

**HEALTH, NUTRITIONAL AND
BEHAVIOURAL INDICATORS
IN ADOLESCENTS
IN URBAN AND RURAL CHINA**

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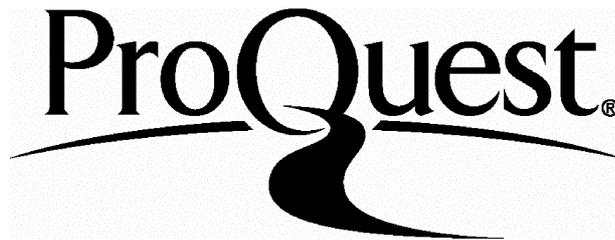
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ABSTRACT

Objectives: to determine differences in health, nutritional and behavioural indicators in adolescents in urban and rural Zhejiang Province, and to make recommendations for the development of adolescent health services and health education in eastern China.

Setting: Twelve secondary schools in three distinct socio-economic and geographic areas: Hangzhou (urban), Xiaoshan (wealthy rural) and Chunan (poor, mountainous rural) in Zhejiang Province, eastern China.

Methods: A two stage cross-sectional survey was carried-out. The first stage was carried out in six middle and high schools and involved the development, testing and administration of a questionnaire covering a range of health and lifestyle issues. Areas of importance highlighted in Stage One informed the content of Stage Two which consisted of anthropometry, haemoglobin measurement, and a further questionnaire focusing particularly on nutritional status and psychological morbidity.

Results: There were 4197 respondents aged predominantly 12-18 in Stage One and 1577 respondents aged 12-16 in Stage 2. Key findings included significant differences in socio-demographic patterns in the three areas: 90% of Hangzhouese were only children, compared with 55% in Xiaoshan and 8% in Chunan. Regular smoking was very rare (0.3%) and non-existent in girls. Underweight was far more prevalent than overweight 18% and 3.6% ($P < 0.001$). The strongest predictor of overweight was urban residence OR 9.1(95% CI 3.7,23). Over half of all girls (51%) were anaemic, with significantly more in Chunan ($P < 0.001$). Anxiety and depression were common in both sexes and in both urban and rural areas, but very few sufferers had sought professional help. Much of the psychological morbidity was related to academic pressure.

Conclusions: As a result of the study, the first of its kind in the Province, changes have been made to the health education curriculum for secondary schools in Zhejiang and there are plans to introduce counselling services into schools.

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"You are the early morning sun"

Mao Ze Dong

to young people in Tiananmen Square, 1966

你們是早晨八、九點鐘的太陽

FOREWORD

From 1986 to 1991 I worked as a clinical lecturer in China, and I developed a fascination for the country, its culture and its people. During this time I became particularly interested in the effects of growing-up in such an oppressive environment on the health and development of children and adolescents. This interest was heightened when a colleague asked me to give English conversation classes to his teenage daughter and her friends. They intrigued me because of the strange mixture of conformity, naiveté, candour and wisdom that they displayed. These sixteen-year olds seemed worlds away from their hedonistic, risk-taking, rebellious counterparts in Europe and North America. Something I found especially curious was their identical opinions on a huge range of subjects: There are too many people in China. Mao Ze Dong: a great man, who made a few mistakes when he was old. London: fog. Mrs Thatcher: a strong lady, very admired. Sex: not before marriage. It forced me to acknowledge the power of a system based on propaganda, where no-one is encouraged to develop their own opinions. It also made me realise that this power could be harnessed to beneficial ends, in areas such as health education.

So when the Director of Public Health for Zhejiang Province informed me he wanted to “modernise” the health education curriculum in Zhejiang schools, I offered to help. He specifically wanted to explore the possibility of incorporating models of good practice from other countries into a new education programme, which would better meet the changing experience of Chinese youth.

