relation to teenage pregnancy.

Table 3.74 shows the results of multivariate analysis in relation to consultation variables for the full case-control series. Cases were significantly more likely than controls to have consulted any health professional frequently (four or more times) and to have at least one recorded consultation for contraceptive purposes (table 3.74a). They were also more likely to have a recorded consultation for psychological problems, consultation for diarrhoea and sickness, and consultation for gynaecological problems (table 3.74c). However the association with consulting with a GP specifically was no longer statistically significant (table 3.74b).

Multivariate analysis of contraceptive variables included specific types of contraception provided at any time prior to the pregnancy, age at first recorded contraceptive provision, and provision of contraception in the 12 months prior to conception. Results are shown in table 3.75. Recorded provision of oral contraception and condoms, and provision of contraception below the age of 16 were all statistically significant at the 0.05 level.

In relation to those cases whose pregnancies ended in termination, both recorded provision of emergency contraception and condoms remained significant at the 0.05 level of probability after multivariate analysis (table 3.76).

Table 3.74: Multivariate Conditional Logistic Regression Analysis of Consultation Rates and Reasons with All Cases (240)

a) Overall Consultation Rate	Odds Ratio	95% Confidence Interval		p-value
Consulted Any Health Professional 1-3 times	1.68	0.91	3.09	0.097
Consulted Any Health Professional 4+ times	2.06	1.06	4.00	**0.032**
Any consultation with contraception discussed	1.66	1.13	2.42	**0.009**
Townsend score	1.19	1.10	1.29	**<0.001**
Distance from surgery	0.99	0.86	1.14	0.902

b) GP Consultations	Odds Ratio	95% Confidence Interval		p-value
Consulted GP	1.62	0.94	2.79	0.080
Any consultation with contraception discussed	1.79	1.25	2.57	**0.002**
Townsend score	1.19	1.10	1.28	**<0.001**
Distance from surgery	0.98	0.85	1.13	0.808

c) Consultations for Specific (Non-Contraceptive) Reasons	Odds Ratio	95% Confidence Interval		p-value
Consulted for psychological problems	1.88	1.10	3.21	**0.022**
Consulted with diarrhoea / sickness	2.45	1.42	4.24	**0.001**
Consulted for gynaecological problem	1.51	1.01	2.26	**0.045**
Any consultation with contraception discussed	1.67	1.15	2.41	**0.006**
Townsend score	1.19	1.10	1.29	**<0.001**
Distance from surgery	1.00	0.87	1.16	0.958

Table 3.75: Multivariate Conditional Logistic Regression Analysis of Contraceptive Provision for All Cases (240)

	Odds Ratio	95% Confidence Interval		p-value
Oral contraception	2.31	1.24	4.30	**0.008**
Injectable progestagens	1.97	0.95	4.10	0.070
Condoms	2.07	1.17	3.64	**0.012**
Less than 16 at first contraceptive contact	1.98	1.29	3.06	**0.002**
Any contraception in past 12 months	0.79	0.44	1.45	0.453
Townsend score	1.19	1.10	1.29	**<0.001**
Distance from surgery	1.00	0.87	1.16	0.958

Table 3.76: Multivariate Conditional Logistic Regression Analysis of Contraceptive Provision for Cases Ending in Termination (53)

	Odds Ratio	95% Confidence Interval		p-value
Emergency contraception	2.84	1.04	7.76	**0.042**
Condoms	3.37	1.11	12.25	**0.033**
Townsend score	1.19	1.02	1.40	**0.026**
Distance from surgery	1.08	0.83	1.40	0.558

3.4.7 Further Analysis of Cases Resulting in Termination of Pregnancy

In an attempt to identify potential prospective modifiable risk indicators for unintended teenage pregnancy in general practice I undertook further detailed analysis of those cases whose pregnancy resulted in a termination. This is because termination of pregnancy is the only indicator of unintended pregnancy available from the data. In particular I attempted to ascertain specific reasons why pregnancy may have occurred, particularly in those receiving contraceptive advice, but also indicators of risk in those not known to be sexually active.

Details of the general practice consultations of this group in relation to contraception are presented in figure 3.6. Twenty-one cases (40%) had no recorded consultations in which contraception had been discussed. Of the remainder, approximately one-half of cases had discussed contraception in the year prior to pregnancy and two-fifths had been prescribed some form of oral contraception. A similar proportion of controls (48%) had discussed contraception and 40% had been prescribed oral contraception in this period.

Sixteen cases (30.2%) had first consulted about contraception below the age of 16. Although this was higher than the proportion of controls (19.5%), the difference was not statistically significant (OR 2.01, 95% CI 0.90, 4.46, p=0.085).

Of those young women who were prescribed continuous oral contraception in the year prior to pregnancy, approximately half became pregnant whilst the prescription was still current. Amongst the remainder the prescription had elapsed, but in three cases conception had occurred within four weeks of the estimated date at which the

prescribed contraception would have been completed. In no cases where contraception had been prescribed was there evidence of concurrent prescribing of antibiotics contributing to contraceptive failure.

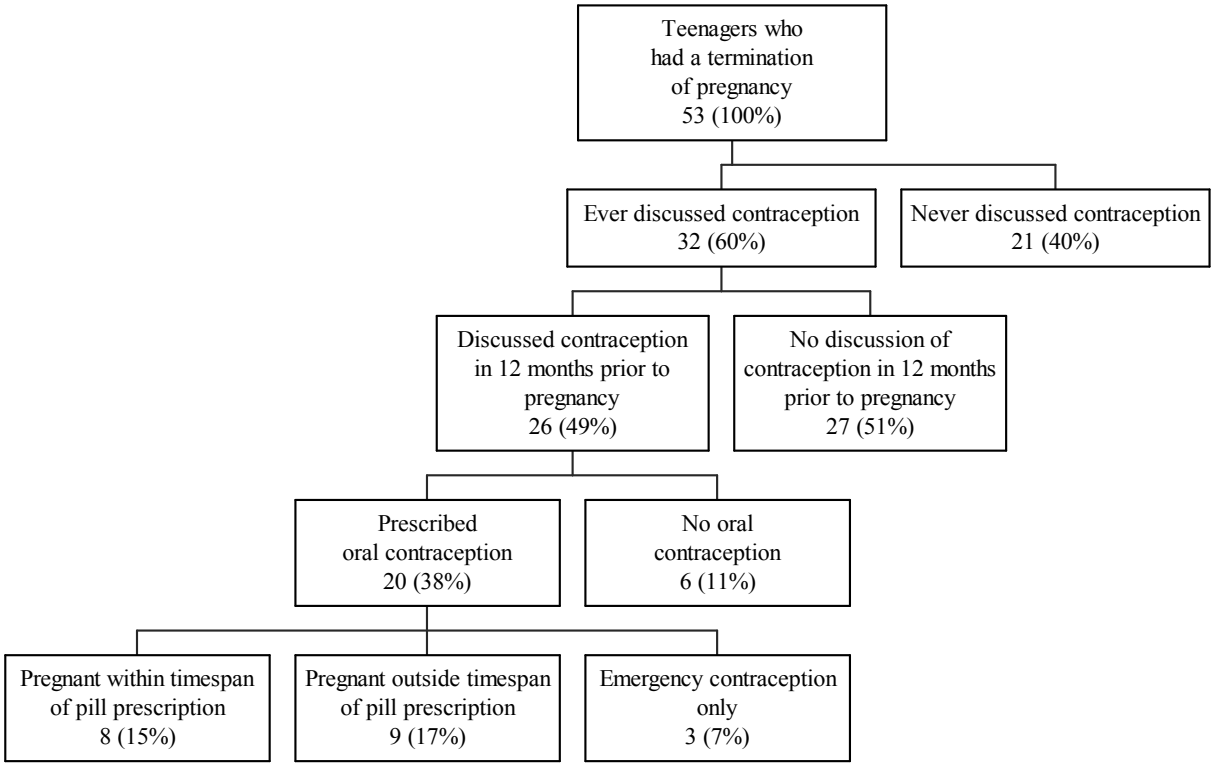
Seven subjects (13%) had been prescribed emergency contraception in the year prior to conception compared with nine controls (6%) (OR 2.54, 95% CI 0.90, 7.19, p=0.072). However the proportion of cases that had been prescribed emergency contraception *at any time* prior to conception (21%) was significantly higher than the proportion of controls (8%) (OR 3.21, 95% CI 1.32, 7.79, p=0.007).

Five of the young women who had a termination of pregnancy in this study had a history of previous pregnancy. Two had reported miscarriages, two had delivered, and one had a previous termination. Of these, one had no mention of contraception in her records in the previous 12 months although she had consulted about other health issues on seven occasions. Three of the others had been prescribed the oral contraceptive pill, but all had recorded side effects (break through bleeding or menorrhagia) or expressed dissatisfaction at some stage in the previous 12 months. The remaining teenager had received depo-provera but discontinued this due to recorded concerns about weight gain.

Of the 21 women who had not consulted for contraception, all except one had consulted at least once during the year prior to conception. I examined specific types of reason for consultation that might be indicative of sexual risk: two had consulted for gynaecological problems (dysmenorrhoea); three for psychological problems; and three for urinary tract infections. I had already demonstrated that there was no

significant difference between cases and controls in relation to the former two variables but I had not examined any potential association with consultation for urinary tract symptoms. Seven of the 53 cases (13.2%) had consulted with recorded urinary tract infections compared with only five controls (3.1%) resulting in an odds ratio of 8.32 (95% CI 1.68, 41.3; p=0.010). Thus, although numbers were small, a potential association exists between consultations for urinary tract infections and unintended teenage pregnancy.

Figure 3.6: General Practice Contraceptive Provision prior to Conceptions resulting in Termination



CHAPTER 4:

DISCUSSION

In this chapter I will firstly consider the strengths and limitations of the methods that I used in each of the studies. I will then, where possible, compare and contrast the results from my research with those from previous studies. Thirdly I will discuss the results themselves, with particular reference to the model of teenagers and general practice presented in Chapter 1. Finally I will propose areas for further research.

4.1 Discussion of Methods

4.1.1 Studies 1 & 2

This is the first research that has attempted to link two data collection methods in order to evaluate the influence of a range of individual health and attitudinal factors on actual consultation behaviour by young teenagers. However there are a number of potential limitations that I have discussed below.

a) Selection of Study Practices

Several previous studies have described teenage consultation patterns within single general practices (Jacobson and Owen 1993; Jacobson *et al.* 1994; Seamark and Pereira Gray 1995; Kramer *et al.* 1997). In this study I wanted to include several practices so that I could determine the extent to which consultation patterns differed between practices. However it was only possible to include a limited number of practices for logistical reasons. These were selected opportunistically on a non-random basis, with the objective of achieving organisational and demographic diversity.

The greatest disadvantage of non-random selection of practices is that the results cannot necessarily be generalised to the whole population. However comparison of

the results with previous published studies, presented in the next section, gives an indication of the extent to which this study population is similar to a wider population. In addition, whilst inter-practice variation was of interest, my principal aim was to examine associations between teenage attitudes and consultation patterns on an individual basis, irrespective of their practice.

Although none of the practices were undertaking specific teenage interventions over the period studied, a prior interest in teenage health was evident by their willingness to participate. Thus the views expressed by their teenage patients may be unrepresentative of the whole teenage population: these practices could be providing better teenage care than average practices with consequent satisfaction being higher. However the fact that a wide range of attitudes were expressed by the teenagers, and that many had only limited contact with the practices over the period of the study, might suggest that such an effect would be minimal.

Specific differences in results between practices have been highlighted in the results section and will be discussed later. However the 'practice' variable incorporates a number of contributing factors including locality, list size, deprivation, characteristics of the general practitioners, and organisational attributes. Within the current study design it was impossible to isolate the specific factors which might contribute to practice variations, although this could be addressed in future research.

b) Study Population

The study was conducted amongst teenagers aged 13-15 years because young people in this age group are believed to have significant health concerns that are not fully

addressed (Macfarlane *et al.* 1987; Epstein *et al.* 1989; Kari *et al.* 1997; Oppong-Odiseng and Heycock 1997; Burack 2000). They are also developing in terms of personal autonomy, whilst not yet fully autonomous with respect to the law. A wider age range would have allowed examination of trends throughout the whole of adolescence, but this was not feasible within the timescale of the research.

In the 13 to 15 year old age group parental influence on attitudes and consultation may be an over-riding factor that could not be directly taken into account. However I undertook an analysis based on the 143 (20%) respondents who reported that they had gone into the consultation alone on the most recent occasion (as a marker of developing autonomy) and there were no significant differences in attitudes or consultation patterns between this subgroup and the whole sample.

c) Postal Questionnaire Survey

The use of general practice registered lists as a sampling frame for the postal questionnaire survey has potential disadvantages in terms of problems of differential response bias and lack of control over the setting in which the questionnaire is completed. To maximise response rates (and thus reduce the effect of differential response bias) I offered an inducement in the form of a gift voucher to those who returned completed questionnaires. The overall response rate of 80% was higher than other postal surveys of this population and was probably as a consequence of this. The potential impact of such an inducement on individual responses to questions must be acknowledged, particularly as it may have encouraged more positive attitudinal responses than otherwise. However, the results obtained in this survey (for example, with respect to self-reported smoking rates) were similar to

those from surveys performed in other settings (as described in the next section) suggesting that such an effect was minimal.

The questionnaire was designed to avoid sensitive issues in order to maximise response, particularly by reducing any parental objection. As a consequence very few parents objected to their teenagers participating in the study before the questionnaires were sent out. However this meant that important issues relating to attitudes to consultation for difficult issues, such as sexual health, could not be studied directly.

In order to identify the effects of any systematic bias in response, I compared the known characteristics of respondents with non-respondents. There were no overall differences in relation to consultation patterns although there was a higher rate of non-attendance amongst non-respondents that may be partly explained by teenagers having moved from the area and not having registered elsewhere. Girls were more likely to respond than boys, and there were differences between practices. Lowest response rates (70.4% and 72.1%) were encountered from the two inner city practices, although there was no statistically significant association between response and deprivation.

The proportion of teenagers from ethnic minority groups amongst questionnaire respondents was 8.0%. This was higher than the national average of 5.7% in the under-16 age group (Coleman and Schofield 2007) but information on the ethnicity of patients registered with individual practices was not available, and so it was not possible to determine the response rate from this group of teenagers specifically.

The use of self-completion questionnaires in the home environment has the potential for response bias. This is most likely to have occurred in relation to questions about health related behaviour, particular if a young person was concerned about parents seeing the response. I included a question specifically to determine whether or not a teenager had received help in completing the questionnaire. One in five respondents reported having received help, usually from family members. However there were no significant differences in self-reported smoking rates or alcohol intake between the group who received help and those who did not, after adjustment for age. With respect to substance misuse there was only a difference in the 15-year age group with none of the 20 teenagers reporting drug use having received help in completing the questionnaire.

Most of the questions that I used were based on a limited number of pre-determined options or categories. Whilst this restricted the ability of respondents to provide alternative or additional answers it meant that the questionnaire was simpler to complete and was therefore more likely to result in higher response rates. Where possible the options were identified from previous published research with the aim of including as comprehensive a range as possible.

One method of assessing internal consistency is to include duplicate questions at different points in the questionnaire. Although I did not do this as such, there were some questions that were sufficiently similar to expect a correlation between the two if the questionnaire was reliable. For example the health habits question of the COOP charts should correlate with self-reported smoking, alcohol, and / or drug use;

whilst the emotional health COOP chart might be expected to show correlation with self-reported low mood. Results are shown in tables 4.1 and 4.2 and demonstrate a high degree of correlation between the variables.

d) Consultation Data

The validity of consultation data is dependent upon the accuracy with which they have been recorded. Most medical records are made contemporaneously and so are not subject to significant recall bias. However, whilst GPs tend to record problems that they perceive to be significant or having medical relevance, they may be less likely to include mention of minor concerns or anything considered to be trivial(de Lusignan 2005). In terms of interpreting the results, this might lead to an underestimate of the extent to which teenagers consult for minor health concerns when, in fact, they may have been mentioned in the context of a consultation for other problems, but not recorded. The only way to determine the extent to which this occurs would be to compare the content of medical records with transcripts of the recorded consultation.

Each practice differed in its policy for recording consultation data on computer and manual records. For this reason both sets of records were accessed. I only used data from face to face contact with a doctor, either at the surgery or as a home visit, in the analysis. Telephone contacts were noted but not subsequently used in the analysis. This was because there were only small numbers (less than 1% of all contacts), with some evidence of inconsistency in recording between practices. In view of the small numbers it is unlikely that this would have had a significant impact on overall results.

I based coding of reason for attendance on suspected diagnosis where this was recorded, or on the nature of the presenting symptom if no diagnosis was mentioned. I grouped these into broad categories, except for clear specific reasons such as contraception, in order to reduce misclassification bias. Thus, for example, both upper and lower respiratory tract infections were grouped together because of the difficulties in distinguishing these consistently on the basis of the medical records.

e) Combining Data Sets from Studies 1 & 2

The overall aim of the study was to examine consultation patterns of teenagers in relation to health related characteristics identified from the postal questionnaire survey. However the results obtained by comparing data from a cross-sectional survey with those from retrospective case-note analysis need to be interpreted with caution. In particular, causal relationships cannot be inferred from the data, because of the relative timings of the two data sets.

Although I could have collected consultation data prospectively in the year following the survey this may have presented additional problems: there would have been a potential loss of data due to migration away from practices; consent for access to medical records is only legitimate in retrospect; and the survey itself may have altered perceptions and behaviour.

The interpretation of any association will depend partly on the extent to which outcome measures obtained in the questionnaire survey are likely to reflect the persistence of a particular characteristic over the previous 12 months. Many health concerns are likely to be transient or self-limiting, whilst attitudes and health related

behaviours might be expected to be more sustained and persistent. However, transient outcomes are less likely to show significant associations with consultation behaviour, such that any associations that do exist are more likely to reflect persistent characteristics. Further research could be performed to determine the stability of teenagers' attitudes over time, and the influence of personal experience upon them.

Table 4.1: Responses to the Health Habits COOP Chart by Self-Reported Health Behaviours.

During the past month, how often did you do things that are harmful to your health	No.	Current Smoking[1]	Regular Alcohol[2]	Drug Use[3]
None of the time	470	2.3%	12.4%	0.6%
Little of the time	114	34.2%	50.9%	9.7%
Some of the time	61	59.0%	65.6%	29.5%
Most of the time	35	80.0%	80.0%	51.4%
All of the time	26	92.3%	53.9%	46.2%

[1] Current smoking = 'sometimes smoke' and 'smoke every day'

[2] Regular alcohol = 'drink regularly but no more than weekly' and 'drink regularly more than weekly'

[3] Drug use = 'use drugs occasionally' and 'use drugs more than weekly'

Table 4.2: Responses to the Emotional Health COOP Chart and Self-Reported Stress / Depression.

During the past month, how often did you feel anxious, depressed, irritable, sad or downhearted and blue?	No.	Worry about feeling down or stressed		
		All of the time	Some of the time	None of the time
None of the time	94	0.0%	24.5%	75.5%
Little of the time	267	1.5%	60.7%	37.8%
Some of the time	231	5.6%	72.7%	21.6%
Most of the time	82	39.0%	59.8%	1.2%
All of the time	18	66.7%	33.3%	0.0%

4.1.2 Discussion of Methods – Study 3

This was the first study of its kind to examine possible associations between general practice consultations and the risk of teenage pregnancy. However I encountered a number of difficulties in carrying out the research that have potential impact on the interpretation of the results.

a) Conduct of the Study

I had originally intended that a single researcher would undertake the data extraction in all of the practices taking part in order to ensure that this was done in a consistent manner. However the Trent Multi-Centre Research Ethics Committee advised that such an approach would be unethical in that individual patients would not have given consent for access to their general practice records.

After extensive discussion it was agreed that the only way the study could proceed was by asking practice staff, who would normally have access to those records (usually practice nurses), to carry out all aspects of the study involving identifiable patient information. The extracted patient data would then be provided in an anonymised form. This meant that there was no way of assuring the validity of case/control identification or data extraction, or ensuring absolute consistency between the practices.

I produced a standard template for data extraction which was designed to allow minimal subjective interpretation of the data being recorded and thus to promote consistency. All practice staff received training prior to collecting data and support if queries occurred.

b) Study Setting and Case-Control Series

The study was carried out in 14 practices from the Trent Focus network of research practices. Although these practices are atypical because of their academic connection, the effect of practice characteristics on case-control analyses is eliminated by the inherent matching of cases and controls by practice.

Although research practices may potentially provide different standards of care for teenage patients, pregnancy rates in the study practices were similar to others in the region. The proportion of pregnancies resulting in a termination in this study (22%) was lower than expected from national data (35% amongst teenagers aged 15-19 in 1994) (Coleman and Schofield 1997) suggesting that not all cases were identified, particularly if the terminations were performed in the private sector or referred directly from family planning services without notifying the general practitioner. This potential ascertainment bias needs to be taken into account in the interpretation of results.

The 240 cases identified exceeded the estimated sample size required. However there was wide variation in the number of cases identified by each practice. This partly reflects differing practice teenage pregnancy rates between practices but may also indicate differences in ascertainment. In order to examine this in more detail I compared the conception rate for each practice from the current study with teenage pregnancy rates for each practice from central data sources obtained for the purposes of another research study (Hippisley-Cox 2000). Results are shown in table 4.3. Overall, the ratio of the calculated rate from this study to that obtained from the

other source was 1.2, but ranged between 0.6 and 4.8 for individual practices. These results suggest a high level of case identification.

A lower ascertainment rate might have been expected on the basis that cases in the current study were required to have been registered both at the time of conception and at the date of data extraction, thus excluding those who migrated following pregnancy or who registered subsequent to a pregnancy. This criterion was applied for pragmatic reasons since pregnancies which occurred whilst the patient was registered with another practice may not be identified as readily as those whilst the patient *is* registered, and cases needed to be currently registered in order to access medical records. Cases and controls were matched according to this criterion, and a separate pilot study in another practice suggested that the migration rate of teenagers who became pregnant was not significantly different from those who did not.

In order to examine the possibility of differential migration I examined the differences between cases and controls in terms of the length of time that they had been registered with the practice. Date of registration was recorded for 236 cases and 708 controls. Cases had been registered for a mean of 120 months prior to the index LMP compared with 139 months for controls (Student's $t=3.639$; $df=235$; $p<0.001$). This difference persisted after adjustment for deprivation. However, although cases were registered for a shorter time period than controls, only 14 cases (6%) and 15 controls (2%) had been registered for less than 12 months at the date of the index LMP.

c) Data Extraction and Validity

The study is based on routinely recorded general practice data. All practices in the Trent Focus network had to fulfill minimum standards with respect to routine clinical data recording. However certain data items used in the current study might be less likely to be recorded consistently, or may be open to ambiguous interpretation. For example, negative pregnancy test results might not be uniformly recorded in clinical records and, in addition, results of home pregnancy tests or ones performed by a chemist are unlikely to be recorded unless the teenager consults specifically in relation to it. Also, clinical records which refer to condoms may mean that they have been provided (in practices with this facility) or alternatively that the teenager has been advised to use them without any being provided.

There is unlikely to be significant systematic bias in the quality of data extraction between cases and controls since, within each practice, all data were extracted by the same person. Within the study design a simple level of data extraction was required with minimal interpretation of recorded data. I personally performed all secondary coding of the practice recorded data into derived variables, such as number of consultations for specific conditions, in order to promote consistency at this stage.

The results of this study apply only to information contained in general practice records. This is appropriate since my interest was specifically in the use made of general practice services. However the results reflect an underestimate of the total provision of contraception to teenagers because a proportion will access family planning or specific teenage services. The extent of use of other services is likely to vary with locality, but one study found that 60% of pregnant teenagers had accessed

contraceptive services in general practice compared with 30% who had used family planning clinics (Pearson *et al.* 1995b).

d) Confounding

Matching cases and controls by age and practice minimises the risk of confounding by these factors. Deprivation is another factor that has been shown to be strongly associated with the risk of teenage pregnancy (Smith 1993; Bethea 2005). I therefore determined the Townsend score for each subject based on their ward of residence. Cases were significantly more likely to live in areas of higher deprivation than controls. Since deprivation and use of general practice services are also possibly related I adjusted for deprivation within the multivariate analyses.

A major confounding factor in this study, for which I could not control, is the role of sexual activity. Teenagers who become pregnant are sexually active, and sexually active teenagers are more likely to consult for contraception. Thus any association between pregnancy and contraception use is understandable. A further factor is the difficulty in distinguishing intended and unintended pregnancy, although this was possible to a limited extent by examining the subgroup whose pregnancies ended in termination, which were therefore assumed to be unintended.

Table 4.3: Teenage Conception Rate determined by Practice compared with Rates from Central Records (Hippisley-Cox 2000)

Surgery Code	Current List Size Aged 13-19	No. of Cases Identified in Study Three	Estimated Conception Rate (per 1000)	95% Confidence Interval		Pregnancy Rate from Central Records (per 1000)	Ratio of Estimated Rate to Central Record Rate
1	630	35	55.6	39.0	76.4	28.5	2.5
2	63	4	63.5	17.6	155.0	66.7	0.9
3	484	28	57.9	38.8	82.5	65.8	0.9
4	732	26	35.5	23.3	51.6	25.5	1.4
5	566	16	28.3	16.2	45.5	19.2	1.5
6	525	38.1	23.4	58.2	37	49.7	0.8
7	137	3	21.9	4.5	62.7	35.6	0.6
8	324	13	40.1	21.5	67.6	38.9	1.0
9	702	21	28.5	17.5	43.7	29.4	1.0
10	451	8	17.7	7.7	34.7	9.7	1.9
11	367	21	57.2	35.8	86.1	36.6	1.7
12	302	5	16.6	5.4	38.2	16.2	1.0
13	162	20	123.0	77.1	184.0	56.7	2.2
14	102	20	196.0	124.0	286.0	40.5	4.8
TOTAL	**5,547**	**240**	**43.3**	**37.9**	**48.6**	**37.4**	**1.2**

4.2 Comparison of Results with Previous Studies

4.2.1 Study 1

a) Teenage Consultation Rates

Two previous papers have described detailed consultation patterns of teenagers based on medical records (Jacobson and Owen 1993; Kramer *et al.* 1997). Both of these studies were based in single surgeries located in different settings, and neither provided their results in a format that is directly comparable with those in this study.

Jacobson and Owen reported mean consultation rates of 2.54 and 2.74 in males and females aged 11-14 respectively, and 1.13 and 4.64 in males and females aged 15-19 (Jacobson and Owen 1993). In comparison, I found an overall consultation rate of 2.15 in this population of 13-15 year olds, ranging from 1.59 to 2.44 between practices and 1.78 and 2.53 between males and females. Thus, the teenagers in Jacobson and Owen's study appeared to consult more frequently. However their study was based on a non-random sample rather than the whole practice population, which could have resulted in an overestimate if there had been any systematic sampling bias.