An initial meeting in Zhejiang with leaders from the Health Bureau and the Education Commission revealed that apart from age-specific mortality rates there was no other information about the health of Zhejiang adolescents. Not only had there been no research carried-out in adolescent health in Zhejiang, but the few published studies into adolescent health in China as a whole were small and local, focusing on specific topics and without any wider perspective. The ensuing discussions resulted in the decision to carry-out a health and lifestyles survey.

Since no broad-based investigation of this type had been undertaken before, it was decided that the starting point should be an initial global assessment. The tool produced could then be used elsewhere in China, and over time, to ascertain geographical differences and

monitor secular trends. It was intended that the information obtained would be used to inform the re-designing of the health education curriculum for Zhejiang province.

From the start it was decided that the research should be carried-out in two stages: the first stage would be carried-out in schools in urban and rural Zhejiang, with the aim of providing broad indicators in the areas of health, nutrition and behaviour. The second stage would explore in more detail those areas which emerged from the first stage to be of particular concern.

This two-stage process has dictated the organisation of this thesis. A large amount of data was collected. For the purposes of this thesis just four subject areas have been reported. They were selected for their policy-relevance, and because all led to formal recommendations. Two of the topics drew results from the first stage of the research: morbidity and health care seeking behaviour, and smoking, while the data on psychological morbidity, and nutrition was drawn mainly from the second stage. Because the thesis covers a wide range of subjects within the context of adolescent health and because each has its own literature, a separate chapter has been devoted to each of the subjects. Therefore each of the five results' chapters is self-contained with its own background and discussion. Each has a different theme, posing specific questions in the background section and then answering them in the discussion. The major points from each section are then drawn together in the concluding chapter to present an overall picture of adolescent health in urban and rural areas.

The thesis is thus set-out as follows:

Chapter 1 sets the context of adolescence. It outlines the reasons for the recently-acknowledged public health importance of adolescence and it describes the methodological issues pertinent to adolescent health research.

The background to China and to Zhejiang Province is set out in **Chapter 2**. It describes the current issues facing China today, with a particular emphasis on health. There follows an exploration of adolescence in the Chinese context. Finally, Zhejiang Province and the three areas selected for the research are introduced.

Chapter 3 describes the methods used in the two stages of the research. It also takes up the methodological issues covered in Chapter 1 and illustrates how these issues were considered and incorporated, where appropriate, into the methods and the analysis.

The demographic and socio-economic indicators are summarised and discussed in **Chapter 4**. There is also a description of the attempt to develop aggregate socio-economic indicators for analysis purposes.

The next four chapters take-up the four main themes in adolescent health, which were selected for exploration in this thesis.

Chapter 5 presents and discusses the results of the health and health care seeking behaviour component and examines the relationship between socio-economic status and ill health in this population.

Smoking behaviour and its risk factors, as well as knowledge and attitudes to smoking, are considered in **Chapter 6**

Chapter 7 draws together all the data relating to nutritional status, and examines relationships between underweight, overweight, anaemia, age of menarche, diet and exercise.

A range of measures of psychological well-being are considered in **Chapter 8**. Here also the specific situation of only children is examined.

Chapter 9 draws together all the findings and paints a picture of adolescence in Zhejiang Province, with particular reference to the differences between the urban and rural communities. It describes the recommendations made as a result of the research and the specific outcomes in terms of changes in the health education curriculum and health service interventions.

This research project was driven throughout by local need, and policy relevance. As will be shown this necessitated some scientific compromises. But working with a team was enormously rewarding and educating. It was their commitment and advocacy which led to the positive outcomes of the study.

CHAPTER 1: THE ADOLESCENT CONTEXT

1.1 INTRODUCTION

This chapter serves as a brief introduction to adolescence in the context of international health research. It focuses particularly on the public health importance of adolescence and methodological issues in adolescent health research.