In contrast Kramer and colleagues reported that only 53.5% of their sample of 13-16 year olds consulted over one year in an inner London general practice (Kramer *et al.* 1997). This compares with 72.2% in my study, ranging from 64.1% to 75.7% between practices. This difference may reflect the nature of inner London practice, where I would anticipate that migration rates between practices tend to be higher and so follow-up, even for short periods such as one year, is likely to be more difficult.

Other local factors, such as provision of alternative health services, might also account for some of the differences observed.

Although the overall consultation rates that I found were lower than those of Jacobson and Owen (Jacobson and Owen 1993), there was a similar trend in relation to gender, with girls starting to consult significantly more frequently at the age of 15 and above. The consistency of these findings between the studies suggests that this is likely to be due to an age effect rather than a cohort effect. Macfarlane & colleagues also concluded that gender differences in rates of consultation and in use of medicines seem to be clearly established by 15 years of age (Macfarlane *et al.* 1987). The results contrast with those of Kramer and colleagues who failed to detect such a gender difference between the ages of 13 and 16 (Kramer *et al.* 1997). However their are similarities between the two studies in relation to frequent consultations, with Kramer and colleagues reporting that 23% of teenagers attended four or more times annually in comparison with 20% in the current study.

b) Reasons for Consultation

In this study I found that the most frequent reasons for consultation were for respiratory and dermatological problems. Jacobson & Owen and Kramer and colleagues both reported the same finding (Jacobson and Owen 1993; Kramer *et al.* 1997).

My analysis of reasons for consultation by age and gender confirmed the finding of Jacobson and Owen that the increase in consultation rate by older females is not explained entirely by consultations for gynaecological and contraceptive reasons

(Jacobson and Owen 1993). The proportion of girls consulting for contraceptive purposes increased from 1.5% to 9.0% between the ages of 13 and 15, whilst the proportion consulting for gynaecological problems increased from 7.3% to 25.4%. However gender differences also emerged at age 15 in relation to consultation for respiratory tract infections and otorhinological symptoms. For both classifications there was a decline in consultation by boys but an increase in girls contributing to the overall difference.

Kramer and colleagues reported that consultations for psychological problems were relatively uncommon, with only 3% of teenagers consulting for these (Kramer *et al.* 1997). I found a slightly higher rate of 4.5%, although this was still the least common category of consultation. There may also have been differences between studies in how problems were categorised.

Kramer and colleagues also reported that frequent attenders were more likely to consult with psychiatric and psychosomatic problems, and less likely to consult with upper respiratory tract complaints (Kramer *et al.* 1997). However I found that frequent attenders were significantly more likely to consult for nearly all types of condition, with no distinction between psychiatric and physical problems. This again may reflect the potential atypicality of inner London practice as discussed above.

Although there were no studies that reported the rate of consultation for contraceptive purposes directly in this age group, Seamark and Pereira Gray found that approximately 49% of 16-17 year olds had consulted for contraception in the

previous year in the two practices that they studied (Seamark and Pereira Gray 1995). This is significantly higher than the 9% that I found in 15 year olds in the current study, but the difference may be solely attributable to age, with sexual activity increasing rapidly in this between the ages of 15 to 18.

4.2.2 Study 2

a) Self-Reported Consultation Rates & Behaviour

In the School Health Education Unit Health Related Behaviour Survey approximately 85% of Year 10 pupils (aged 14 and 15) claimed to have visited their GP in the previous year, a finding that has remained relatively constant between 1997 and 2007 (Balding 1998; Balding 2007). This is consistent with the 84% who claimed to have visited the GP in the past 12 months in my study. However I noted that this is an over-estimate compared with recorded consultations, suggesting that there is either likely to be some recall bias on the part of teenagers or an under-recording of consultations within medical records.

Overall, 19.9% of my sample reported having gone in to see the GP alone at their last consultation. Davies & Casey reported a slightly lower rate of 16% unaccompanied consultations amongst under-16 year olds, although their sample included 12 year olds who were less likely to do so, and this result may be prone to bias due to the low response rate in their study (Davies and Casey 1999). In contrast Donovan and colleagues found that 39% reported attending the GP unaccompanied but this was amongst an older age group of Year 11 pupils aged 15 and 16 (Donovan *et al.* 1997).

b) Health Status

I used the Dartmouth COOP charts as a tool for assessing global health status amongst my sample. The charts were originally validated on an American population, which may not be directly comparable to a UK sample (Wasson *et al.* 1994). However I also gained access to unpublished normative data from a school-based survey in the UK for comparison (Joanna Scott, 1997, BMedSci Dissertation, University of Nottingham). The distribution of the scores from the three sources is similar although the teenagers in my sample tended to rate themselves as healthier (lower scores) in terms of physical fitness, schoolwork, social support, and health habits, than in the other surveys (table 4.4).

I confirmed the original finding of Wasson and colleagues that boys scored significantly better than girls in relation to both physical and emotional health (Wasson *et al.* 1994). They also showed that boys scored worse than girls in relation to health habits, but my results showed the opposite trend. Wilkins & colleagues used the charts to assess adolescent outcomes in a long term prospective birth cohort study and found that, at age 13, there were significant differences by gender in relation to physical health, emotional feelings, and social support (Wilkins *et al.* 2004). However I found no difference in relation to social support. Wilkins-Shurmer and colleagues used the charts to look for relationships between health status and bullying in young people in an Australian sample of young people with a mean age of 13.6 (Wilkins-Shurmer *et al.* 2003). My results are consistent with theirs in showing a statistically significant association between worry about being bullied and poorer emotional health.

Overall I concluded that my results are consistent with those of previous authors and that any differences are likely to be due to cultural factors in the different populations studied.

Table 4.4: Comparison of Dartmouth COOP Chart Scores from Three Sources

% response	Source*	1	2	3	4	5	Median
Physical activity	A	53	31	12	4	0	1.0
	B	46	39	9	5	1	2.0
	C	32	36	17	12	13	2.0
Family	A	12	23	29	25	12	3.0
	B	13	21	26	24	16	3.0
	C	10	27	23	20	20	3.0
Emotional feelings	A	14	39	33	12	3	2.0
	B	16	42	31	9	2	2.0
	C	10	40	29	17	4	2.5
School work	A	22	43	25	8	2	2.0
	B	16	48	28	5	3	2.0
	C	19	25	35	14	7	3.0
Social support	A	47	29	14	7	3	2.0
	B	42	34	11	5	8	2.0
	C	34	33	18	8	7	2.0
Health habits	A	67	16	9	5	4	1.0
	B	64	18	7	6	5	1.0
	C	39	21	15	11	14	2.0

***Sources**

A: Current study (1997), n=704, UK, aged 13-15

B: Scott (1997) n=237, UK, aged 12-15

C: Wasson *et al* (1994) n=658, USA, aged 12-20

c) Health Related Behaviours

(i) Cigarette Smoking

I found that 24% of my sample of 14-15 year olds reported being cigarette smokers. This is almost identical to the rate of 25% found in the Trent Health Young Peoples Lifestyle Survey of 1994, which used the same question format (Roberts *et al.* 1995), and 23% reported by Walker and colleagues in their baseline survey of 14-15 year olds which was validated by salivary cotinine testing (Walker *et al.* 2002). Balding also reported a rate of 22% based on the 1997 SHEU survey amongst year 10 pupils (Balding 1998).

Approximately 32% of the 15 year olds in this sample reported being smokers, and this is higher than that of 23% reported by Currie using 2001/2 data, and of 21% in the 2006 NHS Information Centre survey (Currie 2004; Fuller 2007). These differences may reflect differences in questioning, classification of types of smoking, or temporal trends.

Despite some differences in reported rates I confirmed a similar ratio of female to male smokers as in previous surveys (approximately 1.5 to one) with 24% of girls reporting being smokers compared with 15% of boys. Overall these comparisons support the validity of my data in that there is no evidence of under-reporting as a result of the questionnaire being completed at home in comparison with anonymised school-based surveys.

In their general practice based pilot intervention study Jacobson and colleagues found that 31% of teenage attenders aged 12 to 18 were current smokers but a further

26% were contemplating smoking (Jacobson *et al.* 1995a). I included a question on intent to smoke, but only 9% of respondents reported being in this category. Differences are most likely to be due to the different age ranges studied, but may also result from other methodological approaches such as the way the question was asked and the use of a surgery based population compared with a postal questionnaire.

(ii) Alcohol

I found that 26% of 14 year olds and 46% of 15 year olds reported drinking alcohol regularly, which is almost identical to the rate of 35% for 14-15 year olds combined reported by Roberts and colleagues in the Trent Lifestyle survey (Roberts *et al.* 1995). The rate is also comparable with that of 36% in the 2006 SHEU Survey and slightly lower than the 39% in the 2006 NHS Information Centre survey which both used slightly different questions (Currie 2004; Fuller 2007).

(iii) Substance Misuse

I would anticipate that questions about substance misuse would be most vulnerable to reporting bias. Approximately 12% of 14 and 15 year olds reported having 'used drugs' at some time in my survey. This is slightly lower than the 15% found by Walker and colleagues amongst a general practice sample (Walker *et al.* 2002), and significantly lower than the 21% of Year 10 school pupils claiming to have used any form of substance in the 2006 SHEU survey (Balding 2007) and 34% found in the 2006 NHS Information Centre Survey of 15 year olds (Fuller 2007). Some of this difference is likely to be due to under-reporting in an identifiable questionnaire but some may be due to use of the broader term 'substance use' in the latter studies

compared with ‘drug use’ used in my questionnaire and that of Walker and colleagues.

d) Health Concerns

The most frequently reported health concerns of young people in my study were feeling *down or stressed*, *headaches*, *skin problems*, *weight problems* and *tiredness*. These results are consistent with those of Bewley and colleagues and of MacFarlane and colleagues who found that teenagers frequently complained of headaches and skin problems and were also worried about their weight (Bewley *et al.* 1984; Macfarlane *et al.* 1987). MacFarlane & colleagues also reported that depression was common amongst their sample.

Jacobson and colleagues reported that spots and acne were the commonest health concern of young people followed by diet, and pregnancy (Jacobson *et al.* 2000). However this survey asked about a limited range of pre-determined health problems. Epstein and colleagues invited teenagers to rate a broader range of health and social issues and found that the most common concerns were about nutrition, unemployment, acne, weight problems and menstruation (amongst girls) (Epstein *et al.* 1989). However as their list did not specifically include headaches or depression, and mine did not include nutrition and unemployment, the results are not directly comparable. Jones and colleagues found that the commonest things that young people would like to discuss with a health professional were sex, stress, relationships, and diet, but this was a predominantly female sample, and there is a difference between having a health concern and wishing to discuss it (Jones *et al.* 1997).

e) Help Seeking Attitudes & Health Locus of Control

The results from my survey suggest that family and friends are the most frequent sources of advice for a variety of health problems, but that gender and the type of problem also influenced the decision. GPs are the next most common source of advice for physical problems including contraception, but were less likely to be consulted about psychological problems and some health-related behaviours.

In their survey of a slightly older age group (16 to 20 year olds), Bewley and colleagues found that parents remained a significant source of health advice, with mothers being the most important (Bewley *et al.* 1984). This was based on a question about who they consulted regarding their most recent illness, rather than about specific types of problem. However they also undertook further exploration of help-seeking during semi-structured interviews and found differences by type of problem similar to those in my study with young people being more likely to consult a GP for physical problems, including those relating to sexual activity, and less likely to consult about psychological difficulties such as depression. My results also accord with both those of Bewley and colleagues and of Epstein and colleagues which suggest that GPs are not seen as an important source of advice for health related behaviours such as cigarette smoking or alcohol and substance use (Bewley *et al.* 1984; Epstein *et al.* 1989).

In their school-based survey Oppong-Odesing and Heycock asked a similar question to that in my own survey about potential help-seeking for particular types of problem (Oppong-Odiseng and Heycock 1997). They also found that GPs were identified as the next most common source of advice after family friends for physical illness

("such as sore throats"), contraception, and health related behaviours but not for relationship problems.

One of the limitations of offering a restricted range of options within a questionnaire survey is that some potential sources of advice could not be specified. I found that 30.3% of girls cited their GP as a source of advice for contraception / pregnancy with 5.6% choosing 'other' as a preferred source. Donovan and colleagues specifically asked about family planning clinics and found that 41.4% of girls identified this as their preferred source of contraception compared with only 22.7% citing their GP (Donovan *et al.* 1997). Although this might suggest that my results are therefore underestimating the importance of family planning clinics as a source of contraceptive advice I also found that only 7.9% of girls in my sample reported actually having attended a family planning clinic in the previous year.

Lempp and colleagues also specified magazines and TV as alternative sources of sexual health advice, and found that these were equally important as friends, with only 14% citing GPs a source of advice (Lemmp *et al.* 1998). However in practice there are differences in relation to the type of advice that can be given by various sources, with friends, TV and magazines being sources of information, whilst GPs and family planning clinics are sources of contraception.

Jacobson and colleagues (2000) found that, of those young people reporting specified health concerns, the commonest reason for consulting a GP was for spots/acne followed by diet, pregnancy and smoking (Jacobson *et al.* 2000). Although the categories are slightly different, my findings are consistent with this in

that young people indicated the intention to seek advice from GPs most commonly for skin problems followed by pregnancy, weight, and least commonly for smoking.

I was unable to find a normative sample with which to compare my results for health locus of control, mainly because I had chosen to adopt a two-item response approach. However I confirmed the finding of Balding in the 1992 SHEU survey that boys had a significantly higher internal health locus of control than girls (Balding 1993).

f) Attitudes to General Practice

The high proportion of teenagers identifying the importance of confidentiality in their contacts with general practitioners is consistent with previous surveys (McPherson *et al.* 1996). I was unable to confirm the finding of Donovan and colleagues that teenagers who believe that the service is confidential were more likely to consult (Donovan *et al.* 1997). However their finding was based on self reported consultation behaviour, which overestimates actual consultation behaviour.

Approximately 43% of respondents in my survey reported that they might be too embarrassed to talk about problems to their GP. Donovan and colleagues found that about 55% of teenagers admitted that it was embarrassing to talk to the GP about their personal concerns, although this was amongst the 53% of their total sample who stated that they had experienced difficulties with consultations (Donovan *et al.* 1997). Thus only 29% of the total sample expressed this concern. There was a statistically significant gender difference in both studies with girls being more concerned than boys, but this was less marked in my study. I was unable to confirm

Donovan's finding that embarrassment was less common amongst teenagers who consulted more frequently. Differences may be explained by the different ages of the samples or the variations in questions used.

Several previous studies have identified components of care that teenagers rate as important (McPherson *et al.* 1996; Jones *et al.* 1997; Jacobson *et al.* 2001). I incorporated a question about these in my survey. After confidentiality, respondents rated having a GP with an interest in teenage health as next most important. Same day access, whether as part of a 'drop-in' clinic or as part of routine care was considered next most important. Anonymous telephone advice was rated more highly by respondents in McPherson's survey but was only rated fourth in mine. This may reflect the different ages of the samples.

In terms of satisfaction, 14% of respondents in my survey disagreed with the statement 'I am always satisfied with the care that I get at my doctors surgery', with 70% agreeing and 17% being uncertain. This is comparable with the findings of Jacobson and colleagues who reported 87% satisfaction with the help and advice given at the most recent consultation (Jacobson *et al.* 2000). However there are differences in the way in which the question was asked, which means that direct comparison of responses is not possible. Despite the fact that 72% of respondents in my study were satisfied that their GP took them seriously, only 26% said that they felt able to talk to them about very personal things. This is consistent with Epstein and colleagues who demonstrated reluctance to discuss sensitive issues for a number of reasons (Epstein *et al.* 1989).

Similarly, in my study 64% of respondents agreed that ‘I am given enough time to talk about everything that I want’, with 21% being unsure and 16% disagreeing. Donovan and colleagues found that 21% of teenagers thought that appointments were not long enough and 2% thought that they were too long (Donovan *et al.* 2001). Some of this may be dependent on the experience of the young person, with infrequent consulters having less insight.

4.2.3 Study 3

Although there are no previous studies that are directly comparable with this case-control study of teenage pregnancy and general practice consultations, there have been other retrospective studies that produced similar results.

In a survey of 167 pregnant teenagers in Devon, Pearson and colleagues found that over 92% had used some form of contraception prior to conception and nearly all knew about contraception and where to obtain it (Pearson *et al.* 1995b). 60% reported have been to general practice for contraception compared with 30% to family planning clinics. I found a slightly greater proportion of cases who had ever attended general practice to discuss contraception (71%) whilst just over 60% had consulted about contraception in the previous year or been prescribed oral contraception. Some difference in results might be expected due to the different geographical populations and different methods of acquiring the data (self-report versus medical records).

In a second part of the same study Pearson and colleagues compared the characteristics of teenagers who chose termination of pregnancy with those who continued with the pregnancy (Pearson *et al.* 1995a). Teenagers who requested a termination were more likely to have used condoms as a form of contraception, and to perceive attending general practice for contraception as embarrassing. This is consistent with my results in which I found that teenagers who had a termination were significantly less likely to have consulted for contraception overall or to have been prescribed oral contraception.

Although my control series was not sampled to be representative of the overall population, my finding that 45% of controls had consulted about contraception in the previous year is comparable with that of Seamark and Pereira Gray (Seamark and Pereira Gray 1995; Seamark 1997). They reported the rates of consultation for contraception amongst 16-17 year olds over two time periods and this ranged from 44% to 49%. However in a separate study they found that approximately 16% of 15-19 year old girls had consulted for emergency contraception, and this is significantly higher than the 8% that I found amongst controls in the current study (Seamark and Gray 1997a). This may reflect local variations in alternative providers of emergency contraception, or potential under-provision or under-recording of consultations for emergency contraception in my study.

Morgan and colleagues also compared characteristics of 25 adolescent girls with a history of teenage pregnancy with 35 who had not, who were all attending a clinic of contraception or sexual health issues. Teenage pregnancy was associated with onset of sexual activity under the age of 16, and with 'powerful other' locus of control, a measure of external control by others (Morgan *et al.* 1995). In the current study it was not possible to determine the age of onset of sexual activity as such. However I did find that cases were more than twice as likely to have had their first contraceptive contact under the age of 16, and the same trend was true for the sub-group who had a termination of pregnancy, although this was not statistically significant.

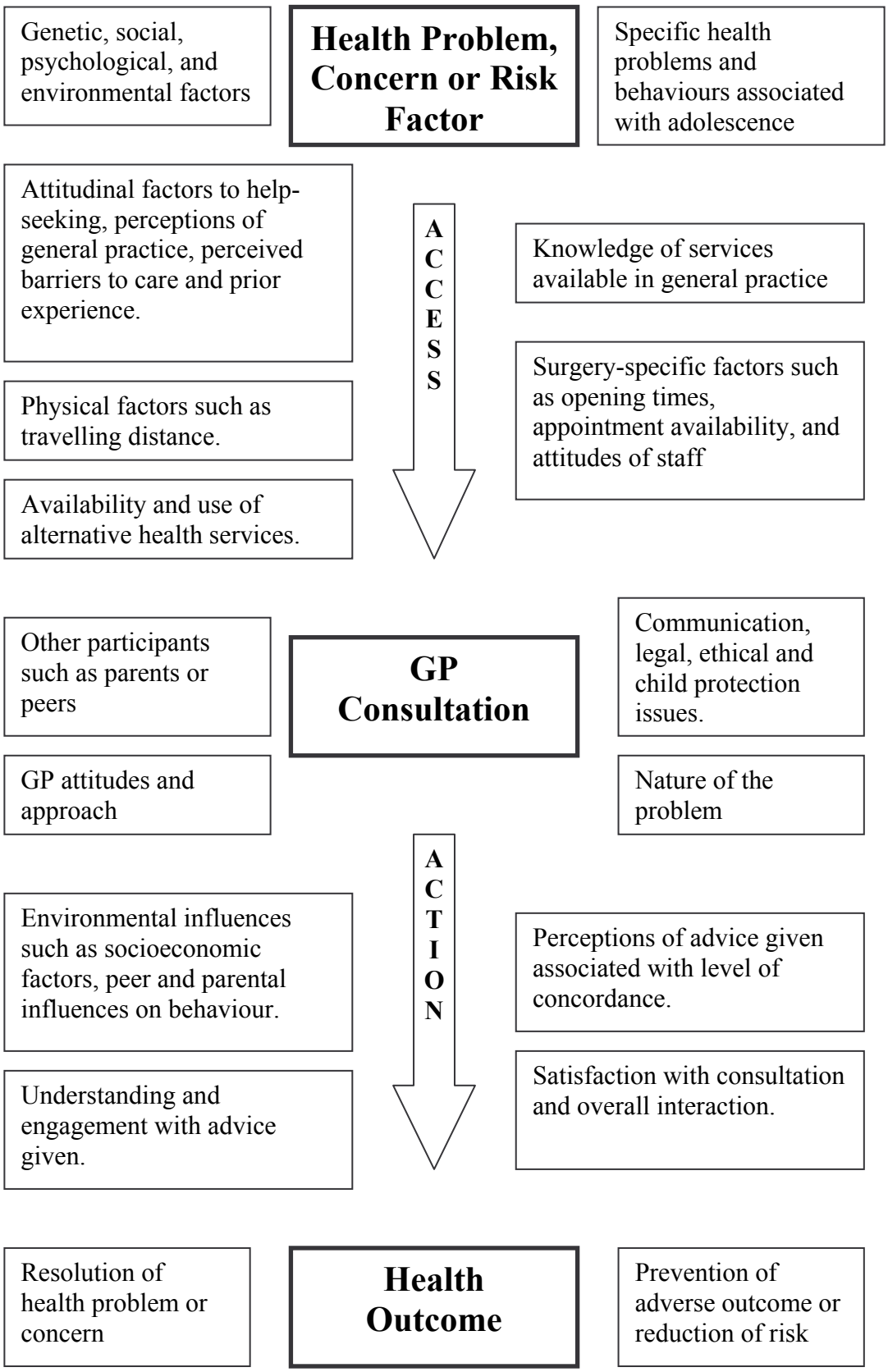
4.3 Discussion of Results

I have based the following discussion around the model presented earlier in this thesis (figure 1.1), which is reproduced on the following page. In this model I proposed a pathway extending from experiencing health needs to the general practice consultation and on to subsequent health outcomes.

The model identifies some of the factors that might be expected to influence specific stages in the pathway, such as the decision to consult. There were also global factors that might be influential at a range of stages in the model. Those considered in the current studies were gender, deprivation, and health locus of control. Age is also relevant because, although the range studied was small, I identified some significant trends within the results.

In the first part of this section I have attempted to identify the influence of these various factors at different stages in the pathway, then I have discussed the validity of the model in the context of the findings, , and at the end I have included three exemplars to demonstrate some of the practical implications of the results for general practice.

Figure 1: A Model for the Potential Role of General Practice in Teenage Healthcare



4.3.1 Age & Gender

Gender was the most influential factor that I identified in relation to the use of general practice based health services by young people. There were numerous significant differences between boys and girls in nearly all stages of the proposed model.

My results showed that girls perceived themselves to be less healthy than boys in a variety of ways. I found that self-reported health concerns were significantly greater amongst girls than boys for a variety of issues, but particularly in relation to skin problems, problems with weight, and feeling down or stressed. The concerns about skin problems may reflect the increased rate of self-reported eczema, because rates of self-reported acne were similar amongst both sexes. In contrast, there was no significant gender difference in relation to breathing problems and this is consistent with the similar rates of self-reported asthma by gender. Girls were more likely to be using regular medication and also scored more poorly on all domains of the Dartmouth COOP charts with the exception of perception of social support. Whilst poorer health experience is likely to result in increased consultation, the use of regular medication will also require more frequent attendance for review purposes. Thus consultation behaviours can potentially develop self-perpetuating or reinforced patterns.

Girls also had increased health risks compared with boys: the risk of teenage pregnancy is clearly gender specific, but girls were also significantly more likely to be regular smokers than boys, although there were no differences in relation to alcohol or substance misuse.

In terms of self-reported help-seeking there was little difference by gender in relation to attitudes towards GPs, but girls were more likely to report seeking help from friends for a range of health concerns. Boys were less likely to indicate that they would seek help from anyone for a range of problems. This may reflect attitudinal differences identified from the multidimensional health locus of control scale in which boys scored higher on the internal dimension, consistent with the belief that they are in control of their own health.

The increased health needs of young women were reflected in the increased consultation rates both overall and for specific conditions that became statistically significant by the age of 15. The increased consultation rate amongst girls was not entirely attributable to consultations for urogenital problems although some of the consultations were for menstrual problems and contraception. Girls were also more likely to consult for dermatological problems, especially acne, despite the fact that self-reported acne was equally common amongst boys and girls. This may be explained by different levels of concern about appearance between the sexes, but may also reflect the association between acne and poorer mental health amongst teenagers reported by Smithard and colleagues (Smithard *et al.* 2001). Smithard and colleagues also reported a higher rate of acne amongst boys than girls, but this may be due to the fact that their sample consisted of a slightly older age group (14 to 16 year olds) and there may be a gender differential in the increase in prevalence of acne with age.

The increased frequency of GP consultation by girls contrasted to some extent with the observation that they also tended to have more concerns about the service. Girls were less satisfied with the care provided, reported greater difficulty getting to the surgery, were less likely to agree that the doctor took them seriously, and felt less able to discuss very personal things with them. The association remained after limiting the analysis to those who had consulted in the past 12 months in order to compensate for any differential recall bias. It is not possible to differentiate whether negative attitudes had no impact on consulting behaviour, or whether the attitudes had been acquired as a result of more frequent experience of the service.

The gender differences in perception of surgery accessibility occurred despite the fact that there was no difference between them in the distance that they lived from the surgery. It may therefore reflect differences in perceived vulnerability when traveling, or that girls were more likely to attend the surgery alone than boys.

Although confidentiality was considered important by all teenagers, it was rated as particularly important by girls. However gender differences were much more prominent in relation to embarrassment. One explanation for some of the attitudinal differences in relation to the consultation is that girls may have been uncomfortable consulting male GPs. I did not specifically include a question about the gender of the GP that they consult so it was not possible to explore this further. However girls rated having a choice of gender of doctor more importantly than boys, as they did having access to a practice nurse instead of doctor. The importance of gender as a factor in the choice of healthcare provider has also been reported by others (Kapphahn *et al.* 1999).

The reasons behind observed gender differences in health experience and behaviour are likely to be complex and certainly not solely due to biological differences. Bird & Reiker argue that "a wide range of social processes can create, maintain or exacerbate underlying biological health differences" (Bird and Rieker 1999).

Age was found to be less influential as a factor in relation to general practice consultations, but this is unsurprising in view of the narrow age band studied. Despite this, there were some significant trends including an increase in consultation by girls but not boys between 13 and 15. Such trends are not usually observed in large data analyses that are based on wide age bands (Rowlands and Moser 2002).

In terms of health needs, Dartmouth COOP chart scores for emotional health, health habits, and schoolwork all deteriorated with age, although these may be interlinked in that pressures of schoolwork might adversely affect emotional health that could cause adoption of harmful health behaviours. Certain self-reported health concerns such as feeling down and stressed, fatigue and weight problems increased, whilst concerns about bullying declined. As expected, young people were more likely to engage in cigarette smoking, drinking alcohol, and substance misuse as they got older and this was also reflected in scores on the COOP health habits chart described above.

In the context of addressing health needs, my results showed that teenagers become more autonomous with age in relation to consulting in general practice with more young people reporting making their own appointment, attending the surgery alone, and consulting alone. By the age of 15 approximately two-fifths of young people

reported consulting alone. Thus, despite reservations from some GPs (Sengupta *et al.* 1998; Donovan *et al.* 2001), unaccompanied consultations by under 16 year olds appear to be relatively common. Whilst most of the decision to consult alone rests with the patient, it is also dependent on the practice allowing unaccompanied attendance. None of the practices involved in the study had specific policies on this issue at the time.

4.3.2 Socioeconomic Deprivation

I included socioeconomic deprivation as a common variable across all three studies. In studies 1 & 2 I used three different measures (Jarman, Townsend, and Carstairs) based on two sets of census data (either side of the survey) to determine whether any of them were more able to predict the health behaviour of young people than others.

I found no association between overall consultation rate and any of the deprivation indices studied. This was unexpected since there is a well-established link between health needs and deprivation, and also between health service use and deprivation amongst both adults and children (Townsend *et al.* 1988; Marmot *et al.* 1997; Carlisle and Johnstone 1998; Saxena *et al.* 2002; Marmot 2005). There are a number of possible explanations: firstly my sample may have been too small to identify a statistically significant association; secondly the deprivation indices used were designed to predict health needs in adult populations and, whilst one would expect similar patterns amongst families, may be less appropriate to young people; finally, that increased health needs in deprived areas are not being matched by uptake of general practice services.

Currie has argued that measures of socioeconomic deprivation used for adults may not be appropriate for teenagers, and my results would tend to support this in relation to consultation behaviour (Currie *et al.* 1997). However I did find some evidence of an association between the measures used and young peoples health behaviour in relation to both cigarette smoking and teenage pregnancy: young people in the most deprived quintile were more likely to be regular smokers; whilst teenagers who became pregnant had significantly higher deprivation scores than controls. In addition teenagers who had a termination of pregnancy had lower deprivation scores than those who continued with the pregnancy. These finding are consistent with previous research on both smoking and teenage pregnancy (Smith 1993; Seamark and Gray 1998; McCulloch 2001; Seamark 2001; Copeland 2003).

In addition to those associations described above, I also found that young people in the least deprived quintile were more likely to report feeling fatigued. This was unexpected since poorer health is usually associated with greater deprivation. However it might be explained by differences in lifestyle, with greater social expectation driving activity and therefore fatigue. Alternatively it may be a chance finding due to a type I error, especially in view of the large number of statistical tests that I performed.

Thus deprivation measures appear to predict some health risks in young people but did not appear to significantly influence help-seeking behaviour, certainly in relation to general practice.

4.3.3 Health Locus of Control

The unexpected lack of association between deprivation and general practice consultation amongst young people may be partly explained by differences in health locus of control, with teenagers from more deprived areas scoring lower on the internal dimension of the scale. This is consistent with the belief that they have less personal control over their health to the extent that they may not initiate appropriate help-seeking. A supporting finding relating internal HLOC to help-seeking was that teenagers who attended the GP alone had higher scores on the internal dimension than those who were accompanied, although this did not attain statistical significance.

Whilst other researchers have reported significant associations between HLOC and a variety of aspects of health behaviour in young people (Regis *et al.* 1994; Gracey *et al.* 1996; Rosenthal *et al.* 1999; Booth-Butterfield *et al.* 2000; Steptoe and Wardle 2001; Lajunen and Rasanen 2004), I found few in the current studies. I found that boys scored higher than girls on the internal dimension, consistent with the belief that they are more in control of their own health and there was a reduction in scores on the 'powerful others' dimension with age, possibly consistent with an increasing sense of autonomy. However I found no significant associations between health locus of control and consultation behaviour.

Wallston, who developed the scale, has argued that the HLC is not an effective predictor of health behaviour unless interpreted in conjunction with a measure of health value (Norman and Bennett 1996). Other factors may also have a more powerful influence than HLOC – for example, Regis and colleagues reported that

self-esteem was more important in predicting dental self-care than HLOC (Regis *et al.* 1994).

Other possible explanations for the lack of observed association between HLOC and consultation behaviour include my relatively small sample size, and the use of a two-item version which may have been too insensitive to detect differences: Furnham and Steel have described some of the difficulties of using different HLOC measures in children and adolescents (Furnham and Steele 1993). The cross-sectional nature of my studies means that the potential longer term predictive value of HLOC on health behaviour may be missed (Zdanowicz *et al.* 2006; Gale *et al.* 2008). Finally it is possible that parents have the most powerful influence on a decision to consult for most young people and so the HLOC has less relevance.

Although I did not assess it within my own study of teenage pregnancy, other researchers have reported an association between teenage pregnancy and health locus of control: Morgan and colleagues found that teenagers who were pregnant scored higher on the 'powerful others' scale than their non-pregnant peers, although this could be explained as an effect of the pregnancy (Morgan *et al.* 1995); However Young and colleagues found a similar association in a prospective study in which the data were collected before pregnancy – young women who became pregnant were more likely to have an external locus of control and poorer sense of self-efficacy than those who did not become pregnant (Young *et al.* 2001).

4.3.4 Distance from Surgery

Another variable that I examined across all three studies was distance of home from the surgery. One might expect that greater distance would be associated with reduced access, reduced consultation rates, and perhaps higher rates of teenage pregnancy because of difficulties obtaining contraception. However I found no association between distance and overall consultations, except for a non-significant trend amongst boys. In Study 3 controls actually lived further away from surgeries than cases, although this difference was no longer significant after controlling for other factors. Thus it appears that distance does not present a significant barrier to young people needing to access general practice. However whilst this may be true for the majority of young people overall, there may be exceptions in more rural communities who may not be adequately represented in these studies.

4.3.5 Practice

A number of differences were observed in relation to Practice. However these are difficult to interpret since they reflect a variety of factors including both the health needs of the local population and the accessibility and acceptability of the service offered. Practice-specific factors that I listed in the proposed consultation model included opening times, appointment availability, and attitudes of staff. However I did not investigate these as independent variables in the current studies.

Variations in teenage pregnancy rates by practice, as found in Study 3, might be predicted to be due to differences in the sexual risk of the young people in the locality, with socioeconomic factors being important determinants (Wellings *et al.* 1999; McCulloch 2001). However the results of the study by Hippisley-Cox and

colleagues suggest that practice factors, such as age and number of female GPs may also play a role (Hippisley-Cox 2000).

In Study 1, consultation rates differed significantly between practices in relation to both total surgery consultations and consultations with a GP. However whilst the same trend persisted in relation to consultations for new problems, this was no longer statistically significant. This suggests that some of the variation between practices is likely to be related to recall and follow-up rates for existing problems rather than necessarily in accessibility for new problems.

Some of the differences observed might have been explained by variation in asthma prevalence, since there was a significant difference between teenagers in terms of self-reported asthma by practice. However this is not necessarily consistent with results from Study 1 in which I failed to demonstrate any difference by practice in terms of consultations for respiratory problems. This might indicate that, whilst the prevalence of asthma is similar, it may not be being labeled or treated as such. In a Danish study Kolnaar and colleagues found that only 44% of cases of asthma had been diagnosed by GPs in adolescents and young adults (Kolnaar *et al.* 1994), and Viner suggested that this was due to a failure to adequately train doctors to assess young people in their social and developmental context (Viner 1998).

The other main category of problem for which there was a difference in consultation rates by practice was in relation to urogenital problems. Practice B, an inner city practice, had significantly higher rates, and this was attributed to consultations for contraception. Again this may be explained by either increased sexual activity in

this population (health need), by increased accessibility for a similar level of need, or by a combination of both.

There were significant differences between practices in relation to satisfaction with the care provided. Some of the variation was in terms of infrastructural factors such as how modern the surgery was and the privacy of the reception area. Other factors involved levels of satisfaction with the level of care provided. However these did not always seem consistent: for example, Practice B had the lowest proportion of respondents agreeing that they were always satisfied with the care provided, but the highest overall consultation rate, the highest level of satisfaction with receptionists, and the greatest proportion of teenagers who felt they were willing to discuss personal things with their doctor. This demonstrates the complexity of attitudes and difficulties assessing patient satisfaction (Jacobson *et al.* 2000).

4.3.6 Health Needs and Help Seeking

In my studies I confirmed the widespread prevalence of health concerns amongst young people. Of particular note was the finding that psychological concerns (feeling down and stressed) were reported as frequently as the most common physical concerns (skin problems).

In terms of help seeking, friends and family were the commonest sources of advice cited. Health professionals were more likely to be identified as a source of advice for physical problems rather than psychological ones. They were also only infrequently identified as a source of advice about health related behaviours. GPs featured as the most common source of advice amongst health professionals.

Identification of the GP as a potential source of health advice was associated with an overall increase in consultation rate as well as for specific types of problem. One possible explanation is that teenagers who are more frequent attenders would be more likely to identify a GP as a potential source of help for all problems.

Even for physical health problems fewer than half of young people reporting such concerns had actually consulted their GP in the previous 12 months. Thus many health concerns appear to go unaddressed by health professionals. Reasons for this may include problems accessing the GP, use of alternative sources of health information (TV, magazines and the internet), or low expectations of health. Equally the health concerns may not have a significant impact on a young person's activity and may not therefore be causing them sufficient problems to seek help.

Only a small proportion of young people with psychological health concerns actually consulted about them. This may be due to lack of awareness by teenagers that they can consult GPs about emotional problems (Donovan *et al.* 2001) or the belief that GPs are inadequately trained to deal with such issues (Biddle *et al.* 2006). However it may also reflect the difficulties that young people find in expressing emotional distress. Those young people that *did* consult for psychological problems also consulted more frequently for other problems. This may reflect both the physical consequences of psychological problems but also possibly the use of physical presentations as a 'passport' to consultation.

I found that some aspects of health status were associated with differences in consultation rate: teenagers with asthma and eczema consulted more frequently than

those without. However the increase in consultations did not appear to be confined to consultations for these respective conditions: teenagers with asthma also consulted more frequently for otorhinological problems and musculoskeletal conditions; whilst those with eczema also consulted more frequently for psychological problems. There are two possible explanations for this. Firstly the other problems may be co-morbid with the primary condition so that, for example, teenagers with asthma are also more likely to suffer from hay fever. Eczema is also recognised as being exacerbated by stress so an association might be anticipated between these. However, secondly young people may use the opportunity of a consultation for a chronic condition to discuss other problems that may then require follow-up.

The only dimension of the Dartmouth COOP charts for which there was an association with consultation rates was the emotional scale, with teenagers who scored more highly on emotional distress consulting more frequently for both psychological problems and urogenital problems. In Study 3 I also noted an association between teenagers who became pregnant and consultation for both psychological and gynaecological problems. This suggests a strong relationship between sexual activity and psychological health problems.

Young people were unlikely to consult explicitly for help or advice about health related behaviours. It is unlikely that they would seek help for these unless they had either identified them as a problem and been unable to change their behaviour without support, or as a result of parental intervention. Again, young people were more likely to cite alternative sources of help such as friends and family, before health professionals. This raises the question as to whether GPs can play a

significant role in this area. Although concerns about confidentiality might be a potential barrier to help seeking for such problems, there was no evidence that this was the case.

Other health services did not appear to be being used as a substitute for general practice. Use of hospital inpatient and outpatient services was actually associated with increased general practice consultation but this is to be expected if general practice is used as a gateway to secondary care services. However use of A&E services was also associated with higher use of general practice. This could be due to a subgroup of patients who are high users of NHS services in general, or possibly because those attending A&E were referred back to general practice for follow up. In either case it does not appear that A&E was being used as a substitute for general practice. Family planning clinics and teenage clinics were accessed relatively infrequently by teenagers in this study, but when they were, their use did not appear to significantly influence general practice consultation rates. These results are consistent with those of other studies that have shown that frequent attenders in general practice also use other health services more frequently (Carlisle *et al.* 1998; Kersnik *et al.* 2001)

4.3.7 Attitudes to General Practice

I attempted to explore a range of attitudes to general practice and their impact on consultation by young people. In particular I focused on perceptions of confidentiality since this is known to be a common cause of concern.

Whilst confidentiality was rated as important by nearly all respondents, there was much more variation in perception of whether or not confidentiality was actually maintained and whether such beliefs would influence disclosure. However none of these responses were associated with differences in actual consultation patterns. Concerns about confidentiality may therefore be a potential barrier, not necessarily to consulting a GP, but to what is actually shared within the consultation.

Embarrassment was identified as a potentially more common inhibition, particularly amongst girls, and such concerns were shown to be associated with reduced consultation for sensitive problems such as gynaecological and contraceptive reasons. This may have implications for the gender mix of health care professionals accessible for teenagers in primary care, although this issue was not specifically addressed in the current studies.

Most of the responses to attitudinal statements by teenagers in this study were not associated with differences in consultation rate. The most prevalent negative views about general practice concerned privacy of the surgery reception area, and waiting times to be seen for appointments. Neither of these were associated with differences in actual consultation patterns suggesting that they are only a minimal or theoretical barrier to health care. However lack of privacy at reception may act to inhibit teenagers asking initial advice either on organisational or medical matters.

There was an association between perceived difficulty getting an appointment and consultation rate but this does not reflect a barrier to health care since the association was in the opposite direction to that which would be expected. Instead it is

consistent with the probability that teenagers who attend more frequently are more likely to have had difficulty obtaining an appointment in the past and their belief is therefore based on experience. However perceived difficulty getting an appointment may act as a barrier to accessing health care for specific problems, and my results suggest that this might be true in relation to contraception, particularly where the need for emergency contraception requires accessible health care.

In contrast to the above, I found that teenagers who expressed the view that they were not given enough time within a consultation had lower consultation rates. This could be consistent with this belief acting as a barrier overall. It is also consistent with previous evidence that teenagers are actually given less time in general practice consultations than adults (Jacobson *et al.* 1994). Alternative explanations also exist: for example, teenagers who consult more frequently may develop a better relationship with their GP resulting in improved satisfaction with the consultation and the perception that more time is given. A similar argument can be applied to the association between willingness to confide in a GP and higher consultation rates. The importance of developing a good doctor-patient relationship with teenagers has been emphasised in other studies whch report that many teenagers believe their GP to be unsympathetic (Donovan *et al.* 1997; Jones *et al.* 1997), or that they feel uncomfortable in the consultation (Balding 1998).

Although nearly two-thirds expressed the wish to see the same doctor on each occasion, only half actually did so. Lack of continuity may contribute to the difficulties that the teenagers expressed in being able to talk about personal things, with only one-quarter feeling that they could do so. This is also despite the fact that

a majority felt that their doctor took them seriously and that they were given enough time in the consultation.

My results indicate that the expressed attitudes of teenagers may be less of a barrier to routine general practice care than previously believed, and this accords with results from Jacobson and colleagues which suggested that most teenagers are generally satisfied with the care which they receive (Jacobson *et al.* 2000).

4.3.8 Contraception and Pregnancy

Most of this section is about the results from Study 3. However I also determined the proportion of young women who received contraceptive advice in Study 1 since this provides information about contraceptive provision specifically in the under 16 year old age group. This is because it has previously been suggested that only a small proportion of sexually active young women approach general practice for contraceptive advice (Seamark and Pereira Gray 1995). I restricted my analysis to the 133 girls in my sample who were aged 15 and whose records were available. 13 (10%) of these had at least one recorded consultation specifically for contraception. On the assumption that 26% of this sample was sexually active (based on 1998 figures for sexual activity of under 16 year olds), then 35 young women might be considered to be at risk. GPs were therefore providing contraception for 37% of the young women at risk. Although 17 (49%) reported having attended a family planning clinic, five of these had also attended general practice. Therefore overall 25 individuals were known to have accessed contraceptive services with a preference for family planning services amongst this sample. This constitutes approximately

71% of the estimated 'at risk' group. However, as the remainder of this discussion shows, consultation for contraception in itself is not sufficient to prevent pregnancy.

My results from Study 3 showed that the majority of teenagers who subsequently become pregnant are likely to have consulted their GP at least once in the year prior to conception, with less than 10% having not done so. An even greater proportion of those whose pregnancy ended in a termination had consulted in this period. Whilst many of the teenagers consulted for contraception, a high proportion of those who did not consult for contraception also attended.

It is uncertain whether or not it would be possible for GPs to be more proactive in discussing contraception with young women who present for other reasons. This might be viewed as an unwelcome intrusion by some particularly as, in one study, of pregnant teenagers, half were unwilling to discuss contraception with a GP (Lo *et al.* 1994). Practice nurses may have less of a role in providing opportunistic contraceptive advice since a relatively smaller proportion of teenagers consult them and many of these consultations are already for contraception. However practice nurses frequently have family planning training and feel comfortable talking to teenagers about contraception (Gregg *et al.* 1998).

I found that teenagers who become pregnant were more likely to have consulted any practice-based health professional, or specifically the GP, at least once in the year prior to pregnancy than their age-matched controls. Overall consultation rates were also higher amongst this group. Most, but not all, of the difference can be explained in terms of consultation for contraception which acts as a confounding factor.

However after adjustment for this, cases were still more likely than controls to have consulted frequently (four or more times), to have consulted for psychological problems, to consult with diarrhoea and sickness, or to consult with gynaecological problems.

Previous studies have demonstrated that frequent consultation is associated with higher rates of psychological morbidity, and also of risk taking in terms of self-reported smoking, alcohol and illicit drug use (Kramer *et al.* 1997). Teenagers who are sexually active have higher levels of mental disorder than their peers who are not sexually active (Stiffman *et al.* 1987).

Gastrointestinal symptoms such as diarrhoea and vomiting place individuals who are on the oral contraceptive pill at potential risk of pregnancy due to reduced absorption and effectiveness. More than twice the number of cases than controls had consulted with such symptoms. However my results demonstrate association but do not necessarily imply causality. A similar hypothesis was tested in relation to the interaction with antibiotics and the oral contraceptive pill but no association was found between antibiotic prescription and risk of pregnancy in this study. Gynaecological problems are likely to be more prevalent amongst teenagers who are sexually active, and may also represent a method of presentation for teenagers seeking contraception.

Nearly three-quarters of pregnant teenagers in this study had a record of contraceptive provision in general practice at some time prior to conception.

Those teenagers whose pregnancy resulted in a termination were less likely to have consulted for contraception than those with other outcomes. Whilst this may indicate that these teenagers are accessing other contraceptive services it may also suggest that they do not perceive themselves to be at risk of pregnancy. This is supported by the fact that this group is just as likely as their matched controls to consult their GP for other reasons.

My results showed that teenagers who became pregnant were more likely to have been provided with the oral contraceptive pill or condoms at any time prior to conception than their matched controls. For the purposes of this study I did not distinguish the use of the oral contraceptive pill for contraceptive purposes from its use in the management of menstrual disorders. Neither was it possible to distinguish whether condoms had been distributed by the practice or had simply been recommended as a form of contraception. The association between these methods of contraception and teenage pregnancy reflects probable confounding by sexual activity.

The association between age of first contraceptive contact and teenage pregnancy is consistent with the possibility that younger age of first sexual intercourse is likely to increase risk of teenage pregnancy. Although such conceptions may be intended, a similar, but non-significant trend was also observed amongst teenagers whose pregnancy ended in termination.

My results suggest that recorded provision of emergency contraception and condoms in general practice is associated with an increased risk of teenage pregnancy

resulting in a termination. This suggestion comes both from the finding that teenagers who have a termination are more likely to have had these forms of contraception than matched controls without a pregnancy, but also that they are more likely to have had these forms of contraception than teenagers who have a pregnancy resulting in delivery or miscarriage. On the assumption that a termination is a proxy measure of unintended pregnancy then my findings would be consistent with the possibility that teenagers who use condoms and emergency contraception, in contrast to ongoing oral contraception, are more at risk of an unintended pregnancy.

Improved knowledge of, and access to, emergency contraception is often advocated as a means of reducing teenage pregnancy. However, teenagers who choose to use this method may be more at risk of unintended pregnancy, possibly because it is a marker of 'risk taking' in sexual activity. This emphasises the importance of appropriate counselling and follow-up to address long term contraceptive needs whenever a teenager consults for emergency contraception. It also raises questions about the possible supply of emergency contraception by agencies who are unable to provide such follow-up. These results are consistent with those of Ziebland and colleagues who found a geographical correlation between higher rates of pregnancy termination and higher usage of emergency contraception in the UK (Ziebland and Scobie 1995).

My results raise the question as to why young women who receive contraception from their GPs become pregnant. Clearly not all pregnancies are unintended, and cessation of contraception within the index year with subsequent conception may be due to effective family planning. Analysis of the teenagers whose pregnancy resulted in termination (as a proxy of unintended pregnancy) suggests that there may

be a range of factors including failing to return for repeat prescriptions of the contraceptive pill, but also failure of the pill itself possibly due to incorrect use or intercurrent gastrointestinal conditions. Some young women may stop the pill during transitions in relationships and not recommence in advance of a new sexual relationship. Arguments have been made for the use of long acting reversible contraceptives in this age group because of the high risk of pill failure.

4.3.9 Comments on the Proposed Model for the Potential Role of General Practice Consultations in Teenage Healthcare

In figure 1.1 (p. 72, reproduced on p. 292) I presented a framework for exploring the role of the general practice consultation, beginning with health needs and following a pathway to health outcomes. Whilst providing an indication of where some of the factors that I investigated might impact, the proposed model is oversimplistic because it fails to show the complex interactions that occur between many of the explanatory variables.

For example, although girls were found to have increased health care needs associated with predictably increased consultation rates, they also had higher levels of dissatisfaction with general practice, which would be expected to be associated with lower consultation rates. One possible explanation for this finding is that the health concerns outweigh any inhibitory effect of poor satisfaction. Alternatively, the poorer satisfaction may have resulted from increased experience of the service. In either case, the proposed model does not entirely allow for the finding.

The model implies a linear relationship between health concerns, consultation and outcomes based on a single episode of health need. In practice, a single general practice consultation is likely to impact on subsequent behaviour. Not only will past experience affect subsequent decisions about whether or not to consult, but prior consultations may introduce a medical imperative. Thus, for example, girls were more likely to be taking regular medication, but renewal of such medication may require further consultations, such that consultation behaviour is perpetuated or

reinforced. Increased knowledge of practice systems may also facilitate increased consultation, possibly at a lower threshold of health concern.

A further aspect that is not adequately conveyed by the model is the clustering of consultations for a range of different conditions. Thus teenagers who consult more frequently for some problems, such as eczema, were also more likely to consult for other, seemingly unrelated problems, such as psychological problems. This may be due to co-morbidity between conditions, but may also reflect facilitation of increased consultation by familiarity with practice systems as mentioned above.

The single most important factor in consultation behaviour that was not included in the original model, and was not directly investigated, was that of parental influence. Although a significant minority of participants attended alone, the majority did not make the appointment themselves and were accompanied by a parent. Parents are likely to strongly influence the decision to consult, and also the content of the consultation, potentially restricting the opportunity for young people to disclose or discuss sensitive health concerns.

The implied direct relationship between consultation and health outcome is also brought into question by the results from Study 3, which showed that consultation for contraception was not sufficient, of itself, to prevent teenage pregnancy. The multiple factors that might modify the simple model have already been discussed, but demonstrate the complexity of health behaviours, particularly in relation to sexual health.

In conclusion, the proposed model cannot adequately reflect the role of general practice consultations in young people's health: some factors such as gender and deprivation have complex interactions with health beliefs, concerns and behaviour; the impact of previous experience and consultation is understated; some important factors, such as parental influence, have been omitted; and health outcomes are influenced by a wide range of external factors, independent of the consultation. However, provided these considerations are taken into account, the model still provides a simple framework for further development.

4.4 Implications for Practice

In this section I will illustrate how some of the results from these studies can be used to inform the various stages of the Consultation Pathway Model presented earlier (figure 1.1). I will do this with reference to three areas of teenage health as exemplars:

- Psychological problems as an example of potentially hidden morbidity
- Cigarette smoking as an example of a potentially modifiable adverse risk factor
- Unintended pregnancy as an example of an adverse health outcome

a) Psychological and Emotional Problems

Psychological and emotional problems are common amongst young people. Between 9% and 14% of the young people in my sample reported being down or stressed all or most of the time with nearly half experiencing emotional distress at least some of the time. However only 4% had recorded consultations about psychological problems.

Young people with emotional problems are more likely to be female and the risk of such problems increases with age. They are also more likely to consult with eczema and with urogenital problems. These factors may help GPs identify those most at risk. Some young people may present with physical symptoms as a 'passport' to discussing emotional problems and GPs need to allow sufficient time within consultations for these to be disclosed (Donovan and Suckling 2004).

Young women tend to seek help from friends, whilst young men are unlikely to disclose their feelings to anybody. GPs are infrequently identified as a source of advice and young people may not know that they can discuss such problems. The first challenge for GPs is therefore to provide opportunities for young people to disclose emotional problems and to indicate that they are prepared to help with such difficulties.

Even when a psychological problem has been disclosed, my results suggest that young people may not be willing to disclose all of their worries because of fears about confidentiality. GPs should therefore take opportunities to confirm the confidential nature of the consultation and its potential limitations.

When addressing psychological problems, GPs should continue to recognise other health needs. In particular they should remember the increased risk of teenage pregnancy in young women consulting with psychological problems.

Once a psychological problem has been identified many GPs will be concerned about its subsequent management. Whilst specific interventions may be necessary, the value of active listening and supportive counselling skills should not be underestimated (Jacobson *et al.* 2002).

b) Cigarette Smoking

One in five of my sample were regular cigarette smokers, whilst nearly one-third of 15 year olds smoked. Girls were more likely to smoke than boys, and smoking rates increased with age. Regular smokers were more likely to consult with respiratory

problems, but also with psychological and urogenital problems. There is also a recognised association between cigarette smoking and teenage pregnancy in girls (Seamark and Gray 1998).

The first challenge for GPs is to identify young people who are smoking. Whilst all teenagers could be asked opportunistically, it is unlikely that they will give an honest response unless they are seen alone. It is therefore important to try to provide opportunities for independent consultation even if they are attending with a parent, particularly if they are in the 'at risk' groups above. Once identified there is a need to offer cessation advice and support.

A subgroup of young people who may be particularly amenable to intervention are those who are not yet smoking but might consider doing so (Jacobson *et al.* 1995a). Of the 9% of young people that fell into this category 63% were aged 13, 31% aged 14, and 6% aged 15. This suggests that the most appropriate age to target this group is age 13 or younger. However teenagers who fell into this category were significantly more likely to agree with the statement that they may not tell their GP about all of their health problems because of fear of somebody else finding out (39% of potential smokers compared with 15% of never smokers and 30% of smokers). GPs therefore need to reassure young people about confidentiality when asking about intended smoking.

c) Unintended Teenage Pregnancy

My research confirms previous findings that a high proportion of young women already use general practice as a source of contraceptive advice. It could be assumed

that, in the absence of such provision, teenage pregnancy rates might be even higher than they are at present. Whilst provision of sexual health advice through schools and other sources has been advocated as a way of solving the teenage pregnancy problem there is evidence to suggest that this is less effective than advice from a health professional (Pearson *et al.* 1995a; Jewell *et al.* 2000).