1.2 DEFINITIONS OF ADOLESCENCE

In nearly all societies puberty is recognised as a distinct passage to adulthood,¹ but the concept of *adolescence* as a period of transition between childhood and adulthood has only relatively recently gained acceptance. As late as the mid-twentieth century in many developed countries, children performed adult tasks, and were expected to contribute to the household.² This remains the norm in many pre-industrial societies. A distinct post-childhood, pre-adult transition phase has been created in most societies by socio-economic change, and specifically longer education and delayed marriage.³

In 1974 the World Health Organisation formulated the definition of adolescence, which is still used widely by practitioners and researchers in the field. Adolescence was defined with respect to three parameters of development: as the period of *sexual development* from the initial appearance of secondary sexual characteristics to sexual maturity, *psychological development* from child to adult identification, and *socio-economic development* from dependence to relative independence.⁴

However, because there is enormous variation between populations and individuals in the timing of the physical and psychosocial changes associated with adolescence, there has been no agreed chronological definition.⁵ Just in terms of physical changes the age differences between the appearance of secondary sexual characteristics and the growth spurt can be up to six years.⁶ But there is even greater variation in the psychosocial changes which are determined largely by social and cultural norms.⁷

This variation is reflected in the range of chronological definitions actually in use. The World Health Organisation initially defined adolescence as the age period from 10 to 19 years, but then included the United Nations definition of youth, which is ages 15 to 24, producing an all-embracing definition covering the ages of 10 to 24 years.⁸ In much of the literature adolescence is defined more narrowly as the teenage years, or the period

between the ages of 13 and 18 years. The latter stems partly from convenience, since this is the period of secondary education in most countries.⁹ Recognition of the differences across such a wide age range has led some commentators to divide adolescence into early, middle and late stages: 10 to 14, 15 to 17 and 18 to 19 years respectively.¹⁰ These are defined to correspond with specific phases in physical, cognitive, psychological and social development in the transition from childhood to adulthood.

Although adolescence defies chronological standardisation, virtually all countries define an age of legal adulthood, when individuals are considered capable of handling their own affairs. The “age of majority” is set at 21 in most countries, although there has been a trend to lower it, usually to 18 years.¹¹ But this rather arbitrary definition of legal adulthood frequently varies within countries when applied to different rights and privileges, such as marriage, voting, purchase of alcohol or cigarettes.

In China the word for adolescence *qingchun* is the same as the word for youth, and is defined as the period between childhood and adulthood. There is no specific chronological definition, though *qingchun* is widely regarded as synonymous with the teenage years. The age of majority is 21 years.

1.3 ADOLESCENCE: THE PUBLIC HEALTH PERSPECTIVE

1.3.1 The importance of adolescence in public health terms

Though definitions and descriptions of adolescence abound, the impact of these physical, social and psychological changes on health problems remains unexplored in many countries, especially in the developing world.¹² In fact, until recently the health needs and concerns of adolescents have been regarded as low priority by policy makers.¹³ There were understandable reasons for this: adolescents in both industrialised and developing countries have the lowest mortality of any age group, have generally low morbidity and therefore have low service utilisation. In developing countries, in particular, in a climate of competition for scarce resources and where the focus has been on improving early child survival, adolescents have been regarded as low priority for health service interventions and resources.¹⁴ Boys in particular have been particularly neglected. The high risks encountered by young girls in pregnancy and childbirth have made policy makers more aware of their needs, while often ignoring those of their apparently healthy male partners.¹⁵