Despite the acknowledged impact of general practice contraceptive services, the purpose of this discussion is to identify ways in which GPs might be able to reduce the risk of unintended teenage pregnancy further. In doing so I will refer to three different situations: the teenager who does not attend general practice but is at risk of pregnancy; the teenager who attends general practice but is not known to be sexually active; and finally the teenager who attends general practice and is already known to be sexually active. Finally I will briefly mention young men.

Teenagers who do not attend general practice

There is still some evidence that teenagers do not know that they can access general practice for confidential sexual health advice (Burack 2000). General practices need to make this more explicit, but particularly for the minority of young people who are infrequent attenders. Whilst invitations for teenage health checks have not particularly been shown to be effective in changing health behaviours, they may still facilitate easier access for some young people as may other proactive approaches.

There is a need to attempt to reduce the embarrassment that young people experience on approaching health professionals for sexual health advice. I demonstrated that embarrassment was associated with reduced consultation rates for urogenital

problems. This is consistent with other studies that have shown that embarrassment is a risk factor for failing to access contraceptive services and for pregnancy resulting in termination (Pearson *et al.* 1995a; Stone and Ingham 2003). Young women who experience embarrassment are more likely to have a preference for a female clinician. Practices without an appropriate gender mix of clinicians should consider how to address this issue. This is supported by other research (Hippisley-Cox 2000). Once consultation behaviour is established then it is likely that fears about embarrassment diminish.

Whilst some teenagers who do not receive contraception in general practice access it from other sources, many rely on condoms which have a notoriously high failure rate (Pearson *et al.* 1995b).

Teenagers not known to be sexually active

There are few clues to sexual activity and risk of pregnancy amongst those young people who attend for other reasons. However it should be considered in all young women who present with urinary tract symptoms, and also those that are known to have psychological problems or engage in risky health behaviours since these risks are known to occur in clusters. GPs may need to be more proactive in discussing sexual health and to develop ways of doing this opportunistically within the consultation. Whilst there was no evidence in my research to suggest that fears about confidentiality affected consultation for sensitive problems, reassurance about this area would be good professional practice and may encourage disclosure, as it is a frequently cited barrier to contraception (Pearson *et al.* 1995b).

Teenagers known to be sexually active

Sexual activity is the biggest risk factor for unintended pregnancy, with a previous unintended pregnancy increasing the risk further. My results suggest that more active follow-up of young women who have been prescribed contraception or who are known to be sexually active may be required. Teenagers who request emergency contraception are at particular risk and need provision of longer-term contraception. Given that some of the young women in my research may have become pregnant after their oral contraceptive pill had expired, a case could be made for facilitating return visits, both by making general practice more 'teenage friendly' and possibly by recall systems. Young women who become sexually active at a younger age are at greater risk, and so this group merits special attention, as do young women who may be experience problems with their contraception.

Young Men

During my research into teenage pregnancy I have concentrated entirely on young women. Young men rarely consult GPs to discuss sexual health and yet about one-third of under 16 year old boys claim to be sexually active. GPs need to develop approaches to discussing sexual health with this population, despite the fact that they consult less frequently than girls.

4.4 Proposals for Further Research

One of the key gaps within existing research is in the understanding of the process of consultation between GPs and young people. Currently this is dependent on the recall and records of GPs, and on accounts of the experiences of young people themselves. However I propose a more objective observation of the consultation process in order to identify those factors which are more likely to result in a positive outcome and which could then potentially be incorporated into training programmes for GPs. It would allow the opportunity to determine the effect of various dynamics within the consultation, such as the presence or absence of parents or friends. However any such study would, of necessity, involve some intrusion into the consultation, whether in the form of an observer, video camera, or tape recorder, and this, in itself, may alter the dynamics. In particular it would influence the perceptions of young people about the confidentiality of the consultation. Despite this, I would suggest that such a study would contribute significantly to current knowledge.

A second area of research should involve robust evaluation of the outcomes of teenage specific initiatives in general practice. A wide range of such initiatives have been proposed from publicising confidentiality to provision of 'drop-in' clinics and health checks. Whilst many of these seem appropriate on the basis of the attitudes of young people, there has been little formal evaluation of their effectiveness and cost-effectiveness in terms of improving the health of young people.

Thirdly, with the increase in range of health services and sources of health advice for young people there is a need to gain an understanding of the way that they use

different types of service. For example there is some evidence that they use a variety of different sources of contraceptive provision, but it is unclear whether multiple services improves access and choice for young people or results in confusion and difficulties of maintaining continuity of care. Research in this area would involve mapping the uptake of services by a range of young people from a variety of backgrounds and differing health needs.

Fourthly, whilst the benefits of providing specific training in teenage health for GPs have been demonstrated in Australia, there has been no similar study in the UK. The RCPCH are currently producing an e-learning package in adolescent health for health professionals including GPs. As a minimum the impact of this package should be evaluated in terms of GP training and consultations with young people.

Finally most studies have explored the views of teenagers towards general practice in isolation. However many of their concerns, such as easy access to appointments, are also likely to be shared by older patients. Further research should attempt to distinguish those views that are unique or particularly important to young people from those that are shared by all ages.

4.5 Summary and Conclusions

In these studies I have demonstrated that teenagers primarily access general practice for minor physical problems, and yet they have other health concerns and behaviours that do not appear to be addressed. In particular they are reluctant to discuss emotional health problems or risky behaviours that may affect their long-term health and well-being.

The most important factor in predicting consultation patterns is gender, with girls being far more likely to consult than boys for a range of problems, not just those related to contraception and gynaecology. This reflects both the greater perceived health concerns amongst girls and also their willingness to seek help, despite higher levels of dissatisfaction with aspects of general practice.

Whilst young peoples' attitudes towards general practice in these studies were consistent with those from previous studies, there was only limited evidence that these attitudes affected the way in which the teenagers used the service. In particular there was no indication that worries about confidentiality prevented them from consulting overall. However there was limited evidence to suggest that concerns about confidentiality and also embarrassment might have an influence on consultation or disclosure about more sensitive problems.

Access to general practice in itself does not necessarily result in desired outcomes. Many teenagers became pregnant despite having accessed general practice for contraception in the year prior to pregnancy, and the multiple reasons for this have been discussed.

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ACKNOWLEDGEMENTS

This thesis has taken many years to develop. Some of the trials and tribulations that I have experienced during this time have been reminiscent of the transition of adolescence itself. During this process many people have had much more influence than they probably realised – from Professor Pam Gillies whose 'off the cuff' remark made me consider a career in academic general practice, to Jim McCracken (sadly deceased) who gave me his file on teenage health (which I never returned) when I started working in the Department of General Practice in 1993.

In my practice my teenage patients have been a constant motivation – reminding me, that it is amazing what a difference a few years can make in people's lives. At a national level, Chris Donovan has championed the cause of young people in general practice for many years and encouraged me to become a part of the RCGP Adolescent Task Group. In this context Lionel Jacobson's pioneering work has been a tremendous inspiration, as have other researchers and advocates for young people including Ann McPherson, Aidan MacFarlane and John Coleman. The recent tragic death of Dr Kathy Phipps, an active member of the Adolescent Task Group and a personal friend, has further inspired me to finish off what I started, remembering the three teenage children she has left behind.

I am grateful to all the GPs who allowed me to carry out this research in their practices as well as to the NHS R&D Mother & Child Health Programme, which provided funding for the first two studies, and NHS Executive Trent R&D which funded the third study. The steering group members in both studies were an invaluable source of help and advice.

Whilst working on this research my own children, Helen and Andrew, have grown from children into adults, and taught me things about adolescence that I would never have learned from the textbooks! Meanwhile my wife, Penny, has patiently, loyally and lovingly supported all of us, frequently hoping (I think) that my teenage years might one day come to an end!

I have listed some of the people who supported this work at the end of the thesis. However Jane Bethea (nee Allen), who acted as the research assistant on all of the studies, deserves special mention in view of her cheerful and unstinting efficiency and patience whilst we were doing the spadework. Professor Tony Avery has patiently supported and encouraged me over many years. Christine Haneline, my secretary, has been lumbered with much of the spadework ranging from finding references to proof reading and photocopying, whilst coping with my mood swings at work.

Finally my thanks go to all of my colleagues who I work with in my practice and at university who have given me the space to get this finished and to finally grow up.

APPENDIX

APPENDIX 1: Information required by the Faculty

The Faculty of Medicine & Health Sciences requires candidates for the degree of Doctorate of Medicine to state the following:

- The location of the work
- How much of the work was done personally or with the help of others
- Whether the work has been supervised
- Whether the work has involved collaboration with others
- What publications have resulted from the work

Location of the work

The studies were undertaken whilst I have been working within the Division of Primary Care at the University of Nottingham Medical School.

Degree of personal involvement in the research

All three of the studies received external funding allowing employment of staff to carry out some of the work. I have indicated their level of involvement throughout the thesis. The research was also supported by expert steering groups, which provided guidance and advice throughout. However I have taken full overall responsibility for all of the research described including:

- Undertaking full literature reviews.
- Development of the research proposals (Studies 1 & 2 were based on my own original idea, whilst Study 3 was based on an original idea by Professor Mike Pringle)
- Application for funding for Studies 1 & 2 and contributing to the application for Study 3.
- Applying for ethical committee approval.
- Production of protocols.
- Acting as Principal Investigator.
- Management of the research on a day-to-day basis including supervising the research assistant.
- Development and pre-piloting of questionnaires and data abstraction tools.
- Development and pre-piloting of data entry templates and performing quality checks on data entry.
- Undertaking all of the statistical analysis (with advice from the project statistician).
- Preparing reports and publications including interpretation of the findings.

Degree of involvement and collaboration with others

Jane Bethea (nee Allen) worked as the Research Assistant on all of these projects. Under my supervision she assisted in literature searching, assisted in the development of the questionnaire and data abstraction tools, administered the postal questionnaire survey, undertook some clinical data abstraction, trained practice staff in case-control and data abstraction processes, performed data entry, and administered the project steering group meetings.

Studies 1 and 2 were funded as a single project by the NHS Mother & Child Health Programme. The steering group consisted of:

Sue Denman,	Division of Public Health Medicine
Katherine Fielding,	Trent Institute for Health Services Research
Debbie Williams,	School of Nursing & Midwifery
Chris Hollis,	Division of Child & Adolescent Psychiatry
Jackie Williams,	Division of General Practice
Martin von Fragstein,	Division of General Practice
Mike Pringle,	Division of General Practice

Study 3 was funded by a grant from NHS Executive Trent R&D. The steering group for this project consisted of:

Mike Pringle	Division of General Practice
Julia Hippisley-Cox	Division of General Practice
Marion MacPherson	Department of Obstetrics & Gynaecology, University Hospital
Sue Bradley	School of Nursing & Midwifery
Dave Ebdon	School of Geography

In addition Carol Coupland (Division of Public Health Medicine) gave advice on the statistical analysis.

Supervision

My supervisor for this thesis has been Professor Tony Avery.

Publications

The following publications have been produced directly from the research in this thesis:

Churchill D, Allen J, Pringle M, Hippisley-Cox J. 2002. Teenagers at risk of unintended pregnancy: identification of practical risk markers for use in general practice from a retrospective analysis of case records in the United Kingdom. *Int J Adolesc Med Health* 2002;**14(2):**155-162.

Churchill RD, Allen J, Denman S, Williams D, Fielding K, von Fragstein M, 2000. Do the attitudes and beliefs of young teenagers towards general practice influence actual consultation behaviour? *Brit J Gen Pract* **50:** 953-957.

Dick **Churchill**, Jane Allen, Mike Pringle, Julia Hippisley-Cox, Dave Ebdon, Marion Macpherson, and Sue Bradley, 2000. Consultation patterns and provision of contraception in general practice before teenage pregnancy: case-control study. *BMJ* **321:** 486-489.

The research has contributed to material in the following publications:

Jacobson L, **Churchill R et al**. 2002. Tackling Teenage Turmoil: primary care recognition and management of mental ill health during adolescence. *Family Practice* **19:**401-409.

Dick Churchill & Ann MacPherson 'Getting it right in primary care': creating a child and young person friendly environment. Chapter in *Looking After Children In Primary Care: a companion to the children's National Service Framework,* edited by Ruth Chambers and Kirsty Licence pub. Radcliffe Publishing, 2004

The following reports have resulted from the research:

Churchill RD, Allen J, Pringle M, Hippisley-Cox J, MacPherson M, Bradley S, Ebdon D. The Trent Teenage Pregnancy Project Final Report for NHSE Trent. May 1999.

Churchill RD, Allen J, Denman S, *et al.* Factors influencing the use of general practice based health services by teenagers: a descriptive study in the East Midlands. Final Report for the NHSE R&D Mother & Child Health Programme. December 1997.

Appendix 2: Summary of Studies Cited in the Literature Review

Table 1:

Surveys & Interviews with Teenagers relating to General Practice

Table 2:

Questionnaire Surveys & Interviews with Health Professionals relating to Teenage Health in General Practice

Table 3:

Questionnaire Surveys & Interviews combining views of both Teenagers and Health Professionals relating to General Practice

Table 4:

Case Note Review and other Observational Studies of Teenagers in General Practice

Table 5:

Interventions aimed at improving Teenage Health in General Practice

Table 6:

Studies of Psychiatric Problems in Teenagers in General Practice

Table 1(a): Surveys & Interviews with Teenagers relating to General Practice (part 1)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Bewley *et al* 1984 GP based postal questionnaire survey	16-20 year olds registered with a single inner-London general practice. 121 questionnaires sent: 87 replied (70%) – case notes of non-responders checked.	To determine the health needs, attitudes and experiences of young people.	Significant gender differences in terms of consultations in previous 3 months, self-treatment for minor illnesses, health concerns (including being overweight), and health-related behaviours (smoking more common amongst girls). Mothers were the commonest source of advice for recent illness. Approximately 45% of males and females were sexually active.	Authors conclude that health problems of young people are under-recognised. Heterogeneous inner-city sample included those in full-time education, as well as employed and unemployed, living with parents and living independently. Results were descriptive without statistical analysis.
Bewley *et al* 1984 Semi-structured interviews	Sample of questionnaire respondents from above: 18 interviews completed	To determine the health needs, attitudes and experiences of young people	Themes included the fact that family, social and cultural problems contribute to morbidity; health concerns are relatively common; negative experiences of health services including fear of 'wasting time' with common problems in general practice.	Authors concluded that there is a need for more appropriate health strategies for inner city teenagers. Sample was more likely to have had recent contact with surgery. No details of qualitative analysis.
MacFarlane *et al* 1987 School-based questionnaire survey	14-16 year olds attending three upper schools in Oxfordshire. 643 (83%) responses: 299 girls and 344 boys.	To obtain the views of teenagers about their health and health problems.	Although 90% rated their health as fair or good, three-quarters had taken medicine in the previous four weeks, and three-quarters had complained of headaches. A third drank alcohol, one-third had time off school in the previous four weeks, and a third were depressed at least once a week.	Authors conclude that young people have more health problems than traditionally perceived. Questionnaire covered a broad range of health concerns and health behaviours. 6% were excluded from study by parents.
Epstein *et al* 1989 School-based questionnaire survey	12-17 year olds attending any of nine (out of 18) comprehensive schools in the London Borough of Brent: 485 completed questionnaires.	To explore the health concerns and health-related behaviours of young people and the extent to which they would seek help for these.	Main concerns were about weight, acne, nutrition, exercise and sexual health. Although a relatively high percentage of the students smoked and a smaller percentage used alcohol or drugs regularly, there was little concern or interest in discussing these matters with a health professional.	Authors concluded that there was significant unmet need, particularly in relation to sexual health. Atypical and mixed population with only 81% being white Caucasian. Most were aged between 13 and 15. 92 did not complete questions on sexuality due to parental concern.

Table 1(b): Surveys & Interviews with Teenagers relating to General Practice (part 2)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
McPherson *et al* 1996 School-based questionnaire survey	16-17 year old school pupils at two mixed comprehensive secondary schools in Oxfordshire. 188 completed.	To identify teenagers priorities for enhancing the provision of general practice – ranking six areas.	Confidentiality was rated as most important (by 65% of respondents) with the ability to phone up for advice on an anonymous basis as next most important. Of six issues, provision of magazines and posters for YP was least important.	Authors concluded that confidentiality is the most important issue for young people. Very limited group – continuing in education, and in single locality. No details of gender mix provided.
Oppong-Odiseng & Heycock 1997 Semi-structured interview survey	14-15 year olds randomly selected from eight (of 16) secondary schools in Stoke on Trent: 253 interviews undertaken (from 499 eligible teenagers).	To investigate teenagers' self-reported use and attitudes towards different health providers including GPs and school health services.	General practice was preferred source of advice after family and peers for a variety of problems. Reasons for the choice of provider included knowledge / understanding and trust as well as similar experience. Main influences on comfort in consulting with GP were: confidentiality, understanding, approachability, familiarity, professionalism, and embarrassment, and shyness.	Authors concluded that young people's preferences for care should be taken into account in developing future services. Large study with quantitative and qualitative elements allowing exploration of responses. Interviews of non-responders suggested similar population. Three interviewers with cross-validation.
Donovan *et al* 1997 School-based questionnaire survey	Year 11 pupils (15-16 year olds) attending 30 schools in rural, semi-urban, and urban areas of England outside of major conurbations. 4,481 responses	To investigate the attitudes of teenagers to the GP consultation and provision of contraception.	One quarter 'felt that the discussion with their GP could be relayed to their parents against their wishes'. Belief in confidentiality was associated with increased consultation rate. Other difficulties with GP appointments were identified as embarrassment, difficulty getting a quick appointment, unsympathetic GPs, difficulty in getting to the surgery.	Authors concluded that adolescents identify significant factors blocking them from easy access to consultation with their GP. Large-scale survey covering teenagers from a wide variety of practices and living in a variety of settings making the findings generalisable.
Kari *et al* 1997 School based questionnaire survey	12-18 year olds attending three state secondary schools in North London - 347 out of 600 questionnaires returned (58%)	To investigate potential barriers to consulting general practitioners.	Main barriers were identified as embarrassment, difficulty getting an appointment, unsympathetic GP, and fear of parents finding out. Services could be improved by quicker appointment, friendly receptionists, more sympathetic GP, same sex GP. About one quarter believed it could be conveyed to parents or staff without consent.	Authors concluded that adjustment of current services may improve healthcare for this teenagers Sample depended on teacher's selection of appropriate classes and pupils. Questionnaire included closed leading questions.

Table 1(c): Surveys & Interviews with Teenagers relating to General Practice (part 3)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Davies & Casey 1999 Questionnaire survey of young attenders	All 12-17 year olds registered with a single semi-rural practice with list size of 7,500. 110 completed questionnaires of 440 eligible (25%)	To identify factors that would make access easier for young people, and to identify the purpose of their consultation.	The main factors were assurance of confidentiality, friendly and welcoming staff at the reception, and being able to see a general practitioner alone or with a friend rather than with a parent. Self report of reasons for consultation were acute respiratory infections (31%) skin problems (24%), musculoskeletal problems (19%), asthma and allergies (13%), and 13% miscellaneous.	Limited information available on methodology and low response rate (attributed to difficulties of distributing questionnaires at reception). Data from self-report analysis may not be as reliable as factual data analysis from recorded consultations. Unclear how multiple presentations by the same individual were coded.
Jones *et al* 1997 School and magazine based questionnaire survey	354 pupils from four varied schools (inner-city, rural and convent) 171 responses from a 'popular teenage magazine'.	To explore views of young people on health issues, where they would like to receive health advice, and their GP.	83% had visited GP in previous year; 91% said they would like a special teenage clinic, staffed by a specialist health worker and to go alone or with a friend. 63% did not want to be seen in their local surgery. Most common reasons for wanting advice were about sex (64%), stress (59%), relationships (59%) and diet (59%).	Authors conclude that surgeries could be made more young person friendly and link to youth services. Dominantly female sample from mixed sources. Questionnaire included closed leading questions regarding drop in clinics
Jacobson *et al* 2000 School based questionnaire survey (same as Donovan 1997)	Year 11 pupils (15-16 year olds) attending a range of schools outside of major conurbations. 5152 pupils: 52% male and 48% female	To explore attitudes to their last GP consultation; and experience of help seeking for common problems.	Relatively high satisfaction ratings: 83% were able to talk about their problem and 87% were satisfied with the help received. Reasons for dissatisfaction included lack of information, failure to get better, perceived lack of care, and embarrassment. A relatively high proportion had health concerns for which they did not seek advice.	Authors conclude that teenagers are largely satisfied with GP services, but some do not seek help for their own health concerns. Large-scale survey covering teenagers from a wide variety of practices and living in a variety of settings making the findings generalisable. Satisfaction rates higher than in previous studies.
Burack 2000 School based questionnaire survey	13 to 15 year olds attending a random sample of eight state secondary schools in Essex. 1045 questionnaires of 1280 completed	To find out the opinions and attitudes of teenagers towards general practice-based sexual health care services.	68% were aware of the sexual health services offered by GPs and 75% were positive about being given helpful advice at a consultation. 54% believed they had to be over 16 years old to access sexual health services (more boys and sexually active girls) and 58% were concerned about their confidentiality not being preserved. 30% were concerned about GPs not having the time or skills to deal with their problems.	Study identifies misinformation about sexual health services and need for educating young people. Large survey, carefully designed, stratified sample, completed under exam conditions, and high response rates.

Table 1(d): Surveys & Interviews with Teenagers relating to General Practice (part 4)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Hine & Oakeshott 2001 School-based questionnaire survey	15-16 year olds attending a single London secondary school. 98/125 (78%) response	To investigate sexual lifestyles and attitudes including access for contraception	44% were sexually active with mean age of onset being 14 although 32% thought this was too early. 43% felt unable to talk to their GP about sexual health because of embarrassment or difficulty talking to GP. 27% expressed concerns about confidentiality.	Authors conclude that GPs need to work to establish greater partnership with adolescents and to establish strategies to improve teenager's awareness and access to services. Small local survey.
Garside *et al* 2002 School based questionnaire survey and focus groups	Pupils attending a single rural Devon secondary school: 311 from Year 9 and 119 from Year 11. Focus groups recruited by youth workers nurses. 18 single sex groups each containing 4-9 people stratified by age and sex.	To assess the concerns of rural teenagers regarding anonymity and confidentiality when accessing sexual health services.	73% of questionnaire respondents said that they believed the GP would keep everything confidential. The particular concerns of young people from small communities are more to do with the difficulties of remaining anonymous, which are related to visibility and lack of privacy in small communities. These problems were more pervasive among rural young people than those concerns more usually reported about confidential consultations.	In a separate survey of all 321 GPs in North & East Devon with 73% response rate: 90% believed they had the same duty of confidentiality to under 16s as older patients, but 70% agreed that they would prefer parents to know if they had been consulted for sexual health advice, and 76% for contraception.
Seamark & Blake 2005 Postal questionnaire survey	Women aged 16–19, 36–39 and 56–59 years registered with a single semi-rural practice in East Devon. 160/281 (57%) teenagers, 319/406 (79%) women in their 39s and 294/331 (89%) women in their 50s.	To compare reported consultation rates, embarrassment when consulting, and views on confidentiality of women in three age groups.	Similar consultation rates in all groups. Embarrassment at attending a GP decreased from 38% of teenagers to only 16% of women in their fifties. There was a similar pattern with 78% of teens and 42% of women in their fifties preferring to see a woman doctor for a women's problem and 31% of teens and 18% of women in their fifties expressing a preference for a woman doctor for any problem. Some 97% of women in their thirties and fifties thought a consultation with a GP would be confidential compared with 88% of the teenagers.	Authors conclude that embarrassment reduces with age whilst confidence in health service confidentiality improves.

Table 2(a): Questionnaire Surveys & Interviews with Health Professionals relating to Teenage Health in General Practice (part 1)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Gregg *et al* 1998 Postal questionnaire survey of practice nurses	All practice nurses working within the City and East London Health Authority. 112 of 139 responded (81%)	To identify practice nurses involvement in the care of teenagers, their training for such work, and their attitudes towards it.	80% saw teens regularly and 97% thought they should be involved. 25% had received specific training and all wanted more training. Main reasons for which practice nurses see teenagers were: acne, family planning, immunisations and weight. Nurses were more likely than YP to raise issues about alcohol, sexual health, immunisations, smoking and weight. But some issues not routinely discussed.	Authors concluded that expansion of the role of the practice nurse in teenage health may be appropriate but needs to be supported by training. High response rate but carried out in an atypical area with high levels of deprivation, ethnic minorities, teenage pregnancy and drug abuse.
Sengupta *et al* 1998 Postal Questionnaire survey of GP Principals	GP Principals in Scotland: 50% UK trained and 50% trained in Indian Subcontinent. 131 of 230 responded (57%)	To determine whether cultural background influences provision of contraception in under 16 year olds.	General practitioners in the study who had trained in the Indian sub-continent were found to be significantly less likely to provide contraceptive services to a female less than 16 years of age than those who had trained in the United Kingdom.	Authors suggest that a larger study is needed to confirm cultural differences in practice. Culturally sensitive topic – suggests that cultural background and / or training may be influential.
Garside *et al* 2000 Postal questionnaire survey of GP Principals	All GP Principals in North and East Devon. 235 of 321 responded (73%).	To determine GPs attitudes to treating under 16 year olds.	Most agreed that teens under 16 had the same rights to a confidential consultation as older patients. 76% would prefer a parent to know if they had consulted for contraception. 10% agreed that they were aiding a criminal act by providing contraception. 30% agreed that they would try to persuade someone to delay having sex.	Authors concluded that by encouraging young people to involve parents might make them more reluctant to attend for contraception (despite this being a necessary part of Fraser guidelines). Female GPs were over-represented amongst respondents.
Graham *et al* 2001 Postal questionnaire survey of GP Principals	All GP Principals in Avon Health Authority. 486 responses (84%).	To determine availability of emergency contraception and attitudes to teenagers consulting for this.	Most provided emergency contraception. 72% would provide out of hours (weekend) emergency contraception for a 14 year old if needed but 1.6% of these would require parental consent before doing so.	Authors concluded that most GPs will provide confidential emergency contraception for under 16 year olds. High response rate. Unclear how questions were worded.

Table 2(b): Questionnaire Surveys & Interviews with Health Professionals relating to Teenage Health in General Practice (part 2)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Davies 2003 Postal questionnaire survey of primary care staff	All GPs, practice nurses and receptionists in 17 general practices in the Cornwall. 166 of 209 responded (79%) response rate: 53 GPs, 28 practice nurses and 85 receptionists.	To investigate the willingness of GPs and PNs to consult with under-16-year-olds and GP to facilitate access by unaccompanied under-16-year-olds.	The majority of GPs and PNs (91%) were willing to consult with unaccompanied under-16-year-olds, although this was dependent on the age of the young person. Only 41% of receptionists, 46% of PNs and 38% of GPs were aware of a definite practice policy on access. 85% of clinicians were comfortable with guidance on Fraser guidelines.	Authors concluded that GPs and PNs are willing to consult with under-16-year-olds without a parent or guardian being present but most practices do not have policies in place to guide health professionals on under-16 access issues. Sample of a range of primary care staff with different response rates by staff group.