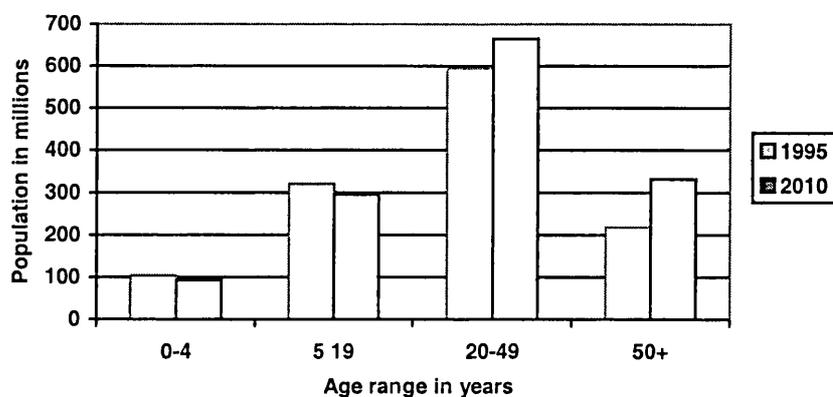
But since the mid-1980s this situation has changed with the World Health Organization in the vanguard of drives to place adolescence on the public health and policy agenda.^{8,13,14} This change in emphasis has been the result of the recognition of a number of interrelated factors which have combined to increase awareness of the public health importance of adolescence:

a. The increase in the proportion of young people globally

There have been dramatic increases in the numbers of young people in many countries, both in absolute terms and in relation to other population groups.¹⁶ It has been estimated that almost 30% of the world's population is aged between 10 and 24 years.¹⁷ From 1960 to 1990 the total population of the world increased by 75%, while that of the 15 to 24 year age group increased by 99%,^{18,19} though this increase in the youth population relative to the total population is now starting to level-off.¹⁷ But the percentage of the world's young people living in developing countries is still growing. While 77% of 10 to 24 year olds lived in developing countries in 1980, it is now estimated to be around 83%.¹⁴ This relative increase in the numbers of young people in developing countries is mainly due to dramatic improvements in early childhood survival without concomitant reductions in birth rates, while in industrialised countries birth rates have declined over recent years.²⁰

In China, the number of adolescents has recently peaked and is now on the decline. According to estimates from the United Nations Population Division the total population of China will increase by 154 million between 1995 and 2010 while the number of 5-19 year olds will decline by 25 million.²¹ This is illustrated in Figure 1.1.

Figure 1.1 Population estimates for China: 1995 and 2010



Source: UN Population Division: World Population Prospects 1998 ²¹

There have also been dramatic shifts in the demographic characteristics of young people within countries. While in 1975 one quarter of the world's population lived in cities it is now estimated to be around 40%, an increase of 60%, and young people account for a disproportionate number of these migrants.²² This is not surprising given that the primary motivation for migration is to seek employment or education. An International Labour Organisation survey showed that 85% of migrants from rural areas of the Punjab were between 15 and 29 years of age, with the equivalent figures for rural Sudan and Ecuador being 67% and 66% respectively.²³ A study carried-out in China for the Ministry of Civil Affairs found that 70% of internal migrants were aged between 16 and 30.²⁴ This move from what is an often traditional and relatively stable rural society to conurbations that lack the infrastructure for family support or health care, has been described as one of the major barriers to the healthy development of young people today.¹³

b. The underestimation of rates of morbidity in adolescence

Recent surveys of the health and health concerns of adolescents have confirmed that much of the illness and poor health, which disproportionately affects this age group, doesn't come to the attention of health services.^{13, 25, 26} Examples are mental health and reproductive health problems. There are a number of reasons for this poor uptake of services including:

- lack of recognition of health problems by the adolescents themselves
- lack of recognition that their problems require professional attention

- the stigma attached to many of the health problems encountered in this age group
- lack of knowledge about where to seek help
- lack of knowledge about the existence of services
- inadequate financial resources.

Even when young people do seek help, health workers are frequently unable to diagnose and deal with the complex problems presented, and mental illness in particular is probably grossly underdiagnosed.²⁷ So routinely collected morbidity rates, based on hospital and clinic consultations underestimate the real need for services, and in many developing countries certainly represent the tip of the iceberg.

c. The long term negative health impact of morbidity in adolescence

Illness, and especially chronic illness during adolescence, not only has immediate detrimental effects, but may have a long-term impact. Firstly, chronic morbidity and poor nutrition may affect chances of achieving optimum growth. This is especially important for girls, since failure to achieve optimal size increases the risk of cephalo-pelvic disproportion with all its attendant complications.²⁸ Secondly, morbidity during adolescence and time missed from school may have important effects on educational attainment with obvious long-term consequences. Finally, morbidity during adolescence may also have an impact on future morbidity and mortality. Disease acquired during adolescence, may only become a clinical problem in adulthood. Sexually transmitted diseases, such as gonorrhoea, may cause immediate morbidity, but the most important consequences such as urethral stricture and secondary infertility, may not manifest until much later in adulthood. Tuberculosis likewise, causes substantial increased disability and mortality in adulthood. Dental disease, particularly periodontal disease, is already established by late adolescence and the state of dentition in this age group acts as a predictive marker for future dental health.²⁹

d. The long-term negative health impact of behaviours acquired in adolescence

Perhaps the single most important feature of adolescence in public health terms is that many of the behaviours and lifestyle patterns, such as smoking, exercise and dietary habits, that start during adolescence will last into adulthood.² These will then have their greatest health impact later in life in terms of morbidity, disability and early death. There is also

now some evidence that the health and health-related behaviours of young people will have an important influence on the health and health-related behaviours of their children.³⁰ The corollary of this is that adoption of healthy behaviours or the modification of unhealthy ones during adolescence can bring about reductions in disability, morbidity and early death, not only in the individual, but also in succeeding generations.

e. The impact of HIV on adolescence

The emergence of HIV and its disproportionate acquisition by young people has been a major impetus for pushing adolescence up the health policy agenda. Studies of HIV antibody prevalence in Sub-Saharan Africa show the risk of infection increases from the age of 15.³¹ In Uganda, for example, the peak prevalence for infection is in the 15 to 24 year age groups.³² In countries with a heavy burden of HIV disease it has become imperative for policy makers to take seriously the health and education needs of this age group, in order to develop appropriate interventions to reduce rates of acquisition of the disease. Through this process the wider needs of adolescents are being considered, in many instances for the first time.

1.3.2 Policy relevance

For all these reasons policy makers are now recognising that interventions to improve the health and health-related behaviours of young people could result in substantial benefits, both for the health of adolescents themselves in the present and the future, for their children, and for communities and society as a whole. Information is therefore required by policy makers to determine what priorities should be given to programmes focused on this age group. The types of information required in adolescent health include the following:

- Epidemiological: mortality, morbidity and disability
- The main health and development problems of the age group in the given setting
- Behavioural indicators, for example, smoking, diet, exercise, hygiene and sexual practices
- Adolescents' own perception of illness and risk
- Adolescents' own perceived needs and preferences with regard to service provision and education
- Evidence for the impact of adolescent health on long term morbidity and mortality.
- Information from intervention studies which have identified effective models of education and service delivery

In most countries, including China, there is a dearth of information in these areas and limited evidence on which to plan services and interventions. Information from intervention studies is still very limited indeed, probably reflecting the fact that research activity in this area is a relatively recent phenomenon. Even in the US, where the majority of research has taken place, most adolescent health research has consisted of descriptive studies. According to a review of all published studies in adolescent health carried-out between 1988 and 1996 in the US (137 in total) only 13% involved an intervention.⁹

1.4 METHODOLOGICAL AND CONCEPTUAL ISSUES IN ADOLESCENT HEALTH RESEARCH

When carrying-out research in young people there are a number of specific methodological and conceptual issues which must be taken into consideration. Young people differ in a number of ways from children and adults. Even at the basic level of research on physiological changes, such as growth research, techniques need to be adapted to accommodate the wide individual variation. For example, body mass indices need to be adjusted by age and sex during the adolescent years, if they are to have any validity.³³ Here these methodological and conceptual issues are drawn together and summarised. In later chapters the ways in which these issues were addressed in this research project are considered.