Table 3: Questionnaire Surveys & Interviews combining views of both Teenagers and Health Professionals relating to General Practice

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Lempp *et al* 1998 Postal questionnaire survey	All GPs and practice nurses in the London Borough of Wandsworth and a random sample of 18-20 year olds living in the area. 154 GPs (58%), 69 practice nurses (73%), and 96 young people (32%).	To explore the views of GPs, practice nurses about the provision of sexual health services and compare these with the views of young people.	All groups rated provision of sexual health information by GPs, telephone advice, and drop-in services as important. Young people perceived practice nurses as significantly less important providers and rated leaflets as less important as sources of information than did service provides. GPs or PNs. Young people wanted information on a broader range of issues whereas service providers focused on contraception. There were differences in perceived advantages and disadvantages of sexual health services in general practice.	Authors concluded that thecurrent provision of information and sexual health services in primary care does not meet the needs of young people. Important comparison of attitudes between health care providers and service users. However study focused on older teenagers and young people, with poor response rate and in a single locality.
Jacobson *et al* 2001 Semi-structured interviews with primary care staff, postal questionnaire and focus groups with teenagers	Staff and 14-18 year old patients registered with 31 general practices in South Wales. 40 interviews: 16 GPs, 12 practice nurses and 12 receptionists; 1082 questionnaire responses from 2265 questionnaires sent (50%). Focus groups with 31 teenagers: 22 female and 9 male took part in six focus groups stratified by age and gender.	To explore how primary care providers view teenage patients, and how teenagers view general practice, and to note any differences in opinions between the two groups.	Key themes covered included: • Difficulty of access to primary care • Status as a patient • The waiting room • Members of the primary care team • Communication • Confidentiality • Information & training • Overall care Teenagers reported a lack of knowledge of services, a feeling of a lack of respect for teenage health concerns, poor communication skills in GPs. and a poor understanding of confidentiality issues. The providers did not always share these concerns and they also had differing views on communication and confidentiality issues.	Authors concluded that there was an apparent gap between teenagers' own opinions about health care and the opinions held by primary care providers. Pluralistic methodology to overcome limitations of questionnaires and allow more in-depth study of teenage agendas and that of providers.

Table 4(a): Case Note Review and other Observational Studies of Teenagers in General Practice (part 1)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Jacobson *et al* 1993 Retrospective case note review	Teenagers registered in one general practice (suburban Cardiff): non-random sample of 22% of records of registered 11-19 year olds.	To determine the consultation rate and recorded reasons for consultation:	Annual consultation of 2.54(male) and 2.74 (female) in 11-14 year olds was lower than overall rate of 4.01. In 15-19 year olds: 1.13 (males) and 4.64 (females) with difference not entirely explained by consultations for gynaecological and contraceptive purposes. Higher than average teen pregnancy (7%) rate noted despite 20% oral contraception in 15-16 year olds and 60% in 17-19 year olds.	Authors concluded that further research is needed into primary care provision of services for teenagers, in the context of adolescent health as a whole. First descriptive study of consultation rates and patterns in young people. No detail provided about coding of consultation. No detail of non-available notes.
Jacobson *et al* 1994 Observational study of consultation times	Patients consulting in one general practice (suburban Cardiff) 900 consultations with six GPs - 119 (13.2%) were with teenagers (11-19).	To compare the duration of consultations with teenagers with that of other patients.	The mean duration of consultations with teenagers was 1.9 minutes shorter that that with adults – even after adjusting for GP. Teenagers were twice as likely to consult in the afternoon when consultations tended to be shorter overall.	Authors concluded that the potential of the teenage consultation for health promotion was being missed. Validated consultation-timing method based on telephone call system for patients compared with direct observation. Consistent with unpublished results from Scotland.
Seamark & Gray 1995 / 1997 Retrospective case note review of two cohorts	Girls aged 16-19 registered with two practices (city-based and semi-rural) 405 girls; 195 16 and 17 year olds with one practice.	To determine the proportion of girls consulting for contraception	More than 50% had consulted for contraception overall. Repeated the following year 49% of 16-17 year olds consulted for contraception with a further 5% having issue raised at consultation.	Authors concluded that girls are not as distrustful of general practice as previously believed. Study was confined to girls aged 16 and over, and performed within a restricted setting.
Seamark & Pereira Gray 1997 Retrospective case note review	Teenage girls aged 15 to 19 registered with a single general practice in Devon. 373 eligible girls	To determine the provision of emergency contraception to teenagers in general practice	59 (16%) had been provided with emergency contraception, 19 more than once. The majority were for condom problems or unprotected intercourse – three were for pill problems (missed or GI upset). 2 became pregnant despite emergency contraception.	Authors concluded that a consultation for emergency contraception presents an opportunity to discuss more reliable and acceptable methods of contraception. Single practice and setting. Preceded national advertising campaign. Suggests that teenagers do access general practice for emergency contraception.

Table 4(b): Case Note Review and other Observational Studies of Teenagers in General Practice (part 2)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Seamark & Pereira Gray 1997 Retrospective case-control study based on medical records	13 to 19 year old girls registered with a single practice in Devon. 37 cases who had a teenage pregnancy matched with 37 controls	To determine whether mothers of girls who had a teenage pregnancy were more likely to have had a teenage pregnancy themselves.	52% of mothers of cases had a teenage pregnancy themselves compared with 24% of mothers of controls.	Authors concluded that girls who have a teenage pregnancy are more likely to have a mother who became pregnant as a teenager. Used maternal medical records to access information based on premise that these would be more reliable than daughter or maternal knowledge, recall or admission.
Kramer *et al* 1997 Retrospective medical record analysis	13-16 year olds registered with a single general practice in London: 432 subjects – of whom 231 (53.5%) had attended in the previous 12 months	To determine the frequency of consultation and reasons for consultation over a 12 month period.	Only 54% had attended in the previous 12 months. Similar consultation rates between male and female. 23% attended 4 or more times (constituted 46% of all appointments). No serious illnesses. Main reasons were URTI, asthma, injury and acne. 3% were for psychiatric problems. Frequent attenders were more likely to present with psychological and vaguer physical problems.	Authors concluded that more research is needed to further clarify what leads adolescents to consult, and what interventions they receive. Lower consultation rate than other studies and failed to demonstrate any gender difference. First study to attempt to relate consultation rate to type of problem
Seamark & Pereira Gray 1998 Retrospective case-control study based on medical records	13 to 19 year old girls registered with a single practice in Devon. 37 cases who had a teenage pregnancy matched with 37 controls	To determine whether teenagers who become pregnant are more likely to be smokers.	61% of cases had smoked compared with 21% of controls. There was no difference in terms of living in rented versus owner occupied homes, which was used as a proxy of social deprivation.	Authors conclude that risk taking behaviours cluster in teenagers. Single practice limits generalisability. The lack of association with housing suggests that socio-economic status may be an uncorrected confounding factor.

Table 5(a): Interventions aimed at improving Teenage Health in General Practice (part 1)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Donovan & McCarthy 1988 Descriptive report of an intervention	16 and 17 year olds registered with a single 'middle class' London practice:	To determine the response to an invitation to a health check (GP and nurse-led), the problems identified, and acceptability.	92 attended invitation ("over 50%" – which included 63% of girls) Commonest problems identified were related to obesity, depression, acne and 'various social problems'. Smoking and alcohol intake 'reflected national trends'. 'Most' rated experience as >3 out of 5.	Authors concluded that, although there were positive outcomes, the results were inconclusive due to the small scale. They suggest that such interventions may help facilitate the process of encouraging young people to take responsibility for their own health. No long-term evaluation of outcome, and limited generalisability. But first report of such an intervention.
Townsend *et al* 1991 Largely observational with a pilot randomised intervention component	13, 15 and 17 year olds registered with three general practices: rural, urban, inner city: 491/677 (73%)	To compare characteristics of adolescent smokers and non-smokers and their initial response to anti-smoking counselling	68(14%) were regular smokers – underwent less exercise, slept less, had higher alcohol intake, higher blood pressure, and lower BMI than non-smokers. Persistent health problems, mostly asthma or allergic symptoms, were reported by 25% (17/68) of the smokers and 16% (60/381) of the non-smokers. Of the smokers given counselling, 60% (26/43) made an agreement with the practice doctor or nurse to quit.	Authors concluded that general practice is an appropriate setting for adolescents to receive advice on healthy lifestyle, which should not focus solely on smoking. No evaluation of effectiveness of the intervention.
Hibble & Elwood 1992 Descriptive report of uptake and usefulness of intervention	Single general practice in a market town in Lincolnshire: registered patients aged 16: 171 teenagers	To assess the impact of a young peoples nurse-led 'school leavers' clinic: uptake and rating of usefulness	141 (83%) accepted invitation. Advice on general health breast self-examination, testicular self-examination, and drugs, was rated as most helpful; advice on smoking and healthy diet was rated as least helpful. Immunisations were updated and there was an increase in return visits (no data provided).	This intervention focused on physical health and had a high uptake. There was no objective evaluation of longer-term outcomes.
Campbell & Edgar, 1993 Intervention and follow-up survey	14year olds registered with a single general practice: 115 teenagers: invited for a health screening appointment around their 14th birthday	To determine the uptake of invitation to a health screening appointment and evaluation of the impact of health advice.	64 attended (56%). 37 returned completed questionnaires at one week and six-months. Over the six months following the intervention there was an increase in the number taking exercise and eating a healthier diet, as well as an apparent improvement in family health as a result of discussions at home. Immunisations were updated. Invitation was to teenagers without their parents.	Validity of the self-completion survey is questionable as none of the teenagers admitted to ever having smoked. The intervention focused on physical health, but the authors commented on problems of poor self-esteem and stress amongst the young people. Sexual health issues do not appear to have been discussed. There was no statistical analysis.

Table 5(b): Interventions aimed at improving Teenage Health in General Practice (part 2)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Jacobson *et al* 1995 Pilot intervention	12-18 year olds registered with a single general practice and consulting with a single GP: 35 young people	To assess the feasibility of using a tool to identify teenagers contemplating starting smoking, and then to target counselling at this group.	11(31%) current smokers; 15 (43%) non-smokers; nine (26%) contemplating smoking of whom four were considering starting soon. All nine accepted counselling advice. The tool was acceptable to teenagers and helped them consider their position.	Authors concluded that GPs have a potential role of GPs in intervening to prevent the onset of cigarette smoking, although further research would be required to fully evaluate the intervention. Pilot intervention only – would need replication in wider range of practices.
Cowap 1996 Brief report of an intervention	13-17 year olds registered with two practices in East London. 867 invited.	To determine the feasibility of inviting teenagers to a weekly teenage health clinic	Only 63(7%) responded: rates were higher in 15-16 year olds offered booster immunisations (12%) compared with those offered a general invitation (2%).	Authors concluded that teenage clinics may not be suitable in more deprived areas and that GPs need to be more proactive in routine consultations. Small study with limited detail provided.
Walker *et al* 2000 Pilot randomised controlled trial with postal questionnaire and focus groups to assess acceptability.	14-15 year olds registered with 2 practices. 132 randomised to invitation to health check with nurse or control.	To determine the uptake and impact of an invitation to a practice nurse led health consultation.	56% responded to the invitation. 55% of the intervention group and 45% controls reported some positive change in health related behaviour at one month.	Authors concluded that nurse-led health promotion clinics are feasible and may have benefit, but require further evaluation. First attempt to formally evaluate nurse led clinics by a randomized controlled trial.
Fidler & Lambert 2001 Randomised controlled trial of a postal smoking prevention intervention based on GP lists	10-14 year olds registered with 14 general practices in Oxfordshire: 2942 never-smokers identified from an initial randomised survey of 6,000	To determine the effectiveness of postal advice from a GP on remaining a non-smoker, supported by certificates of non-smoking etc.	At 12 months significantly more YP (7.8%) had taken up smoking in the control group compared with the intervention group (5.1%). This difference was only statistically significant for boys.	Authors concluded that the intervention substantially reduced smoking uptake among the young people, particularly boys. Confidential postal contact from the doctor direct to the young person at home is influential and cost-effective. Although based on general practice populations it is uncertain how much this was dependent on the impact of the GP.

Table 5(c): Interventions aimed at improving Teenage Health in General Practice (part 2)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Walker *et al* 2002 Randomised controlled trial of nurse-led health promotion advice.	14-15 year olds registered with eight general practices in Hertfordshire: 1516 teenagers - 970 completed baseline questionnaires. Follow up was similar in both groups (48% / 49%)	To evaluate the effectiveness of inviting teenagers to general practice consultations to discuss health behaviour concerns with a practice nurse (20 minute appt) and appropriate follow up care.	41% of invited teenagers attended and one-third were offered follow-up. Significantly more teenagers in the intervention group exhibited positive movement in the stage of change for diet, exercise, smoking, and alcohol intake at three months (41% vs 31%) but this was not maintained at 12 months. There was marginally more positive change in actual behaviour by intervention teenagers at 3 months (16% *v* 12%) Recognition of possible depression resulted in improved mental health outcomes at 3 and 12 months. 97% of attenders said they would recommend the intervention to a friend. There were fewer visits to the GP in the year following the intervention and teenagers had increased knowledge about where to see confidential advice and contraceptive advice.	Authors concluded that change in behaviour was slight but encouraging, and the intervention was well received and relatively cheap. First large scale RCT with follow-up to evaluate teenage health clinics. Low response to invitation may miss those with greater health risks.

Table 6(a): Studies of Psychiatric Problems in Teenagers in General Practice (part 1)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Smeeton *et al* 1992 Observation	Single GP in London: registered patients over 20 years - young people continuously registered from adolescence to young adulthood. 134 males and 100 female	To determine patterns of psychiatric diagnoses made by a single GP during 'early adolescence' (10-14) and 'early adulthood' (18-19).	In early adolescence 11% of males and 6% of females were given a psychiatric diagnosis compared with 13% of males and 24% of females in early adulthood. 38% of those who had a diagnosis in early adolescence were diagnosed as having a psychiatric problem in early adulthood compared with 16% of the others.	Authors conclude that there is a high risk of recurrence in of psychiatric problems in adulthood. Longitudinal study limited by migration from the practice, non-standardised data, and potential bias from non-blinded diagnoses in early adolescence.
Westman & Garralda 1996 Pilot intervention: mental health promotion clinic	14-15 year olds registered with an ethnically diverse general practice in London: 115 invited:	To identify young people at high risk of depression, and offer psychotherapeutic intervention	25 (22%) attended – more likely if invited without parents: 11 diagnosed with disorder – mainly depressive: 4 attended for psychotherapy and 3 subjectively improved. 10/11 had consulted in general practice in the previous year	Authors concluded that specific health promotion intervention is not cost effective but opportunistic identification and management might be. Small study in single practice limits generalisability.
Kramer & Garralda, 1998 Cross-sectional interview study linked to consultation outcomes by GP questionnaire after each visit	13 to 16 year olds attending a single 8 GP London general practice. 131 of 200 eligible teenagers took part in the interviews: 57 male and 79 female.	To assess the prevalence of psychiatric morbidity in teenagers and the recognition by GPs	2% presented with psychiatric problems; 38% had some psychiatric disorder in previous year with half having moderate impairment or worse. 84% of disorders were emotional. Psychiatric disorders were associated with physical symptoms. GP assessment was low on sensitivity (20.8%) but high on specificity (90.7%) with most severely affected teenagers being recognised.	Authors concluded that emotional disorders are common among adolescent GP attenders and linked to physical symptoms; GP recognition is limited. In depth psychiatric interviews with large sample. Results are not necessarily generalisable. GP recognition may have been artefactually increased by participation in the study.
Pott *et al* 2001 Case note review followed by postal questionnaire survey of a sample.	16 year olds registered with 34 randomly selected practices in Scotland: 2359 records reviewed; 99 of 137 questionnaires returned (72%).	To estimate the prevalence of psychological morbidity young people and assess their related consultation behaviour.	5% of all cases had been identified as having mental health problems by GP and 1% had 'attempted suicide' From questionnaire survey, 26% were 'cases' according to GHQ and half had some emotional health concerns in previous year. Only one had consulted about this.	Authors conclude that the majority of adolescents who have mental health problems are not easily identifiable from the remainder in terms of consultation patterns Sample size was much smaller than intended due to lack of participation by GPs.

Table 6(b): Studies of Psychiatric Problems in Teenagers in General Practice (part 2)

Study / Study Type	Population / Nos.	Aim	Key Results	Comment
Gledhill *et al* 2003 Evaluation of a pilot educational intervention aimed at improving GP recognition of teenage depression and initial management	10 GPs in a ingle central London practice: 136 of 200 consecutive adolescent patients before intervention and 184/190 after the intervention.	To evaluate the effectiveness of an intervention to train GPs in the identification of depression as detected by screening and psychiatric interview.	Sensitivity of GP identification improved from 20% 43% without loss of specificity; Of the 16 adolescents identified as depressed by the general practitioners, 13 received at least one component of the treatment intervention. Most commonly used interventions from general practitioner reports were naming the difficulty as depression, identifying a confidant, giving information about depression, linking it to stressors and offering another appointment.	Authors concluded that training GPs is feasible and may improve recognition of adolescent depression. First UK study aimed an education intervention for GPs in adolescent health. Need for fuller evaluation including longer term outcomes and wider range of settings.
Yates *et al* 2004 Cross-sectional survey of GP attenders linked to GP report of consultation.	13-16 year olds attending one of three general practices: one inner London and two suburban. Of 413 teenagers attending 276 (67%) completed questionnaires 95% of GP 57% of parent questionnaires returned.	To determine the associations with depressive symptoms in teenagers consulting in primary care.	Up to 33% of the teenagers were 'high scorers' on the Mood & Feelings Questionnaire. No difference in rates between urban and suburban practices. GPs identified psychological problems in 25% and psychiatric disorder in 11% although this did not correlate with mood symptoms. Depressive symptoms were associated with older age, female gender, parental psychiatric problems, with physical symptoms causing psychosocial impairment, with health risks (substance use), and with use of services (both primary care and mental health services).	Authors conclude that depressive symptoms are more common in GP attenders than in the population (5%) and diagnostic rates are low. Study compared different settings but only two-thirds response so risk of response bias in results.
Martinez *et al* 2006 Prospective cohort study	13 to 16 year olds consulting with 13 GPs in Norfolk: 38 males and 60 females. 98 teenagers were recruited	To identify factors associated with GP detection of psychological problems in the consultation.	31 (32%) had psychological problems according to the pre-screening strengths & difficulties questionnaire. Discussion of psychological issues occurred during 18% of GP consultations. GPs recognised psychological problems in 19/31 (61% sensitivity) with a specificity of 85% (57/67). GPs were more likely to detect more severe problems, and when psychological issues were discussed openly.	Authors concluded that GPs are in a good position to identify psychological issues in adolescents, but GPs and adolescents are reluctant to explore these openly. Under-recruitment may have led to the failure to recognise associations. Self-selection and participation in the study is more likely to have overestimated sensitivity. SDQ is a screening tool not diagnostic instrument.

APPENDIX 3: Coding Framework for Consultations in Study One

	Specific Symptoms / Conditions	Total No of Consults	Ever / Never Consulted
Respiratory Conditions		rst	rstx
Infections	upper and lower respiratory tract infections	rtit	rtitx
Asthma	acute exacerbations and chronic monitoring		
	GP consultations	ast1	ast1x
	Nurse consultations	asn	asnx
	All contacts	ast2	ast2x
Miscellaneous	non-specific dyspnoea, haemoptysis	sob	sobx
Dermatological Conditions		drmt	drmtx
Miscellaneous	dandruff, chillblains, abdominal striae, skin lumps, pigmented lesions, urticaria, fungal skin and nail infections, nail dystrophy, headlice, ganglion, non-specific rashes, skin tags, pityriasis versicolor	sp	spx
Acne vulgaris	all types	act	actx
Eczema	atopic and contact dermatitis	ext	extx
Warts / verrucas	all types, including molluscum contagiosum	wart	wartx
Soft tissue infections	impetigo, cellulitis, paronychia, infected insect bites, abcess	sti	stix
In-growing toe nails	infected and non-infected	igtn	igtnx
Musculoskeletal Conditions		musct	musctx
Injury / trauma	head injury, laceration, limb injury, sports injury, neck sprain and whiplash injury	inj	injx
Miscellaneous	gait problems, non-specific limb or joint pain (other than knee or back), joint swelling, groin pain, tenosynovitis, tendinitis, non-specific crepitus	jp	jpx
Knee pain	non-traumatic, non-specific, chondromalacia patellae, Osgood-Schlatters disease	kpt	kptx
Back pain	non-traumatic, non-specific	bp	bpx
Chest pain	musculo-skeletal	cp	cpx
Otorhinological Conditions		entt	enttx
Hay fever	allergic rhinitis and related conditions	hft	hftx
Otalgia	simple otalgia, otitis media	eart	eartx
Miscellaneous	deafness, otitis externa, epistaxis, tinnitus, nasal obstruction and irritation, labyrinthitis, discharging ear, ear piercing, ear lump	ent	entx

Coding Framework continued

Ophthalmic Conditions	conjunctivitis, meibomian cyst, squint, blurred vision, swollen eyelid	eye	eyex
Urogenital Conditions		gynt	gyntx
Menstrual disorders	amennorhoea, dysmenorhoea, menorhagia	pbt	pbtx
Miscellaneous	vaginal discharge, sexually transmitted disease, vulval soreness, vulval trauma, testicular pain scrotal swelling, penile problems	gnt	gntx
Contraception	request for contraception, pregnancy test		
	Total consultations	ctt1	ctt1x
	Nurse consultations	ctn	ctnx
	Total contacts	ctt2	ctt2x
Urinary tract disorders	dysuria, cystitis, pyelonephritis, glomerulonephritis, enuresis, balanitis, nocturia	utp	utpx
Pregnancy related	antenatal care, postnatal care	preg	pregx
Gastrointestinal Conditions		gitt	gittx
Diarrhoea / vomiting / constipation / nausea	including colitis, gastro-oesophageal reflux, gastroenteritis, non-specific disorders	git	gitx
Abdominal pain	non-specific, appendicitis	apt	aptx
Perianal disorders	threadworm, haemorhoids, perianal irritation	pr	prx
Weight problems	obesity	wt	wtx
Psychological Conditions		psyt	psytx
Emotional	depression, anxiety, school problems, deliberate self-harm, family problems	emt	emtx
Behavioural	conduct disorder, glue sniffing, possible drug abuse	bht	bhtx
Sleep	insomnia, nightmares	slp	slpx
Miscellaneous Conditions		mist2	mist2x
Headache	migraine, undiagnosed headache, tension headache	hat	hatx
Fatigue	undiagnosed fatigue and non-specific myalgia	tatt	tattx
Breast problems	gynaecomastia, breast pain	brst	brstx
Lymphadenopathy	undiagnosed lymphademopathy	ln	lnx
Oral / dental problems	dental abscess, mouth ulcer, oral herpes simplex	oral	oralx
Dizziness	undiagnosed fainting, blackout, vertigo, collapse	diz	dizx
Specific viral illnesses	chicken pox, mumps, shingles	virl	virlx
Immunisation reactions	all types	imr	imrx
Other (uncoded)	all other conditions except medicals & new patient checks (admin)	uncode	uncodex

APPENDIX 4: Clinical Data Extraction Sheet for Study One

Surgery

	Code:

Demographics

Practice ID		**Date of Birth**	
Study ID		**Postcode**	
Date of Registration		**Male / Female**	
Data Collection Start		**Data Collection End**	

Background

	Condition / Drug	**Start Date**	**End Date**
Chronic Illnesses	**1**		
	2		
	3		
	4		
Repeat Prescriptions	**A**		
	B		
	C		
	D		
	E		
	F		
	G		

Hospital Attendances

No.	**Date**	**IP/OP**	**Department**	**Problem**	**Action**

Consultations

No.	Date	A/V	D/P	Problem	N/C/R	Diagnosis	Outcome	Prescription
1								
2								
3								
4								
5								
6								
7								
8								

A = Attendance at surgery **D = Practice initiated** **N = New problem**
V = Home visit **P = Patient initiated** **C = Continuing problem**
R = Recurrent problem

Other Prescriptions

No.	Date	Item	No.	Date	Item

APPENDIX 5: Copy of Letter sent from Practice to Parents

PRACTICE HEADED PAPER

To the Parent or Guardian of:
«M_5» «M_6»
«M_8» «M_9»
«M_10»
«M_11» «M_13»

Date

Dear Sir / Madam

The University of Nottingham East Midlands Teenage Study

The University of Nottingham are carrying out an important research study about teenagers and their health. We have been asked if we can help by allowing them to send a questionnaire to our teenage patients.

The questionnaire asks about health and lifestyle, and has already been used in schools. Teenagers returning completed questionnaires will each receive a £4 gift voucher as a token of appreciation. A few young people will also be asked if they would take part in a telephone interview with one of the researchers.

All the information will be treated confidentially which means that nobody outside the study team will be able to find out what any individual has replied. All personal information will be destroyed at the end of the study.

We hope that you will agree to «M_5» taking part. If you are happy for them to do so then there is no need to take any action and the questionnaire will be sent in approximately two weeks. If you **do not** wish them to do so, or if you would like more information first, then please complete and return the attached form.

Yours faithfully

on behalf of ……. PRACTICE

APPENDIX 6: Copy of Teenage Health Questionnaire

Teenage Health Questionnaire

We are asking for your help in a project that aims to find out about the health needs of young people and how they use health services. To do this we would like you to fill in this confidential questionnaire. Only the people who are carrying out the project at The University of Nottingham will see your answers and they will not pass these on to anyone else.

Please answer as many questions as you can. To help you complete the questionnaire there are instructions at the beginning of each section.

When you have finished, please post the questionnaire to us in the envelope provided. It does not need a stamp. As a way of saying thank you we will be sending a £4 gift voucher to everyone who sends us a questionnaire that is completed fully and correctly by .....

Thank you for your help!!!!!!!!

I am : male ☐ female ☐

My date of birth is: *(please write in the boxes the day/month/year in numbers- e.g. 12 07 86).*

☐☐ day ☐☐ month ☐☐ year

Which of these best describes you?

☐ White ☐ Black - African

☐ Black- Caribbean ☐ Black other

☐ Indian ☐ Bangladeshi

☐ Pakistani ☐ Chinese

☐ Other Asian

☐ Other *(please write your answer)*

.....

Q1) Here are some television programmes that deal with health issues. Which, if any do you watch? *(please tick a box for all of the programmes you watch)*

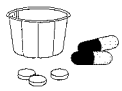
☐ Casualty ☐ Eastenders ☐ The Ward ☐ Shortland Street ☐ Byker Grove

☐ Cardiac Arrest ☐ 999 ☐ Dangerfield

Q2) Do you have or have you had any of these health problems?
(please tick all of the boxes that apply to you)

☐ Asthma ☐ Eczema ☐ Diabetes ☐ Acne ☐ Epilepsy

Q3) Do you take any medicine, tablets or inhalers **everyday** ?



☐ Yes

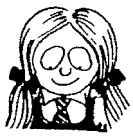
☐ No

if **yes**, what do you take? *(please write your answer)*

.....

Q4) If you wanted to talk about the following health issues, who would you talk to? You can tick more than one box for each health issue .

	Family member	Family doctor (GP)	Nurse at doctor's surgery	School Nurse	Friend	No-one	Other
Smoking cigarettes	☐	☐	☐	☐	☐	☐	☐
Feeling down or stressed	☐	☐	☐	☐	☐	☐	☐
Relationships	☐	☐	☐	☐	☐	☐	☐
Illegal drugs such as cannabis (draw, spliff)	☐	☐	☐	☐	☐	☐	☐
Weight problems	☐	☐	☐	☐	☐	☐	☐
Contraception and pregnancy	☐	☐	☐	☐	☐	☐	☐
Alcohol	☐	☐	☐	☐	☐	☐	☐
Skin problems	☐	☐	☐	☐	☐	☐	☐



Q5) These are a list of problems some teenagers have. Tick one box on each line to show if it worries you:

	All of the time	Some of the time	Never
Skin problems	☐	☐	☐
Breathing problems	☐	☐	☐
Headaches	☐	☐	☐
Being bullied	☐	☐	☐
Problems with sleeping	☐	☐	☐
Problems with my weight	☐	☐	☐
Tiredness	☐	☐	☐
Painful joints	☐	☐	☐
Feeling down depressed or stressed	☐	☐	☐
Death and dying	☐	☐	☐

Q6) For the following statements, tick either ☑ agree or ☑ disagree.
(tick one box for each statement)

	Agree	Disagree
My good health is mainly due to luck	☐	☐
Seeing my doctor regularly is the best way for me to avoid being ill	☐	☐
The main thing that affects my health is what I do	☐	☐
No matter what I do , if I am going to be ill, I will be ill	☐	☐
Health professionals such as doctors and nurses , control my health	☐	☐
If I do the right things, I can stay healthy	☐	☐
I will stay healthy if it is meant to be	☐	☐
If I take care of myself I can avoid being ill	☐	☐
Whenever I don't feel well, I should see a medically trained professional	☐	☐

Visiting your doctor (GP).

Q7) How long ago did you last visit your family doctor? (GP, general practitioner)
(please tick one box)

☐ In the past seven days

☐ In the past month

☐ In the past six months

☐ In the past year

☐ More than a year ago *(if you tick this box, go on to question 10)*

Q8)Who made the appointment when you last went to see the doctor (GP)?

☐ I made it myself ☐ Friend ☐ Parent/ Guardian

☐ Other family member ☐ Somebody else *(please write your answer)*

.....

Q9) Who went with you the last time you went to see the doctor (GP)?

☐ I went on my own ☐ Friend ☐ Parent/ Guardian

☐ Other family member ☐ Somebody else *(please write who went with you)*

.....

If someone did go with you, did they go into the doctor's room with you?

☐ Yes ☐ No ☐ Can't remember

Q10) In the past year, have you visited any of the following about your health?

(please tick one box on each line)

	Never	Once	More than once
Your doctor (GP)	☐	☐	☐
Hospital as an inpatient (stayed in hospital for one night or more)	☐	☐	☐
Hospital clinic (outpatients)	☐	☐	☐
Hospital accident and emergency department (Casualty)	☐	☐	☐
A family planning clinic	☐	☐	☐
A teenage health clinic that **is not** part of your usual doctor's (GP's) surgery	☐	☐	☐
A teenage clinic that **is** part of your usual doctor's (GP's)surgery	☐	☐	☐

Q11) For this question, please read the statements carefully and tick the box that best describes what you think, e.g. If you agree with the statement then tick ☑ agree. Some of the questions ask about confidentiality, this means that what you tell your doctor should not be discussed with other people without you knowing.

	Agree	Disagree	Not sure
Doctors (GPs) should treat everything I tell him/her as confidential.	☐	☐	☐
I believe my doctor (GP) does keep everything I tell him/her confidential	☐	☐	☐
I might not tell my doctor (GP) about some **health** problems because I would worry about other people finding out	☐	☐	☐
I might not tell my doctor (GP)about **emotional** problems because I would worry about other people finding out	☐	☐	☐
I might be too embarrassed to talk to my doctor(GP) about my problems	☐	☐	☐
I do not go to see my doctor (GP) about all of my health problems because I do not trust him/her	☐	☐	☐

Q12) Listed below are five things which some young people think are important about their doctor's surgery. Let us know how important you think they are by ticking the box that best describes what you think.

*(Tick **one** box for each)*

Confidentiality (knowing that if you tell your doctor something, other people will not find out)

☐ Very important ☐ Important ☐ Not important

Seeing the same doctor (GP) or nurse every time you visit the doctor's surgery

☐ Very important ☐ Important ☐ Not important

Being able to choose to see a male or female doctor (GP)

☐ Very important ☐ Important ☐ Not important

Having a friendly receptionist

☐ Very important ☐ Important ☐ Not important

Having a doctor (GP) who is interested in teenage problems

☐ Very important ☐ Important ☐ Not important

Q13) Listed below are five ways some teenagers would like to get to speak to their doctor (GP). Again, let us know what you think by ticking the box that best describes what you think.

*(Tick **one** box for each)*

Being able to ask for health advice over the telephone without giving you name

☐ Very important ☐ Important ☐ Not important

Having a special 'teenage clinic' which you can drop into when you have a problem

☐ Very important ☐ Important ☐ Not important

Being invited to a special health check with a doctor (GP) or nurse

☐ Very important ☐ Important ☐ Not important

Being able to discuss health problems with a nurse instead of a doctor (GP)

☐ Very important ☐ Important ☐ Not important

Being able to see the doctor (GP) on the same day you make the appointment

☐ Very important ☐ Important ☐ Not important

Q14) The following is a list of things which you may or may not agree with.

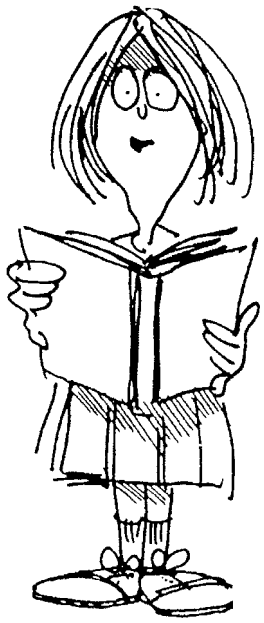
If you **agree** , draw a ring around the smiley face that looks like this: ☺
If you **disagree** , draw a ring around the gloomy face that looks like this: ☹
If you are **not sure** draw a ring around the question mark : ?

Make sure you only draw a ring around **one** on each line.

	Agree	Disagree	Not sure
My doctor's surgery is modern and up to date	☺	☹	?
The receptionists at the surgery are always friendly and helpful	☺	☹	?
The surgery reception is private enough to talk to the receptionists	☺	☹	?
If I go to see the doctor I will always have to wait a long time	☺	☹	?
It can be difficult to get through to the surgery by telephone	☺	☹	?
I am always satisfied with the care I get at my doctor's surgery	☺	☹	?
It can be hard to get an appointment to see a doctor	☺	☹	?
Getting to my doctor's surgery can be a problem for me	☺	☹	?
I would like to see the same doctor every time I go to the surgery	☺	☹	?
I see the same doctor almost every time I go to the surgery	☺	☹	?
I feel able to talk to the doctor about very personal things	☺	☹	?
I feel the doctor takes me seriously	☺	☹	?
When I see the doctor I am given enough time to talk about everything I want	☺	☹	?

Q15) These are some statements about smoking cigarettes , drinking alcohol and using drugs. For **each set of statements** tick the **one box** that best describes you.

a) Smoking.



☐ I have never smoked

☐ I have never smoked but I will probably try it

☐ I used to smoke but I have given up now

☐ I sometimes smoke

☐ I smoke every day

b) Alcohol.

☐ I have never had a taste of alcohol

☐ I have not tasted alcohol but probably will try it

☐ I drink alcohol on special occasions such as birthdays or Christmas

☐ I drink alcohol regularly , but not more than once a week

☐ I have an alcoholic drink more than once a week

c) Drugs (like cannabis , ecstasy or solvents)

☐ I will never use drugs

☐ I might try drugs at some time

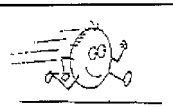
☐ I have used drugs occasionally

☐ I use drugs more than once a week

Q.16) Please look at the following charts and draw a ring around the number that best fits how you feel.

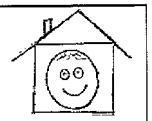
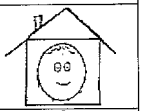
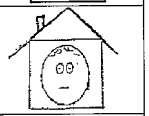
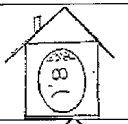
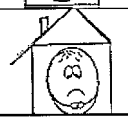
1) Physical Fitness

During the past month, what was the hardest physical activity you could do **for at least 10 minutes ?**

Very heavy (Run, fast pace)		1
Heavy (Jog, slow pace)		2
Moderate (Walk, fast pace)		3
Light (Walk, regular pace)		4
Very light (Walk, slow pace)		5

2) Family

During the past month, how often did you talk about your problems, feelings or opinions with someone in your family?

All of the time		1
Most of the time		2
Some of the time		3
A little of the time		4
None of the time		5

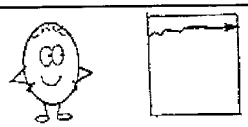
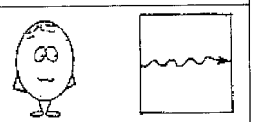
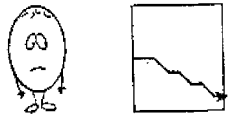
3)Emotional Feelings.

During the past month, how often did you feel anxious, depressed, irritable, sad or downhearted and blue?

None of the time		1
A little of the time		2
Some of the time		3
Most of the time		4
All of the time		5

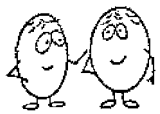
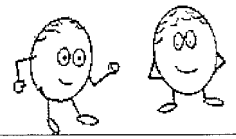
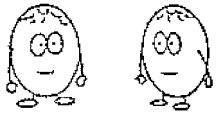
4) School Work

During the last month you were in school, how did you do?

I did very well		1
I did as well as I could		2
I could have done a little better		3
I could have done much better		4
I did poorly		5

5) Social Support

During the past month, if you needed someone to listen or to help you, was someone there for you?

Yes, as much as I wanted		1
Yes, quite a bit		2
Yes, some		3
Yes, a little		4
No, not at all		5

6) Health Habits

During the past month, how often did you do things that are harmful to your health such as :

- smoke cigarettes or use drugs like cannabis or ecstasy
- have unprotected sex
- got drunk on alcohol such as beer or wine

None of the time		1
A little of the time		2
Some of the time		3
Most of the time		4
All of the time		5

Did anyone help you fill out this questionnaire ?

☐ Yes ☐ No

If YES, who?

☐ Parent / Guardian ☐ Friend ☐ Other family member

☐ Other

To help us find out more about the health of young people we would like to look at your medical records at your doctors' surgery. Again all of the information which we get will be treated as confidential (nobody apart from the people doing the study will see it)

Will you let us see your medical records? ☐ Yes ☐ No

We will be asking some people to help us plan health services for young people by taking part in a telephone interview with one of our researchers . We will be offering a further gift voucher for anyone who takes part .

Would you be willing to talk to a researcher on the telephone about health services for young people? ☐ Yes ☐ No

You have finished, well done!!!

If there is anything you would like to add about your health or health services, please write in the space provided.

.....

.....

.....

.....

.....

.....

.....

.....

APPENDIX 7: Instructions for Practices for the Identification of Cases and Controls and Data Extraction in Study Three

INSTRUCTIONS FOR MIQUEST PRACTICES

We are making every effort to make the process of data extraction as simple as possible. To ensure this we have provided written instructions for each step. If you have any problems or questions please do not hesitate to contact us, the researcher working on the project will be more than willing to visit you.

How to identify your cases and controls

As your practice computer system is MIQUEST compatible we have written a local search that will identify teenagers who have had a pregnancy, the second search will also produce a list of all your teenagers who may be used as control patients. However, to make sure that this search is complete we would like to ask you to use other resources, such as maternity books and practice knowledge.

The search for cases has been designed so that only patients who meet the essential criteria are selected. However, it may be that you know of other patients who may be eligible to take part in the study. In this case you would need to follow the following checklist:

- The patients last recorded menstrual period before the pregnancy was between 1st of Jan 1995 and 1st of Jan 1998
- The patient was aged 19 or under at the last recorded menstrual period before the pregnancy
- The patient was registered at the practice at the time of the last recorded menstrual period before the pregnancy **and** is still currently registered

Once you have identified the cases you will then need to match each one to **three** control patients. The list of possible control patients we have provided gives the patients date of birth, you will need to know this as the cases will be matched to females whose date of birth is closest to the case but who have never had a teenage pregnancy. Again, to make sure that a patient is eligable to be a control for a case you will need to follow this checklist:

- The patient has NEVER had a teenage pregnancy
- The patient was registered at the practice at the time of the case patients last recorded menstrual period and is still currently registered
- The patient has not been used as a control for any other patient (each control can only be used ONCE)
- The patient is not a twin of the case
- The patient's date of birth is as close as possible to that of the case

Getting ready to record the data

You will see that we have included full instructions for recording the data. Before you do this you will have to collect the medical records of the cases and controls you have identified. We would like you to record the data using both the computer and paper records, this is to make sure that we get as much information as possible.

When you have finished recording the data

When you have finished the data collection, we would be grateful if you could contact the researcher. She will then come out to the practice to collect the completed forms. Before the researcher leaves the practice she will enter the postcodes of the cases and controls into a lap top computer. This generates anonymised information on how far patients' live from the surgery, this method ensures that we protect patient confidentiality.

INSTRUCTIONS FOR NON-MIQUEST PRACTICES:

We are making every effort to make the process of data extraction as simple as possible. To ensure this we have provided written instructions for each step. If you have any problems or questions please do not hesitate to contact us, the researcher working on the project will be more than willing to visit you.

How to identify your cases and controls

To identify your cases and controls you will need to use the practice computer system, practice knowledge and also the maternity book. To make sure that our data is consistent across all of the practices taking part in the study we would like you to use this checklist to identify eligible cases:

- The patients last recorded menstrual period before the pregnancy was between 1st of Jan 1995 and 1st of Jan 1998
- The patient was aged 19 or under at the last recorded menstrual period before the pregnancy
- The patient was registered at the practice at the time of the last recorded menstrual period before the pregnancy **and** is still currently registered

Once you have identified the cases you will then need to match each one to **three** control patients. Your control patients will be females who have NEVER had a teenage pregnancy. As this is a study that matches cases to controls, the cases will be matched to females whose date of birth is closest to the case but who have never had a teenage pregnancy. Again, to make sure that a patient is eligible to be a control for a case you will need to follow this checklist:

- The patient has NEVER had a teenage pregnancy
- The patient was registered at the practice at the time of the case patients last recorded menstrual period and is still currently registered
- The patient has not been used as a control for any other patient (each control can only be used ONCE)
- The patient is not a twin of the case
- The patient's date of birth is as close as possible to that of the case

Getting ready to record the data

You will see that we have included full instructions for recording the data. Before you do this you will have to collect the medical records of the cases and controls you have identified. We would like you to record the data using both the computer and paper records, this is to make sure that we get as much information as possible.

When you have finished recording the data

When you have finished the data collection, we would be grateful if you could contact the researcher. She will then come out to the practice to collect the completed forms. Before the researcher leaves the practice she will enter the postcodes of the cases and controls into a lap top computer. This generates anonymised information on how far patients' live from the surgery, this method ensures that we protect patient confidentiality.

COLLECTING THE DATA

A guide to filling in the data extraction form for cases

In order to help you with the data extraction, we have written this step by step guide. If at any time you have questions or problems please do not hesitate to contact us. You can do that by calling **Jane Allen on** xxxxxxxx**.** You can also contact her on the mobile phone on xxxxxxxx.

The patients' postcode.

We are taking every care to ensure that only remove anonymous information from the practice. That is why we would like you to record the postcode on the detachable piece of paper at the top of the form. The researcher will come in when you have completed the data extraction and put this information into a computer. This will generate data on how far the patient lives from the surgery. The slips of paper with the postcode written on will then be destroyed before the forms are removed from the surgery.

Control number and surgery code

You will notice that the forms come already arranged into packs that include one green case form and three lilac control forms. In case the forms become detached from each other we have included a code number for the case and the surgery. You do not have to add anything to this box.

Section 1: Patient Information

1a) Is the patient currently registered

It is quite likely that some of the cases and the controls will no longer be registered with the practice. In this case tick the 'no' box and simply record the information using the only the computerised records. For patients who are registered please use both the manual and computerised records so that we can be sure that no consultations or relevant information is missed.

1b) Year and month of birth

So as not to remove identifiable information from the practice we would like you to record only the patients' month and year of birth.

Section 2: First pregnancy between 1st Jan 1995 and 1st Jan 1998

The period we will be studying is the 1st Jan 1995 to 1st Jan 1998 and so we would like you to record the first pregnancy in that period. The first pregnancy is termed as the index pregnancy.

2a) Date of the patient's last menstrual period

The data is only recorded up to the patient's last menstrual period. It may be that this is recorded in the notes, and if so then please use this date. If not, to work this out you will need to follow these steps using the gestation calculator we have provided:

- For a termination of pregnancy (TOP), or for a miscarriage, count back 12 weeks before the event, e.g. if the patient had a termination on the 04/04/96 then the data collection start date will be the 13/01/96
- For a delivery count back 40 weeks form the birth

2b) Date one year prior to the patient's last menstrual period

This is the date from which you will be recording the data. This will be exactly 12 months prior to the date of the last menstrual period.

2c) Outcome of the index pregnancy

This is whether the patient had a termination, miscarriage or delivered a child.

2d) Date of the outcome of the index pregnancy

This is the date of the termination, delivery or miscarriage.

Section 3: Obstetrics before 1st Jan 1995.

3a) Has the patient had a pregnancy before 1st of Jan 1995

It may be that the patient has had a pregnancy before the 3 year time period. If this is the case then please record the outcome of that pregnancy and the date of the outcome.

In this section we are interested in the time period before the **case** became pregnant.

Section 4: Contraception history

4a) Has the patient ever consulted for contraception before the index pregnancy?

By looking through the notes, please determine whether the patient has ever consulted for contraception before the index pregnancy. If they have not then please go to the section concerned with referrals.

4b) When was the first ever recorded contact for contraception

If the patient has attended for contraception please record the date of first contact.

4c) What types of contraception were provided before the index pregnancy?

Please record what types of contraception was provided by ticking the relevant boxes.

Section 5: Contraception provided in the year before the case's index pregnancy

This section is concerned with contraception provided in the year prior to the case's index pregnancy. This will be exactly one year before the LMP for the index pregnancy.

5a) Total months of contraception in the year before the index pregnancy.

Please count the total number months for which contraception was given in the year prior to the index pregnancy. For example if the patient was given one injection of depo provera then she received 3 months of contraception.

5b) Number of prescriptions for emergency contraception in the year before the index pregnancy.

Please record the number of prescriptions for emergency contraception in the year before the pregnancy

Section 6: Referrals

6a) Has the patient ever been referred for gynaecological problems before the index pregnancy?

By looking at referral letters and the patients medical records, please record whether the patient has **ever** been referred for a gynae related problem **before the case's index pregnancy**.

Section7: Recording of general practice consultations.

As we are looking at the consulting behaviour of teenage patients who do and do not become pregnant it is necessary that we record all general practice consultations in the study period. We have asked you to record the one year period for which you will be recording data, if you record this then you will not have to refer back to check the date range.

7a) Date

This means the date of the consultation.

7b) GP/Nurse or other

Please record whether the patient saw the nurse, GP or other member of practice staff.

7c) Presenting problems/diagnosis

Please record each problem that the patient presents with or the diagnosis recorded.

7d) Was contraception discussed

To record whether contraception was discussed please write 'yes' or 'no'.

7e) Prescriptions

If the patient is given a new prescription please record what it is- i.e. Penicillin.

APPENDIX 8: Data Abstraction Forms for Study Three

CASE NUMBER:
(office use only)

Surgery: *(office use only)*	Surgery Code: *(office use only)*

Patient Information:

Is the patient currently registered? ☐ yes ☐ no

Year of birth *(eg 1980)* ☐☐ ☐☐

First three figures of postcode ☐☐☐

Obstetrics

Data collection end date ☐☐ ☐☐ ☐☐

Data collection start date ☐☐ ☐☐ ☐☐

Outcome *(Please circle)*: **TOP Delivery Miscarriage**

Date of outcome ☐☐ ☐☐ ☐☐

Estimated date of conception ☐☐ ☐☐ ☐☐

Gestation at termination or miscarriage ☐☐ **weeks** ☐ **not known**

Last recorded menstrual period *(if known)* ☐☐ ☐☐ ☐☐ ☐ **not known**

Contraception history

First **ever** recorded contact for contraception ☐☐ ☐☐ ☐☐ **Type:**

Number of prescriptions for emergency contraception in the study period ☐

Number of prescriptions for oral contraception in the study period ☐☐

Total months of oral contraception in the study period ☐☐

Referrals

Has the patient ever been referred for gynaecological problems? ☐ yes ☐ no

Has the patient ever been referred for psychiatric problems? ☐ yes ☐ no

CONTROL NUMBER _____
(office use only)

Surgery: *(office use only)*	Surgery Code: *(office use only)*

Patient Information:

Is the patient currently registered? ☐ yes ☐ no

Year of birth *(eg 1980)* ☐☐ ☐☐

First three figures of postcode ☐☐☐

Data collection end date ☐☐ ☐☐ ☐☐

Data collection start date ☐☐ ☐☐ ☐☐

Contraception history

First **ever** recorded contact for contraception ☐☐ ☐☐ ☐☐ **Type:** _____

Number of prescriptions for emergency contraception in the study period ☐

Number of prescriptions for oral contraception in the study period ☐☐

Total months of oral contraception in the study period ☐☐

Referrals

Has the patient ever been referred for gynaecological problems? ☐ yes ☐ no

Has the patient ever been referred for psychiatric problems? ☐ yes ☐ no

General practice consultations in the 12 month study period.

Date	GP/ nurse or other	Presenting problems	Diagnosis	Contraception Y/N	Other gynae Y/N	RX /advice/ referral / admission / other
		1. 2 3				1. 2. 3.
		1. 2 3.				1. 2. 3.
		1. 2. 3.				1. 2. 3.
		1. 2. 3.				1. 2. 3.
		1. 2. 3				1. 2. 3.
		1. 2. 3.				1. 2. 3.
		1. 2. 3.				1. 2. 3.

Appendix 9: Published Papers based on this Research

1. Churchill D, Allen J, Pringle M, Hippisley-Cox J. 2002. Teenagers at risk of unintended pregnancy: identification of practical risk markers for use in general practice from a retrospective analysis of case records in the United Kingdom. *Int J Adolesc Med Health* 2002;**14(2):**155-162.

2. Churchill RD, Allen J, Denman S, Williams D, Fielding K, von Fragstein M, 2000. Do the attitudes and beliefs of young teenagers towards general practice influence actual consultation behaviour? *Brit J Gen Pract* **50:** 953-957.

3. Dick **Churchill**, Jane Allen, Mike Pringle, Julia Hippisley-Cox, Dave Ebdon, Marion Macpherson, and Sue Bradley, 2000. Consultation patterns and provision of contraception in general practice before teenage pregnancy: case-control study. *BMJ* **321:** 486-489.

Int J Adolesc Med Health 2002;14(2):153-160.

Teenagers at risk of unintended pregnancy: identification of practical risk markers for use in general practice from a retrospective analysis of case records in the United Kingdom

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Abstract: The United Kingdom has one of the highest teenage pregnancy rates in Western Europe with a high proportion of unintended pregnancies resulting in termination. General practice is one source of contraceptive and sexual advice for teenagers but it is difficult to target young women most at risk. This study was performed to determine whether it was possible to identify any markers that could alert general practitioners to the need to give appropriate opportunistic preventive advice. This was a retrospective case-control study in which the general practice medical records of young women with a recorded history of termination of pregnancy resulting from conception between the ages of 13-19 years inclusive were examined for details of consultations and contraceptive provision prior to conception. Where appropriate, comparison was made with an age and practice-matched control group. A total of 53 cases were identified and compared with 159 controls. In the 12 months prior to conception approximately half of the cases had discussed contraception and two-fifths had been prescribed oral contraception. A significantly higher proportion of cases than controls had consulted for emergency contraception and also for urinary tract symptoms. Weaker associations were also found with younger age of starting contraception, and also recorded side-effects or dissatisfaction with contraception. Lapsed contraception and previous pregnancy were noted as other potential markers of risk. The findings from this study may assist primary care professionals in focussing opportunistic sexual health interventions at some teenagers who are at higher risk of unintended pregnancy.

Keywords: Adolescent pregnancy, risk factors, risk markers, general practice, United Kingdom

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Submitted: January 13, 2002. ***Revised:*** January 18, 2002. ***Accepted:*** January 18, 2002.

INTRODUCTION

The United Kingdom has one of the highest rates of teenage pregnancy in Western Europe, against the background of increasingly younger age of first sexual intercourse (1). The potential negative health and social outcomes of teenage pregnancy are well recognised, and so consecutive governments have introduced policies aimed at reducing rates (2). Whilst not all teenage pregnancies are unintended, the fact that up to 50% result in requests for termination demonstrates that a high proportion fall into this category.

Whilst societal, educational, and media influences play a significant part in shaping teenage sexual behaviour overall, primary health care workers have a key role at local and individual level, largely by provision of sexual and contraceptive advice. In the United Kingdom there have historically been two main sources of contraception for teenagers: general practice, and family planning clinics. Although the situation is now changing with the introduction of innovative teenage health initiatives in

some areas, these two sources remain the most important.

Documented epidemiological risk factors for teenage pregnancy include social deprivation, low educational achievement, having a mother who was a teenage parent, a history of sexual abuse, and presence of mental health problems (3). Whilst these risk factors might be useful at community and policy level, they are less valuable in the context of individual clinical contact in which the presence or otherwise of the factors may not be known, and they may have only indirect relevance to an individual medical consultation.

As part of a larger study (4) we decided to retrospectively examine the general practice medical records of teenagers whose pregnancy ended in termination in order to determine whether or not they contained any information that might have alerted primary care professionals to the individual being at risk of unintended pregnancy. Such risk markers might potentially allow general practitioners and others to target sexual health promotion opportunistically.

METHODS

We undertook a retrospective analysis of the general practice records of young women identified as having conceived as teenagers (13 to 19 years old inclusive), and whose pregnancy resulted in a termination.