a. Limitations on the use of routine data sources

In many countries, and developing countries in particular, young people are rarely considered as a separate group in routinely-collected survey data. Many of the larger national studies, which include all age groups, use aggregated age ranges, which prevent adolescents from being examined separately. In many studies age groups are presented as 0-4, 5-14, 15-44 and over 45 years. The World Health Statistics Annual uses the age groups 5-14 and 15-24 for mortality data.³⁴ The World Bank Development Report³⁵ and the companion book on disease control priorities in developing countries,³⁶ used the age groups 5-14 and 15-44 years. The United Nations Population Division uses an age range of 5-19 years. This is the same age grouping widely used in China. The Chinese Ministry of Public Health has developed a network of sixty disease sentinel surveillance sites throughout the country, each site consisting of a rural county or an urban district, designed to be representative of the whole country. Mortality data from these sites is reported by

International Classification of Disease (ICD) Codes and by age group, including an age group of 5-19 years.³⁷

b. Limitations on the use of non-specific data

Much information on young people's health comes from quantitative epidemiological and demographic studies (often focusing on mortality, morbidity and fertility). Information of this kind is often obtained from household surveys such as the General Household Survey used in the UK.³⁸ Adolescents are often included in these surveys, but by the very nature of the data collection, they are often unrepresented, partly because they are likely to be absent at the time of the interview, and partly because they are the group most likely to give dishonest or evasive answers, because of the lack of privacy of the context.³⁹

c. Adolescents' involvement in the research process

Until very recently little was known about what young people themselves regard as their important health problems, because for research purposes they were never asked. The perspective of others who deal with youth on a daily basis, parents, health care providers and teachers, is important in assessing areas of need, but they are limited. Adults' priorities for adolescents may be very different from the priorities of the adolescents themselves, and adults may be unaware particularly of the risk behaviours in which adolescents are engaged.⁴⁰ Now it is thought that participatory approaches in adolescent health research are vital if an accurate picture is to be obtained.⁴¹

There is a growing body of literature from developed countries which elicits the views of young people themselves about their health and their health concerns. North America took the lead in this with studies in Canada⁴² and the US.^{43,44} Other developed countries quickly recognised the importance of these participatory approaches: Australia⁴⁵ Japan⁴⁶ Switzerland⁴⁷ and the UK.⁴⁸ The approaches have now been taken a step further with the development of profiles of health, which incorporate non-medical problems and health concerns. An example is the Child Health and Illness Profile developed at Johns Hopkins University, which develops an aggregate "health" score which takes into consideration health, emotional state, school achievement, and relationships.⁴⁹ In many Western countries, including the US, Canada, UK, France and Switzerland surveys of the health and lifestyles of adolescents, which elicit the views of the young people themselves, are now carried-out on a regular basis. The correlation between self-reported illness and organic

disease has been shown to be high where the relationship has been examined,⁴¹ and the consensus is that participatory approaches are highly desirable to obtain an understanding of the health problems of adolescents.

In developing countries participatory research in this area is in its infancy, though there are a number of examples of good practice emerging. For example, in Bangladesh schoolgirls were involved in monitoring their own growth. This enhanced their understanding of nutrition and its relation to growth beyond that acquired by standard health education.⁵⁰ The narrative research method advocated by WHO, particularly for researching sensitive issues, such as sexual behaviour, is successfully identifying the health concerns of young people in a number of developing countries⁵¹ (see below).