The study was performed in 14 general practices that belonged to a collaborative research network in the English East Midlands. (Practices in the *Trent Focus Collaborative Research Network* have previously been shown to be representative of all practices in the area for process and outcome measures including teenage pregnancy) (5). For this part of the study, cases (registered patients who had a recorded termination resulting from conception before the age of 20, between 1st Jan 1995 and 1st Jan 1998) were identified from computer records, maternity books, and personal knowledge of practice staff. If any case had more than one pregnancy during the study period then the earliest was selected as the index pregnancy. Estimated date of conception was based on the date of the last menstrual period when recorded, or alternatively estimated from the date of outcome. Three age-matched controls per case were identified from within the same practice by selecting young women closest in chronological age from an ordered list, who had no evidence of teenage pregnancy.

Demographic, consultation and contraceptive data were extracted from medical records by a member of each practice (usually the practice nurse). Consultation data were recorded for the same 12-month period before the estimated date of conception for both the case and matched controls. Clinical consultation data were then categorised and coded by one of us (DC). These included details of reasons for consultation, prescriptions, referrals, and investigations.

All data were initially entered onto an EpiInfo 6.01 database (CDC, USA; WHO, Geneva). Principle analyses and calculations of odds ratios were performed using STATA 5.0 (Stata Corporation, Texas) and descriptive analyses were carried out using SPSS for Windows 8.0 (SPSS Inc.). Conditional logistic regression analysis was used to calculate odds ratios (with 95% confidence limits) and probabilities for matched case-control differences.

The study was approved by the Trent Multi-Centre Research Ethics Committee and individual local research ethics committees. A post hoc power calculation revealed that our study had an 80% power at the 5% significance level (two tailed) to detect an odds ratio of 2.8, based on a 20% exposure rate in controls.

RESULTS

Overall, 53 young women were identified who had conceived as teenagers and had a

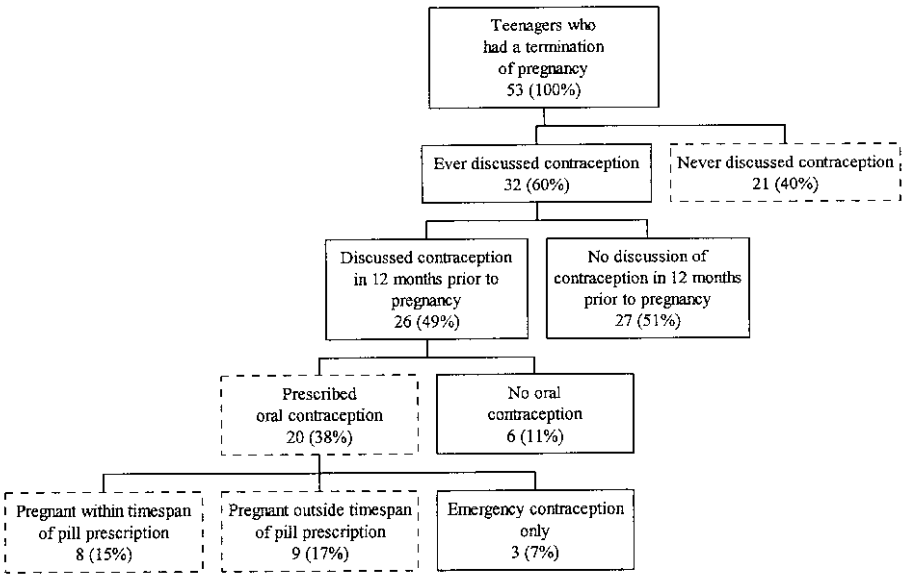

Fig. 1: General Practice Contraceptive Provision Prior to Unintended Teenage Pregnancy

termination of pregnancy. The median age of conception was 17 and ranged from 13 to 19. Nine of the sample had conceived below the age of 16. The control group consisted of 159 young women matched by age and practice.

CONTRACEPTIVE CONSULTATIONS AND PROVISION

Details of general practice consultations in relation to contraception are summarised in Figure 1. Twenty-one cases (40%) had no recorded consultations in which contraception had been discussed. Approximately one-half of cases had discussed contraception in the year prior to pregnancy and two-fifths had been prescribed some form of oral contraception. A similar proportion of controls (48%) had discussed contraception and 40% had been prescribed oral contraception in this period.

Sixteen cases (30.2%) had first consulted about contraception below the age of 16. Although this was higher than the proportion of controls (19.5%), the difference was not statistically significant (OR 2.01, 95% CI 0.90, 4.46, p=0.085).

Of those young women who were prescribed continuous oral contraception in the year prior to pregnancy, approximately half became pregnant whilst the prescription was still current. Amongst the remainder the prescription had elapsed, but in three cases conception had occurred within four weeks of the estimated date at which the prescribed contraception would have been completed. In no cases where contraception had been prescribed was there evidence of concurrent prescribing of antibiotics contributing to contraceptive failure.

Seven subjects (13%) had been prescribed emergency contraception in the year prior to conception compared with nine controls (6%) (OR 2.54, 95% CI 0.90, 7.19, p=0.072). However the proportion of cases

that had been prescribed emergency contraception *at any time* prior to conception (21%) was significantly higher than the proportion of controls (8%) (OR 3.21, 95% CI 1.32, 7.79, p=0.007).

Five of the young women who had a termination of pregnancy in this study had a history of previous pregnancy. Two had reported miscarriages, two had delivered, and one had a previous termination. Of these, one had no mention of contraception in her records in the previous 12 months although she had consulted about other health issues on seven occasions. Three of the others had been prescribed the oral contraceptive pill, but all had recorded side effects (break through bleeding or menorrhagia) or expressed dissatisfaction at some stage in the previous 12 months. The remaining teenager had received depo-provera but discontinued this due to recorded concerns about weight gain.

In view of the high frequency of recorded contraceptive side-effects in this subset of cases we explored the frequency amongst all cases and controls. Although five cases (9.4%) and five controls (3.1%) had reported problems, the difference was not statistically significant (OR 3.21, 95% CI 0.89, 11.5, p=0.061).

NON-CONTRACEPTIVE CONSULTATIONS

Of the 21 women who had not consulted for contraception, all except one had consulted at least once during the year prior to conception. The median consultation rate of two was not significantly different from that of the controls.

We examined specific types of reason for consultation that might be indicative of sexual risk: two had consulted for gynaecological problems (dysmenorrhoea); three for psychological problems; and three for urinary tract infections. Table 1 shows the comparison of frequency for consultation for these problems amongst the overall group between cases and controls. There was no significant difference between the proportion of cases and controls consulting for gynaecological and psychological problems, but a significantly higher proportion of cases had consulted for urinary tract infections.

DISCUSSION

In this study we attempted to identify markers that might alert primary care health workers to teenagers who could benefit from an opportunistic sexual health intervention in order to prevent unintended

Table 1. *Consultations for specific (non-contraceptive) reasons in the 12 months prior to conception.*

Consulted at least once for:	Cases (53)	Controls (159)	Odds Ratio	95% Interval	Confidence	p-value
Urinary tract infections	7 (13.2%)	5 (3.1%)	8.32	1.68	41.3	0.010
Psychological problems	5 (9.4%)	12 (7.5%)	1.29	0.42	3.96	0.655
Gastrointestinal problems	4 (7.5%)	6 (3.8%)	2.13	0.56	8.08	0.267
Gynaecological problems	9 (17.0%)	29 (18.2%)	0.92	0.41	2.06	0.840

Table 2. *Potential risk markers for unintended pregnancy.*

Risk Marker	Comments
Consultation for contraception	Although this is a marker for sexual activity, rates were no higher for cases than controls.
Younger age of onset of contraceptive use	This may indicate higher risk due to longer duration of sexual activity. The difference did not attain statistical significance in our sample.
Previous teenage pregnancy	This indicates both sexual activity and fertility. Side-effects and dissatisfaction with contraception may be an important factor in this sub-group.
Lapsed oral contraception	Discontinuation because of failure to renew contraception may be important for some teenagers.
Provision of emergency contraception	This association may indicate teenagers who are at higher risk because of failure to use more appropriate longer-term contraceptive methods.
Contraceptive side-effects	Teenagers who experience side-effects may be at higher risk although the association with recorded side-effects did not attain statistical significance in the whole sample.
Consultation for urinary tract infection	This was the only marker identified which could be applied to young women not known to be sexually active.

teenage pregnancy. The retrospective case note methodology has high face validity, and the data should be free of recall bias, since we used clinical records written prior to conception.

We used termination of pregnancy as a proxy for unintended pregnancy. Clearly a proportion of unintended pregnancies also result in delivery, but it is impossible to distinguish these from deliveries resulting from intended conception. Teenagers who chose to have a termination of pregnancy have been shown to differ demographically from those who continue with the pregnancy (6). Thus, our results are only truly applicable to unintended pregnancy resulting in termination. The extent to which risk markers for this group could be extrapolated to a wider group of unintended conceptions would need further investigation.

Our sample may be under-representative of all teenage pregnancies resulting in termination within the study practices, since some may have been undertaken independently of the National Health Service without notifying the general practitioner. The potential effect of misclassification of some 'missed' cases as controls or, indeed, of some controls who were really cases would be to dilute the strength of any associations found.

In this study we only used information available from general practice medical records. Apart from the practicalities of this from a research perspective, this information has good face validity, representing the knowledge base available to the primary care clinicians when dealing with an individual patient, so that any risk markers identified are relevant to clinical practice. As such we did not attempt to adjust for confounding by other known epidemiological risk factors such as socio-economic status, since these are not necessarily known in the clinical setting. In addition we had no information about the use made of Family Planning Clinics and other sexual

health services by the teenagers concerned and, as such, our results underestimate contraceptive uptake by them.

In terms of identifying teenagers at risk of unintended pregnancy in practical terms in primary care there are two main groups: firstly those who have discussed contraception and are thus probably sexually active; and secondly those who have never attended for contraceptive or sexual health advice.

Discussion or provision of contraception is an indicator of sexual activity and thus might be considered to be a risk factor for unintended pregnancy. However, we found no difference in the frequency of contraceptive consultations or consultations for oral contraception between cases and controls in the year before pregnancy. This is understandable since the identification of sexual activity is countered by the protective effect of the contraception provided.

Our results suggest that younger age of onset of discussing or being provided with oral contraception might be a risk marker for unintended pregnancy, possibly because it indicates longer duration of sexual activity conferring increased risk. However our sample size was too small to confirm this association statistically.

A proportion of young women became pregnant whilst they had a current prescription for oral contraception. This might be attributed to discontinuation or incorrect use. The extent to which adherence might be increased by improved education by primary health care professionals merits consideration. We found no evidence of any pregnancies resulting from concurrent use of broad-spectrum antibiotics and the oral contraceptive pill in this sample.

A similar proportion of young women conceived after their pill prescription had elapsed. For some this may have been due to a conscious choice, perhaps because of altered relationships. However it may also indicate that the process of contraceptive renewal may present difficulties for some young women. This raises the question as to whether general practice should be more proactive in encouraging teenagers who have consulted for contraception to return for review.

Wider provision of emergency contraception has been advocated as a method of reducing teenage pregnancy. However, in this study we have demonstrated that there is an association between general practice provision of emergency contraception and subsequent termination of pregnancy. This may be because the use of emergency contraception indicates higher level of sexual risk-taking. Our results are consistent with those of Ziebland and colleagues who found a geographical correlation between higher rates of pregnancy termination and higher usage of emergency contraception in the United Kingdom (7). This suggests that primary care professionals need to address the longer-term contraceptive needs of teenagers consulting for emergency contraception.

A history of previous pregnancy is, by its very nature, a strong risk factor for further pregnancy, since it indicates both sexual activity and fertility. Previous unintended pregnancy may be a marker of lack of knowledge or poor use of contraception. Although a relatively small number of teenagers fall into this group, their level of risk is sufficiently high to merit significant attention from primary care professionals. Our results suggest that side-effects and dissatisfaction with conventional contraceptives may be an important contributor to recurring pregnancy amongst this group, and possibly amongst all teenagers. This is consistent with a previous survey of teenagers undergoing termination of pregnancy which found that fear about the side-effects of oral contraception was

the commonest reason for failing to use contraception (8). In the USA a large survey of teenage mothers also found a high rate of contraceptive discontinuation and switching in the six-months following delivery (9). Thus the risk of subsequent unintentional pregnancy in this group should not be underestimated.

We identified an association between consultation for urinary tract infection and subsequent termination of pregnancy. This was the only risk marker identified which may apply to teenagers who did not have any contraceptive consultations. The term 'urinary tract infection' is applied loosely since, in some instances, there was no confirmation of diagnosis, and the symptoms might be attributable to other genito-urinary infections including ones sexually transmitted. Thus, any consultation for such symptoms should alert clinicians to enquire about sexual activity and, if appropriate, discuss issues of sexual health and contraception.

CONCLUSIONS

In this study we identified a range of markers that might alert primary care professionals to teenagers at increased risk of unintended pregnancy. Some of these are based on statistical associations, whilst others are based on interpretation of observational data. These are summarised in Table 2.

ACKNOWLEDGEMENT

Marian Macpherson, Susan Bradley, and David Ebdon were part of the project team for the main study. All authors of this paper were part of the project team. DC developed the original idea by MP, had major input into the study design, performed data coding and analysis, interpreted the results, and wrote the paper; he will act as guarantor for the paper. JA contributed to the design of the study, provided training for practices undertaking data collection, and performed data entry. MP conceived the original idea for the project and contributed to the design, interpretation of results, and writing of the paper. JH-C contributed to the development of core ideas, study design, and the paper. We thank the practices and their staff who took part in this study, and also Christine Allen who assisted with some of the case-note review. The study was funded by a grant from the NHSE Trent R & D Programme. There were no competing interests.

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BITS 'N PIECES

Prevalence and pattern of childhood abdominal pain in an Australian general practice

Objective: Abdominal pain is a common problem in childhood and accounts for a significant workload in general practice. The aim of this study was assess the nature of abdominal pain in a sample of Australian children attending a Western Australian general practice for any reason, and to determine factors associated with the reporting of such pain.

Methodology: A prospective study of children and their families attending a rural general practice was undertaken using a parental survey to assess the frequency and nature of abdominal pain, demographic features, physical and behavioural characteristics.

Results: Abdominal pain was common in this population; 44% (70 of 164) of parents reported that the index child had experienced abdominal pain in the past 12 months. The average age of children who experienced recent abdominal pain was 9 years and 9 months. Multivariate analysis suggested that children experiencing abdominal pain in the preceding 12 months were more likely to be anxious (odds ratio (OR) = 3.74, P = 0.01), to have a family history of similar problems in siblings (OR = 4.26, P = 0.01) and to experience sleep disturbance (OR = 3.90, P = 0.02) than children without abdominal pain. Consumption of three or more serves of wholemeal bread or cereals per day had a significant protective effect on reported abdominal pain in children (OR = 0.12, P = 0.03). The majority of families (66%) dealt with the pain without resorting to medical care.

Conclusions: Abdominal pain remains a common problem of children attending an Australian general practice, and was associated with features suggesting that it is related to anxiety and coping ability. Abdominal pain is not usually associated with disease; most families recognize this and cope with abdominal pain without medical consultation.

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Do the attitudes and beliefs of young teenagers towards general practice influence actual consultation behaviour?

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SUMMARY

Background. *Teenagers are believed to have health concerns that are not adequately addressed in primary care because of perceived barriers that inhibit them from consulting a general practitioner (GP). We report the results of a study examining links between potential attitudinal barriers and actual help-seeking behaviour.*

Aim. *To determine whether the attitudes of teenagers towards general practice are associated with differences in consultation patterns.*

Method. *Results of a postal questionnaire survey of attitudes to general practice, performed among teenage patients aged 13 to 15 years registered with five general practices in the East Midlands, were analysed in relation to consultation data from retrospective casenote analysis for the preceding 12 months.*

Results. *Matched questionnaire and consultation data were available for 678 teenagers. We found few significant differences in overall consultation rates between teenagers expressing differing attitudes about aspects of general practice. Differences did exist in relation to perceived difficulty in getting an appointment, feeling able to confide in a GP, and perception of adequate time being given in the consultation. Fear of embarrassment was associated with lower consultation rates for gynaecological problems and contraception.*

Conclusions. *Negative perceptions of general practice by teenagers may have less of an influence on actual consultation behaviour than previously believed. However, there are some aspects of care that merit further attention if teenagers are to feel able to consult their GP more easily.*

Keywords: adolescent health; adolescent attitudes; consultations.

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Submitted: 2 February 2000; Editor's response: 9 May 2000; final acceptance: 13 September 2000.

Introduction

Teenagers are recognised as having health concerns that are not adequately addressed by healthcare professionals.[1-4] There has therefore been growing interest in understanding perceived barriers to accessing services so that alternative models of health care can be provided. Potential barriers include the attitudes and beliefs of the teenagers themselves, the characteristics of the services provided, and the attitudes and behaviour of health professionals involved. Aspects of care that have been shown to be important to teenagers in previous surveys include the perceived attitudes of reception staff, privacy of the reception area, difficulty getting an appointment, waiting times before being seen, duration of the consultation, attitudes of the doctor, concerns about confidentiality, and fear of embarrassment.[5-7]

Previous research into teenagers and general practice has been conducted in one of two ways: cross-sectional surveys or interviews with teenagers providing evidence of the opinions that they hold and insight into their concerns;[1,5-8] or analysis of consultation patterns, offering insight into actual general practice utilisation.[9,10] The aim of the current study was to combine both strategies in an attempt to gain a greater understanding of the impact of teenagers' attitudes on consultation behaviour. Specifically, we wanted to know whether teenagers expressing opposite attitudes differed significantly in their overall consultation patterns.

Method

Study design

A cross-sectional postal questionnaire survey was performed among 13- to 15-year-old teenagers registered with general practices in the East Midlands. Consultation data for these teenagers for the previous 12 months were obtained from medical records. The study received local research ethical committee approval.

Practices and patients

The study was carried out in five group practices in the East Midlands that were selected opportunistically on the basis of personal contact and willingness to participate. None of the practices had current health promotion initiatives aimed specifically at young people and all were located in different settings: two in inner-city areas, one in a rural setting, and the other two in semi-urban settings. All registered patients aged between 13 and 15 years, inclusive, at the sampling date were included, with the exception of patients known to have significant learning difficulties or special needs.

Postal questionnaire survey

The postal questionnaire incorporated a range of questions about health attitudes, behaviours, and concerns. Attitudinal questions consisted of statements to which responses of 'agree', 'disagree', and 'not sure' were invited. Some statements were adapted from the Surgery Satisfaction Questionnaire.[11] The questionnaire was piloted among 13- to 14-year-old pupils in a mixed comprehensive school, with minor modifications incorporated into the final

version as a result. Prior to the survey, parents or guardians were sent a letter explaining the purpose of the study and allowing them to request further information or 'opt out' if desired. A £4 gift voucher was offered for all returned completed questionnaires.

Consultation rates

Details of all recorded face-to-face contacts between the teenager and a primary health care professional working in the general practice setting over the previous 12 months were extracted from manual and computerised records. Specified reasons for consultation were coded into broad categories. In order to account for multiple consultations for the same problem, and for multiple problem categories in the same consultation, analysis of consultations according to category was performed on an 'ever' or 'never' basis.

Data entry and analysis

Data were numerically coded and double entered onto an EpiInfo database, with cross-file verification. Analyses were performed using SPSS for Windows (Release 6.1.3) and Stata (Version 5.0).

Principal analyses consisted of comparison of overall consultation rates against sex, practice, and attitudinal responses. All statistical tests were two-sided and carried out at the 5% significance level. Ninety-five per cent confidence intervals were calculated where appropriate. A chi-squared test was used to compare categorical data. Poisson regression analysis was used to calculate incidence rate ratios (IRR) comparing annual consultation rates of groups of teenagers giving different attitudinal responses, adjusting for sex and practice as potential confounding variables. An IRR greater than 1 demonstrates that a particular group had a higher annual consultation rate than the comparison group and vice versa. Logistic regression analysis was used to compare groups in relation to whether or not they had ever attended for specific conditions during the index year, with results presented as odds ratios (ORs).

Results

Postal questionnaire response rate

Eight hundred and eighty-six teenagers were sent questionnaires and 713 (80.5%) responded. Of the remainder, seven were returned because the patient was no longer at the registered address. Three parents declined permission for their child to participate. The response rate from girls was 85% compared with 76.1% from boys (difference = 8.9%, 95% CI = 3.7%–14.1%). Response rates from different practices ranged from 70.4% to 85.1% (χ^2 = 17.6, df = 4, P = 0.001).

Consultation data

The medical records of 836 (94.4%) teenagers were examined, with the remainder being unavailable or incomplete for the relevant 12-month period. Matched consultation and questionnaire data were available for 678 teenagers (76.5%). There were no significant differences in overall consultation rates between questionnaire responders and non-responders.

Table 1 shows the distribution of annual consultation rates among those teenagers whose medical records were examined: the median consultation rate was 1; 27.8% of teenagers had no recorded consultations; and 20.3% had four or more consultations over the 12-month period, with a maximum of 18. Girls had significantly higher annual consultation rates than boys. Table 2 shows recorded reasons for consultation with respiratory and dermatological problems being the most common. Among 'urogenital conditions', 23 (5.2%) girls had consulted for contraceptive purposes.

Table 1. Annual consultation frequency in relation to gender.

Number of consultations	Boys n (%)	Girls n (%)	All n (%)
0	132 (30.8)	100 (24.5)	232 (27.8)
1	121 (28.3)	90 (22.1)	211 (25.2)
2	62 (14.5)	74 (18.1)	136 (16.3)
3	50 (11.7)	37 (9.1)	87 (10.4)
>4	63 (14.7)	107 (26.2)	170 (20.3)
Total	428	408	836

Difference between males and females: c^2 = 22.9, df = 4, P<0.001.

Attitudes to the practice and medical care

Responses to attitudinal questions about the practice and medical care provision are shown in Table 3. The most negative attitudes concerned privacy of the reception area and the ability to confide in the general practitioner (GP) about very personal things. Girls expressed more negative attitudes to their practice than boys. They were significantly less likely to agree that:

- they were satisfied with the care provided (difference = 9%, 95% CI = 2.4%–15.8%);
- they could talk to the doctor about very personal things (difference = 10.5%, 95% CI = 4.1%–16.9%); or
- the doctor took them seriously (difference = 15.3%, 95% CI = 8.8%–21.7%).

They were more likely to report that getting to the doctor could be difficult for them (difference = 6%, 95% CI = 1.3%–10.7%).

Table 3 also shows the overall consultation rates of teenagers in relation to their expressed attitudes. The association between uncertainty ('not sure') and lower consultation rates for a number of factors reflects lack of experience on which to base perceptions and is to be expected. Statistically significant differences in consultation rates between teenagers expressing opposing views ('agree' versus 'disagree') were found in relation to difficulty getting an appointment, feeling able to talk to the doctor about personal things, and perceived adequacy of time in the consultation.

We performed separate analyses of self-reported attitudes against consultation for potentially sensitive problems. Girls who consulted for contraception were more likely to agree that it was difficult to get an appointment (OR = 3.03, 95% CI = 1.06–8.33, P = 0.037) and were also less likely to report being satisfied with care (OR = 0.32, 95% CI = 0.12–8.33, P = 0.029) than those who did not. There were no other statistically significant associations.

Attitudes to confidentiality and embarrassment

Teenagers were asked to indicate their agreement or otherwise with a series of statements about confidentiality. Confidentiality was explained as follows: 'What you tell your doctor should not be discussed with other people without you knowing.' Six hundred and forty-nine (91.8%) responders agreed with the statement that doctors should keep everything they are told confidential. However, only about two-thirds believed that their GP did actually keep everything they are told confidential, with most of the remainder being uncertain. Responses to the remaining questions are shown in Table 4.

The only significant difference between sexes was in relation to the question about embarrassment: 206 (46.9%) girls agreed that they might not be able to talk to a doctor about problems because of embarrassment compared with 176 (39.3%) boys (difference = 7.8%, 95% CI = 0.5%–15.0%).

Table 4 also shows overall consultation rates in relation to question responses. There were no significant associations

Table 2. Reasons for consultation: teenagers consulting at least once for particular conditions (n = 836).[a]

Consultation category	n (%)
Respiratory conditions (including asthma and upper/lower respiratory tract infections)	293 (35.1)
Dermatological conditions (including acne and eczema)	242 (28.9)
Musculoskeletal conditions (including trauma, sports injuries, and joint problems)	185 (22.1)
Otorhinological conditions (including rhinitis, otalgia, and ear infections)	147 (17.6)
Urogenital conditions (including menstrual disorders, urinary disorders, and contraception)	82 (9.8)
Gastrointestinal conditions (including abdominal pain, diarrhoea, and vomiting)	70 (8.4)
Psychological conditions (including emotional, behavioural, and sleep problems)	38 (4.5)
Ophthalmic conditions (including conjunctivitis and visual problems)	35 (4.2)
Miscellaneous conditions (any not covered elsewhere)	118 (14.1)

[a]Based on all teenagers for whom consultation data were available.

Table 3. Associations between attitudinal responses to statements about general practice and mean annual consultation rates controlling for sex and practice.[a]

			ACR[b]				
Statement (n)	Response	Percentage	Mean	Median	IRR[c]	95% CI	P-value
My doctor's surgery is modern and up-to-date (675)	Agree	76.6	2.2	1	1	-	-
	Disagree	4.3	2.6	2	1.17	0.92–1.48	0.194
	Not sure	19.1	2	1	0.91	0.79–1.05	0.186
The receptionists at the surgery are always friendly and helpful (675)	Agree	67.6	2.3	1	1	-	-
	Disagree	12.6	2.4	2	1.06	0.92–1.24	0.403
	Not sure	19.8	1.7	1	0.75	0.65–0.87	<0.001
The surgery is private enough to talk to the receptionist (674)	Agree	16.5	2.3	1	1	-	-
	Disagree	60.7	2.1	1	0.93	0.8–1.07	0.307
	Not sure	22.8	2.2	1	0.95	0.8–1.12	0.514
If I go to the surgery I will always have to wait a long time (673)	Agree	38.3	2.2	1	1	-	-
	Disagree	38.3	2.2	1	0.96	0.85–1.08	0.475
	Not sure	23.3	2.1	1	0.88	0.76–1.01	0.061
It can be difficult to get through to the surgery by telephone (673)	Agree	17.2	2.5	1.5	1	-	-
	Disagree	51.6	2.2	2	0.96	0.83–1.1	0.555
	Not sure	31.2	1.9	1	0.83	0.71–0.96	0.016
I am always satisfied with the care I get at my doctor's surgery (672)	Agree	69.7	2.1	1	1	-	-
	Disagree	14.9	2.5	2	1.15	1–1.33	0.051
	Not sure	15.5	2.1	1	0.94	0.81–1.08	0.377
It can be hard to get an appointment to see the doctor (671)	Agree	31.2	2.6	2	1	-	-
	Disagree	43.9	2.1	1	0.84	0.75–0.94	0.004
	Not sure	24.9	1.7	1	0.68	0.59–0.78	<0.001
Getting to my doctor's surgery can be a problem for me (674)	Agree	11.6	2	1	1	-	-
	Disagree	83.4	2.2	1	1.14	0.97–1.35	0.115
	Not sure	5	1.7	1	0.83	0.62–1.13	0.239
I feel able to talk to the doctor about very personal things (674)	Agree	26	2.5	2	1	-	-
	Disagree	40.9	2.1	1	0.82	0.72–0.93	0.002
	Not sure	33.1	2	1	0.8	0.7–0.91	0.001
I feel the doctor takes me seriously (674)	Agree	71.1	2.2	1	1	-	-
	Disagree	6.2	2.6	2	1.12	0.92–1.37	0.266
	Not sure	22.1	2	1	0.87	0.76–0.99	0.032
When I see the doctor I am given enough time to talk about everything I want (673)	Agree	63.3	2.3	1	1	-	-
	Disagree	16	1.9	1	0.8	0.68–0.93	0.003
	Not sure	20.7	1.9	1	0.8	0.7–0.92	0.002

[a]Poisson regression analysis; [b]annual consultation rate; [c]incidence rate ratio, adjusted for sex and practice.

between positive or negative attitudes and overall consultation rates. Further analysis was performed to determine whether such attitudes influenced consultation for potentially sensitive problems, as above. Teenagers who consulted for psychological problems were more likely to agree that they 'might not be willing to tell their GP about some health problems because they were afraid of other people finding out' (OR = 2.5, 95% CI = 1.15–5.26). A similar, but non-significant, trend was observed in relation to discussion of emotional problems. Girls who expressed concern about embarrassment were less likely to have consulted for any gynaecological problem (including contraception) (OR = 0.49, 95% CI = 0.25–0.97, $P = 0.040$) with a similar trend in relation to consultations specifically for contraception. There were no other statistically significant associations between consultations for sensitive problems and attitudes towards confidentiality and embarrassment.

Table 4. Associations between attitudinal responses to statements about confidentiality and embarrassment and mean annual consultation rates controlling for sex and practice.[a]

Statement (n)	Response	Percentage	ACR[b] Mean	ACR[b] Median	IRR[c]	95% CI	P-value
I might not tell my GP about some health problems because I would worry about other people finding out (673)	Agree	22.3	2.1	1	1	-	-
	Disagree	60.8	2.1	1	0.97	0.85–1.11	0.656
	Not sure	16.9	5.5	2	1.12	0.95–1.31	0.167
I might not want to tell my GP about emotional problems because I would worry about other people finding out (670)	Agree	21.3	2	1	1	-	-
	Disagree	54.9	2.2	1	1.11	0.98–1.28	0.1
	Not sure	23.7	2.2	1	1.08	0.92–1.26	0.340
I might be too embarrassed to talk to my GP about my problems (673)	Agree	43.1	2.2	1	1	-	-
	Disagree	33	2.1	1	0.96	0.85–1.08	0.465
	Not sure	23.9	2.2	1	0.96	0.84–1.09	0.499
I might not go see my doctor about all my healthproblems because I do not trust him/her (650)	Agree	6.1	1.7	1	1	-	-
	Disagree	82.9	2.2	1	1.2	0.93–1.53	0.154
	Not sure	11	2.5	2	1.3	0.98–1.72	0.073

[a]Poisson regression analysis; [b]annual consultation rate; [c]incidence rate ratio, adjusted for sex and practice.

Discussion

To our knowledge, this is the first published study to attempt to evaluate the influence of the attitudes of teenagers with respect to general practice on actual consultation behaviour. The purpose was to try to determine the extent to which particular attitudes or beliefs act as barriers to primary health care. Our findings suggest that they may be less of an actual barrier than previously believed among this population.

The study was conducted among teenagers aged 13 to 15 years, since people in this age group are believed to have significant health concerns that are not addressed. They are also developing in terms of personal autonomy, while not yet being fully autonomous with respect to the law.[12]

We acknowledge that there are a number of potential limitations to the study design. First, among the age group studied parental influence may be an overriding factor that could not be directly taken into account. However, we performed an analysis based on the 143 (20%) responders who reported that they had gone into the consultation alone on the most recent occasion and there were no significant differences in attitudes or consultation patterns between this subgroup and the whole sample.

The practices in the study were selected opportunistically. Although they were not undertaking specific teenage interventions over the period studied, a prior interest in teenage health was evidenced by their willingness to participate. Thus, the views expressed by their teenage patients may be unrepresentative of the whole teenage population: these practices could be providing better teenage care than average practices with consequent satisfaction higher and the effect of any potential 'barriers' diminished. However, the fact that a wide range of attitudes were expressed by the teenagers, and many had only limited contact with the practices over the period of the study, might suggest that such an effect would be minimal.

To undertake the study it was necessary to use general practice registered lists as the sampling frame and carry out a postal questionnaire survey. This approach has potential disadvantages in terms of problems of differential response bias and lack of control over the setting in which the questionnaire is completed. To reduce the former problem an inducement in the form of a gift voucher was used to maximise response rates. The potential effect of such an inducement on individual responses to questions must be acknowledged, particularly as it may have encouraged more positive attitudinal responses than otherwise. However, the results obtained in our survey (for example, with respect to self-reported smoking rates) were similar to those from surveys performed in other settings, suggesting that such an effect was minimal. We also examined consultation patterns of questionnaire responders and non-responders and found no significant differences between the groups. In addition, we examined questionnaire responses of those who reported having received help in completing it with those who did not and found no significant differences in reported attitudes between the groups.

Finally, the retrospective nature of the study means that the associations found cannot necessarily be interpreted as demonstrating causality between attitudes and behaviours. However, we have attempted to interpret our findings in this context. Further research could be performed to determine the stability of teenagers' attitudes over time and the influence of experience on them.

Our findings confirm the concerns that teenagers have expressed in previous research. The most prevalent negative views about general practice in this study concerned privacy of the surgery reception area and waiting times to be seen for appointments. However, the fact that there was no association between the expression of these concerns and actual consultation behaviour suggests that they are only a minimal or theoretical barrier to health care.

The association between perceived difficulty getting an appointment and consultation rates does not reflect a barrier to health care since the association is in the opposite direction to that which would be expected. Instead it is consistent with the probability that teenagers who attend more frequently are more likely to have had difficulty obtaining an appointment in the past and their belief is therefore based on experience. Perceived difficulty getting an appointment may act as a barrier to health care for specific problems and our findings suggest that this might be true in relation to contraception, where the need for emergency contraception requires accessible health care.

In contrast, the finding that teenagers who disagreed that they were given enough time within a consultation had lower consultation rates than others could be consistent with this belief acting as a barrier overall. It is also consistent with previous evidence that teenagers are actually given less time in general practice consultations than adults.[13] Alternative explanations also exist; for example, teenagers who consult more frequently may develop a better relationship with their GP

resulting in improved satisfaction with the consultation and the perception that more time is given. A similar argument can be applied to the association between willingness to confide in a GP and higher consultation rates. The importance of developing a good doctor–patient relationship with teenagers has been emphasised in other studies reporting that many teenagers believe their GP to be unsympathetic[1,5] or that they feel uncomfortable in the consultation.[8]

While teenagers' concerns about confidentiality are frequently cited as barriers to consultation,[1] such concerns were not associated with differences either in overall consultation rates or consultation for sensitive issues. 'Embarrassment' was a more widespread concern, especially among girls, and such concerns were shown to be associated with reduced consultation for sensitive problems such as gynaecological and contraceptive reasons. The importance of 'embarrassment' as a potential barrier has been emphasised in previous surveys.[5] This may have implications for the gender mix of health care professionals accessible for teenagers in primary care, although this issue was not specifically addressed in the current study.

Previous authors have suggested that teenagers might need specific health care interventions to address their concerns and make primary health care more accessible and acceptable.[1,14-16] Our findings suggest that the expressed attitudes of teenagers may be less of a barrier to routine general practice care than previously believed, which accords with results from another recent survey that suggested that most teenagers are generally satisfied with the care that they receive.[17] Specific concerns might better be addressed within the context of routine care rather than providing separate special services for this age group. However, where special services are being proposed it will be important to carry out proper evaluation for evidence of added benefit to justify significant diversion of resources.

Conclusion

Previously reported negative attitudes of teenagers towards general practice appear to have limited inhibitory effect on their use of services. However, our study confirms the need for GPs to try to develop trusting relationships with their teenage patients so that they are more likely to confide, and be less embarrassed to do so, when they do have health concerns.

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Acknowledgements

The study was supported by a grant from the NHS R&D Mother and Child Health Programme. We are grateful to the five practices and the teenagers who took part in it and to Kath Bennett who provided advice with the analysis.

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Consultation patterns and provision of contraception in general practice before teenage pregnancy: case-control study

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Editorial by Donovan

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BMJ 2000;321:486–9

Abstract

Objectives To determine patterns of consultation in general practice and provision of contraception before teenage pregnancy.
Design Case-control study, with retrospective analysis of case notes.
Setting 14 general practices in Trent region.
Subjects 240 registered patients (cases) with a recorded conception before the age of 20. Three controls per case were matched by age and practice.
Main outcome measures Consultations in general practice and provision of contraception in the 12 months before conception and recorded provision of contraception at any time before conception.
Results Overall, 223 cases (93%) had consulted a health professional at least once in the year before conception, 171 (71%) had discussed contraception in this time, and 121 (50%) had been prescribed oral contraception. Cases were more likely to have consulted in the year before conception than controls (odds ratio 2.70, 95% confidence interval 1.56 to 4.66). Most of the difference was owing to consultation for contraception. Overall, 53 cases (22%) resulted in a termination of pregnancy. Cases whose pregnancy ended in a termination were more likely to have received emergency contraception than either their controls (3.21, 1.32 to 7.79) or cases resulting in other outcomes (3.01, 1.06 to 8.51).
Conclusions Most teenagers who became pregnant attended general practice in the year before pregnancy, and many had sought contraceptive advice. The reluctance of teenagers to attend general practice for contraception may be less than previously supposed. The association between provision of emergency contraception and pregnancy ending in termination emphasises the need for continuing follow up of teenagers consulting for this form of contraception.

Introduction

The United Kingdom has the highest teenage pregnancy rate among 15-19 year olds in western Europe,[1] and associated problems have recently been highlighted.[2] Around 35% of teenage pregnancies result in a termination, and continued pregnancy is associated with physical, psychosocial, and educational complications for both the mother and the child.[2] Teenage pregnancy has been identified as a target for health improvement by successive governments.[2,3]

Improving access to health education and contraceptive services is seen as the principal way to reduce teenage pregnancy.[4] General practice is one source of provision of contraception, but it has been suggested that teenagers are reluctant to seek advice because of difficulty in gaining access and fears about confidentiality.[5] However, there is little published evidence concerning the actual use made of general practice services by teenagers who subsequently become pregnant.

We aimed to determine the extent to which teenagers who become pregnant have utilised general practice services before the pregnancy, and also whether there are differences between those whose pregnancy ends in termination (as a proxy for unintended pregnancy) and others. The results might allow identification of potential opportunities for preventing teenage pregnancy.

Subjects and methods

We conducted a case-control study in which characteristics of cases who conceived as teenagers were compared with those of controls matched by age and practice. The study was performed in 14 general practices from the Trent Focus Collaborative Research Network.

Identification of subjects

Cases were registered patients who had a recorded termination, delivery, or miscarriage resulting from conception before the age of 20, between 1 January 1995 and 1 January 1998. Cases were identified from computer records, maternity books, and the knowledge of practice staff. If cases had more than one pregnancy during the study period then the earliest was selected as the index pregnancy. Date of conception was based on the date of the last menstrual period when recorded or estimated from the date of outcome.

Controls were registered patients who had no recorded teenage pregnancy. Three age matched con-

trols per case were identified from within the same practice by selecting those closest in chronological age from an ordered list. Each control could only act as a control for one case. Twin siblings were excluded.

Data extraction

Data on demography, consultation, and contraception were extracted from medical records by a member of each practice (usually the practice nurse) after standardised training. Data on consultations were recorded for the same 12 month period before the estimated date of conception for both the case and matched controls. Data on clinical consultations were then categorised and coded by one of us (DC).

Consultations in general practice in the year before conception were classified as either related to contraception (contraception provided or evidence that it had been discussed) or not related to contraception (no mention of contraception).

Provision of contraception was recorded, both in the year before conception and also at any time before conception. Postcodes were used to estimate distance of residence from the practice premises, and Townsend score was used as an indicator of deprivation.

Analysis

Data were entered on to an EpiInfo 6.01 database. Principal analyses and calculations of odds ratios were performed with STATA 5.0, and descriptive analyses were performed with SPSS for Windows 8.0.

Separate analyses were performed on all cases and on the subgroup of cases whose pregnancy ended in a termination, in relation to their matched controls. Conditional logistic regression analysis was used to calculate odds ratios (with 95% confidence limits) for matched case-control differences. Absolute differences in interval or continuous data were calculated between case values and the aggregate of matched control values by using Student's t test for normally distributed variables and Wilcoxon signed ranks test for other variables. A significance level of 0.05 was selected for the main outcomes. Multivariate conditional logistic regression analysis, incorporating Townsend scores and distance of residence from surgery, was applied to consultation variables to adjust for potential confounding.

Initial target sample size calculations were based on a 2:1 ratio of controls to cases, assuming that 20% of cases were frequent attenders compared with 10% of controls. Such a difference would be detected at a 5% significance level and 80% power with 158 cases and 316 controls. A 3:1 ratio was selected to increase the power and to allow for any shortfall of cases identified, although a shortfall did not subsequently present difficulty. The study was approved by the Trent multicentre research ethics committee and individual local research ethics committees.

Results

Overall, 240 cases, and 719 matched controls, were identified. Overall, 70% of index pregnancies resulted in delivery, 22% in termination, and 8% in miscarriage. The median age of cases at conception was 17 years (range 13 to 19 years). Thirty four cases (14%) were less than 16 years. Forty eight cases (20%) had been pregnant at least once previously.

Table 1 Case-control differences in relation to consultations and provision of contraception (all cases). Values are numbers (percentages) unless stated otherwise

Variable	Cases (n=240)	Controls (n=719)	Odds ratio (95% CI)	P value
Demography				
Lives ≥2 miles from surgery*	57 (24.6)	195 (29.4)	0.67 (0.45 to 0.99)	0.045
Townsend score ≥4†	89 (37.9)	189 (28.8)	2.25 (1.45 to 3.50)	<0.001
Consultation in year before conception				
Any health professional at least once	224 (93.3)	603 (83.9)	2.70 (1.56 to 4.66)	<0.001
Any health professional ≥4 times	128 (53.3)	302 (42.0)	1.68 (1.23 to 2.30)	0.001
General practitioner	219 (91.3)	586 (81.5)	2.37 (1.45 to 3.86)	0.001
Practice nurse	56 (23.3)	170 (23.6)	0.98 (0.69 to 1.39)	0.905
Any health professional, with contraception discussed	148 (61.7)	322 (44.8)	2.15 (1.56 to 2.97)	<0.001
For any non-contraceptive reason	198 (82.5)	547 (76.1)	1.51 (1.03 to 2.22)	0.035
Contraception provided at any time before conception				
Ever consulted for contraception	171 (71.3)	339 (47.1)	3.32 (2.33 to 4.73)	<0.001
Contraceptive pill	156 (65.0)	301 (41.9)	2.96 (2.11 to 4.14)	<0.001
Emergency contraception	27 (11.3)	61 (8.5)	1.35 (0.84 to 2.18)	0.210
Intrauterine device	1 (0.4)	3 (0.4)	1.00 (0.10 to 9.61)	1.000
Injectable progestogens	17 (7.1)	23 (3.2)	2.36 (1.23 to 4.55)	0.010
Condoms	31 (12.9)	38 (5.3)	2.73 (1.64 to 4.54)	<0.001

Data missing for 8 cases and 55 controls* and 8 cases and 62 controls†.

The median number of consultations by cases in the year before conception was 4 (range 0 to 29). Table 1 shows the proportion of cases consulting and also recorded provision of contraception both in the index year and at any time before conception. Of the 92 cases who had not consulted for contraception in the year before conception, 76 (83%) had consulted for another reason at least once and 24 (26%) had consulted on four or more occasions.

Townsend scores were available for 232 cases (97%) and 657 controls (91%). The mean score was 3.2 for cases (SD 3.4) and 2.4 for controls (SD 3.3), with the difference between cases and aggregated matched controls being significant ($t=4.866$, $df=231$, $P<0.001$), indicating that cases were resident in more deprived areas. More cases than controls lived within two miles of the surgery, although the difference only just attained significance (table 1).

In the year before conception, cases were more likely than controls to have consulted any health professional at least once, to have consulted a general practitioner, to have consulted frequently (four or more times), and to have consulted for purposes both related to contraception and not related to contraception (table 1). After multivariate analysis, in the year before pregnancy the only significant association was in relation to consultation for contraception (odds ratio 1.78, 95% confidence interval 1.22 to 2.60; $P=0.003$). Cases were more likely to have consulted for contraception at any time before conception and specifically to have been provided with oral contraception, injectable progestogens, or condoms (table 1).

Table 2 shows consultation rates and uptake of contraception by cases whose pregnancy ended in termination. Of the 27 cases who had not consulted for contraception, all but two (7%) had consulted at least once, and seven (26%) had consulted on four or more occasions in the previous year. There were no significant differences between cases whose pregnancy ended in termination and their 159 matched controls

Table 2 Case-control differences in relation to consultations and provision of contraception (cases resulting in termination). Values are numbers (percentages) unless stated otherwise

Variable	Cases (n=53)	Controls (n=159)	Odds ratio (95% CI)	P value
Demography				
Lives ≥2 miles from surgery*	17 (32.1)	60 (39.2)	0.68 (0.33 to 1.38)	0.280
Townsend score ≥4†	17 (32.1)	32 (21.2)	2.25 (1.45 to 3.50)	<0.001
Consultations in year before conception				
Any health professional at least once	51 (96.2)	139 (87.4)	3.51 (0.81 to 15.37)	0.094
Any health professional ≥4 times	24 (45.3)	72 (45.3)	1.00 (0.50 to 1.99)	0.144
General practitioner	50 (94.3)	137 (86.2)	2.68 (0.77 to 9.33)	0.110
Practice nurse	7 (13.2)	34 (21.4)	0.56 (0.23 to 1.35)	0.192
Any health professional, with contraception discussed	26 (49.1)	76 (47.8)	1.05 (0.57 to 1.96)	0.874
For any non-contraceptive reason	45 (84.9)	129 (81.1)	1.32 (0.56 to 3.13)	0.528
Types of contraception provided at any time before conception				
Ever consulted for contraception	32 (60.4)	73 (45.9)	1.80 (0.95 to 3.38)	0.068
Contraceptive pill	27 (50.9)	64 (40.3)	1.54 (0.83 to 2.88)	0.173
Emergency contraception	11 (20.8)	12 (7.5)	3.21 (1.32 to 7.79)	0.007
Injectable progestogens	2 (3.8)	6 (3.8)	1.00 (0.20 to 5.11)	1.000
Condoms	8 (15.1)	6 (3.8)	4.53 (1.50 to 13.75)	0.004

Data missing for 6* and 8† controls.

Table 3 Comparison of recorded provision of contraception between cases resulting in termination of pregnancy and those with other outcomes. Values are numbers (percentages) unless stated otherwise

	Termination (n=53)	Delivery or miscarriage (n=187)	Odds ratio (95% CI)	P value
Ever consulted for contraception	32 (60.4)	139 (74.3)	0.53 (0.28 to 1.00)	0.048
Consulted for contraception in previous 12 months	26 (49.1)	122 (65.2)	0.51 (0.28 to 0.95)	0.032
Ever prescribed oral contraception	27 (50.9)	129 (69.0)	0.47 (0.25 to 0.87)	0.015
Prescribed oral contraception in past 12 months	20 (37.7)	101 (54.0)	0.52 (0.28 to 0.97)	0.036
Ever prescribed emergency contraception	11 (20.8)	16 (8.6)	2.80 (1.21 to 6.48)	0.013
Prescribed emergency contraception in past 12 months	7 (13.2)	9 (4.8)	3.01 (1.06 to 8.51)	0.031
Ever used injectable progestogen	2 (3.8)	15 (8.0)	0.45 (0.10 to 2.03)	0.376*
Ever used condoms	8 (15.1)	23 (12.3)	1.27 (0.53 to 3.02)	0.593

*Fisher's exact test.

for overall consultation rate, consultations with a general practitioner, or consultations related to contraception or not related to contraception. Cases were less likely than controls to have consulted a practice nurse, although the difference did not attain significance. Cases resulting in termination of pregnancy were significantly more likely to have been provided with emergency contraception or condoms at any time before conception.

Consultation rates of cases whose pregnancies ended in termination were compared with those with other outcomes. There were no significant differences in terms of overall consultation rate or the proportion consulting any health professional at least once, consulting the general practitioner at least once, or consulting frequently. Cases resulting in a termination were, however, half as likely to have consulted the practice nurse than others, with seven (13%) having done so compared with 49 (26%) others ($\chi^2 = 3.899$, df = 1, P = 0.048).

The use of contraception by teenagers whose pregnancy resulted in a termination was compared with that of other outcomes (table 3). Cases resulting in a termination of the pregnancy were less likely to have consulted for contraception and less likely to have been prescribed oral contraception at any time but were more likely to have been prescribed emergency contraception.

Discussion

This is the first study to compare the consultation patterns of teenagers who become pregnant with those of age matched peers. There is little published research about the uptake of services for contraception in general practice by teenagers before pregnancy. Such research is difficult to undertake and is subject to ethical constraints.

Our study involved general practices from the Trent Focus Collaborative Research Network. Although research practices may potentially provide different standards of care for teenage patients, pregnancy rates in the study practices were similar to those of other practices in the region. The proportion of pregnancies resulting in a termination in this study (22%) was lower than expected from national data (35% among teenagers aged 15-19 in 1994[2]) suggesting that we may not have identified all such cases, particularly if the terminations were performed in the private sector or referred directly from family planning services without notifying the general practitioner.

Our data were based solely on general practice records. This was appropriate since our interest was in the use made of general practice services. Our results therefore provide an underestimate of the total provision of contraception to teenagers because a proportion access family planning or specific teenage services. The extent of use of other services is likely to vary with locality, but one study found that 60% of pregnant teenagers had accessed services for contraception in general practice compared with 30% who had attended family planning clinics.[6]

Consultation patterns before pregnancy

Our results show that most teenagers who become pregnant do access general practice for both general medical services and contraceptive advice before their pregnancy. This suggests that for most teenagers fears about confidentiality and embarrassment is less of a barrier than previously supposed.[5] These issues may, however, still be important for the minority who did not consult.

At least four fifths of the pregnant teenagers who had not discussed contraception had consulted for other reasons. Although these represent potential "missed opportunities" for contraceptive advice, it was not possible to identify such teenagers as a distinct "at risk" group. It has been suggested that teenagers may have a hidden agenda when consulting, which includes the desire to discuss sexual health issues.[7,8] However, teenagers have also been reported to have shorter consultations than adults, which provides less opportunity for raising such concerns.[9]

We found that teenagers who become pregnant consulted more frequently in general practice than did their peers. Most of the difference was owing to consultation for contraception, with sexual activity acting as a confounding variable. Among this group, however, consultation rates were also marginally higher overall for reasons not related to contraception. Frequent con-

What is already known on this topic

Teenage pregnancy rates in the United Kingdom are among the highest in western Europe

General practice is a potential source of provision of contraception for teenagers but may not be fully utilised by them

What this study adds

Most teenagers who become pregnant do access general practice in the year before pregnancy, suggesting that potential barriers to care are less than often supposed

Teenagers who become pregnant have higher consultation rates than their age matched peers, and most of the difference is owing to consultation for contraception

Teenagers whose pregnancies end in termination are more likely to have received emergency contraception before conception, emphasising the need for adequate follow up

sultation among teenagers is also associated with higher rates of psychological morbidity.[10] Thus general practitioners need to be aware of the complex issues that may need addressing among teenagers who consult frequently.

Unintended pregnancy

A separate analysis was performed on cases whose pregnancy ended in a termination, as this group excludes those teenagers in whom the pregnancy was planned or wanted. Most teenagers in this group were still likely to have consulted in general practice in the year before pregnancy, and half had discussed contraception during this time.

Recorded provision of emergency contraception in general practice was associated with an increased risk of termination. Teenagers who had a termination were also more likely to have had emergency contraception and less likely to have had regular oral contraception than teenagers who had a pregnancy resulting in delivery or miscarriage. Similar results were reported by Pearson et al, who found that teenagers who requested a termination of pregnancy were significantly more likely to report having used condoms and less likely to have used oral contraception than teenagers attending antenatal care.[11]

Improved knowledge of, and access to, emergency contraception is often advocated as a means of reducing teenage pregnancy.[12] Teenagers who choose this method, however, may be more at risk of unintended pregnancy, possibly because it is a marker of "risk taking" in sexual activity. This emphasises the importance of appropriate follow up to address long term needs for contraception whenever a teenager consults for emergency contraception. It also raises questions about the possible supply of emergency contraception by agencies who are unable to provide such follow up.

We thank the practices from the Trent Focus Research Network and their staff who took part. Since this paper was written, Dave Ebdon has died.

Contributors: All authors were part of the project team. DC developed the original idea by MP, had major input into the study design, performed data coding and analysis, interpreted the results, and wrote the paper; he will act as guarantor for the paper. JA contributed to the design of the study, undertook the literature review, provided training for practices undertaking data collection, performed data entry, and commented on the analysis and the paper. MP conceived the original idea for the project and contributed to the design, interpretation of results, and writing of the paper. JH-C contributed to the development of core ideas, study design, data analysis, interpretation of results, and the paper. DE analysed postcode data for deprivation and spatial analysis. MM and SB commented on the design, interpretation of results, and the paper. Data collection was performed by staff in participating practices. Carol Coupland provided advice on statistical analysis.

Funding: Trent NHS Executive.

Competing interests: None declared.

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(Accepted 5 July 2000)

Endpiece

Artie Shaw's philosophy on life

Artie Shaw, composer, arranger, bandleader, and clarinet virtuoso, is now 90, living in California. His version of Cole Porter's "Begin the Beguine" made him world famous, and his 1940s original theme "Nightmare" was also widely acclaimed. His composition "Gloomy Sunday" was banned in Hungary in the 1930s, because it allegedly led to a rise in suicides among those who heard it.

I wrote to Mr Shaw and asked him for a brief message embodying his successful ageing and life philosophy.

This is what he replied: "I believe it can be summed up this way. Try to leave things a little better than you found them. Note the words 'little better'—anyone who tries to make a really major difference stands a chance of becoming a Hitler, a Stalin, or a Milosevic. As William Blake put it some 200 years ago: 'If you wish to do good, be sure to do so only in minute particulars.'"

Mr Shaw is also a writer and has published three novels, the best known of which is *The Trouble with Cinderella*.

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