However, even in the best settings participatory research methods are less likely to involve young people in the design of research, the interpretation of results or in the development of programmes targeted towards them. But there are moves towards this: the narrative research method is a good example of research which encourages the involvement of young people themselves throughout.

d. Adolescents should not be regarded as a homogeneous group

There are huge differences at the age extremes during adolescence, with corresponding differences in needs and problems. For example, behaviours such as sexual activity or alcohol use, may be a serious cause for concern at 13 years of age, but accepted as a social norm at age 18.²⁰ Likewise health problems and health-related lifestyles may have a very different impact on the two sexes for both physical and sociological reasons. To account for this, survey questions about risk behaviours, in particular, may need to be modified for different age groups. Further, to avoid misleading interpretation analysis should be carried-out by age and gender, with these differences considered when determining policy implications.⁵²

e. Interpretation should be cautious when confining research to certain groups

Studies of adolescent health most frequently use school attendees, mainly because they are an easily accessible group. In younger adolescents in settings where school attendance is very high this is probably justified. But in settings where school attendance is low, for example in rural areas and urban slums of developing countries, the results from such

surveys will be biased, if taken as representative of the adolescent population as a whole.¹³ The poor, the ill, the disabled and girls will be underrepresented. Even in developed countries there are limitations, since school non-attendees on a given day are more likely to have health or behavioural problems, such as truancy, thus probably biasing the results.⁵³

Another frequently studied group for health studies is attendees at health facilities. For epidemiological purposes this approach is particularly flawed: adolescents are generally low users of health facilities for the reasons stated above. In most settings those who attend are likely to be more self-aware and wealthier, and of course they must have access to a facility. They are thus likely to be highly unrepresentative of the adolescent population as a whole.

f. The importance of the psychosocial environment

Adolescents may be particularly vulnerable to the changes in society going on around them. One of the major changes of current times is globalisation, defined as the trend towards growing interdependence and interconnectedness of the modern world.⁵⁴ To young people the most visible impact of globalisation is the near universal availability of the same consumer goods: hamburgers, soft drinks, popular music and films, and access to easy cheap global communication and information through the internet. Most young people have witnessed huge changes in this respect in their own short lifetimes, and many have been greatly influenced in terms of their lifestyles and aspirations.

Therefore measurement of the health and development of young people needs to take into account the prevailing environment. At a more local level these environments may include urbanisation, the stage of epidemiological transition, social or political unrest, breakdown of traditional family networks or changes in prevailing moral and social values. A review of the international literature showed that adolescents are particularly vulnerable to an increase in health problems and adoption of risk behaviours during times of transition. Illicit abortions, substance abuse and accidents have all been shown to increase in such situations.²⁰

Research has started to take these issues into account, with consideration being given to physical, psychological and social perspectives, with many large surveys examining the interaction between the three parameters.^{49,52,55} This broader-based approach is only just

beginning in developing countries. Up until now most research in these countries has been small-scale, focusing on individual health problems or risk behaviours without a broader perspective.¹⁴

g. Clustering of health problems

It is well-established that health problems tend to cluster in families, or localities, for example. Different high risk behaviours are often clustered in certain young people, since the underlying reasons for many of these specific behaviours are the same.⁵⁶ Reporting which creates aggregated statistics often fails to identify the fact that the problems are clustered in certain high-risk groups. This has important implications in terms of policy: an understanding of why this clustering occurs in certain young people could help towards facilitating decisions on targeted interventions.

h. Western models should not be simply transferred to other countries

Health concerns, beliefs, assumptions, lifestyles are all highly culturally specific, particularly in young people. Therefore research tools must be tailored to the population they address. Some survey tools have been developed specifically for comparison between countries, for example, the WHO Cross Sectional Survey which has been carried-out in 20 developed countries,⁵⁷ but such tools must be carefully piloted in each country and interpretation and direct comparisons made cautiously. This is especially relevant when risk behaviours are being explored, since norms for adolescents in one country may be highly offensive or even illegal in another.

1.5 RESEARCH METHODS IN ADOLESCENT HEALTH

All of the above considerations have led to the recognition that certain research methodologies are particularly appropriate in the study of adolescent health. It is further acknowledged that adolescent health is an area where quantitative and qualitative approaches can be highly complementary. Methods involving two or more approaches (triangulation) are especially desirable in order to increase the validity and reliability of results.⁵⁸

For example, when studying adolescent health in populations, where there is little existing information, qualitative approaches can be used to uncover problems and generate hypotheses. Quantitative approaches may then be used to answer the How many? Who?

What? When? Whether or not? types of questions. These approaches are particularly suited to situations where large sample sizes are required to answer a question, such as incidence or prevalence of a condition.⁵⁸ Qualitative approaches can then elucidate how a multitude of factors such as individual experience, culture and peer influence interact to guide behaviour or produce morbidity.⁵⁹

A large number of research methods have been used to study adolescent health and health-related behaviour. Here the most widely used and advocated are mentioned. It is these methods which were discussed as possibilities when this research project was at the planning stage.

a. Adolescent health surveys using self-completion questionnaires

These have been used largely for collecting quantitative data from large populations. In adolescent health they have been widely used in schools. The major strengths of such surveys are in their potential large scale in terms of number of respondents, the number of topics which can be covered, and the fact that they can be used for direct comparison between populations and different demographic groupings. Because they can also be anonymous, and confidential, sensitive topics can be explored, for example sexual attitudes and behaviour, substance abuse and psychological problems. Open questions can provide some qualitative data, but in general these types of surveys cannot examine the complex interplay among factors that produce individual choice or behaviours.⁶⁰ Furthermore, such surveys demand high rates of literacy which is an unreasonable assumption in many populations. To overcome this problem researchers in developed countries have used a combination of an audio-taped interview with a simple tick-box answer sheet or computer-administered questionnaires.⁶¹

b. Adolescent health surveys using interviews

These can emphasise quantitative or qualitative approaches depending on the type of interview used. Interview protocols may range from precisely worded scripts to semi-structured conversations, in which broad initial questions elicit participants' responses, which in turn generate further questions.⁵⁸ In adolescent health motivation for behaviour, influences on behaviour and underlying belief systems have been particularly explored with this technique.⁶⁰ Limitations are the time and expense of training interviewers and administering the interviews themselves, thus limiting the scale of the survey. Secondly,

young people may be reluctant to admit sensitive information to an interviewer face-to-face, even when the data is collected anonymously. This may lead to an underestimate of risk behaviours and some types of morbidity.⁶²

c. Focus groups

These involve asking a small group of individuals for responses or to discuss a particular issue. Originally focus groups were used for market research, but their value was soon recognised by sociological researchers and then health researchers.^{63,64} The technique is particularly useful when examining consensus beliefs or group behaviours such as excessive drinking,^{65,66} but has also been found to be of particular use in the investigation of sensitive health topics such as reproductive health, including HIV.⁶⁷ There are a number of different ways of conducting focus groups. For the purposes of adolescent research two techniques are regarded as most appropriate.⁵⁸ The open focus group uses a facilitator to guide a group of participants through a discussion focused on a specific issue. The Nominal Group Technique is a 'one question' method in which a group generates and prioritises solutions to a question. The advantages are that results can be obtained quickly and more importantly opinions may be elicited that may not be obtained from individuals. The limitation is that sensitive, embarrassing and indeed illegal behaviours may not be admitted with peers, or there may be exaggeration of risk behaviours to impress peers.⁶⁸

Focus group discussions are also used to obtain background information prior to surveys and may help in the planning of questionnaires and in guiding study design.

d. Narrative research method

Although not widely used in worldwide terms, this technique is important, because it was developed particularly for use in adolescents and for dealing with sensitive issues. In this approach groups of young people jointly construct a prototypical story, based around a real-life situation.⁵¹ It makes use of role-play in the development of the story. The story provides the basis for the development of a questionnaire, which is subsequently administered to other young people. The end result is an aggregated prototypical story, which is constructed by pooling the results from all these stages. The findings of the research provide insights into the issues from the perspective of young people themselves. This technique has been used successfully in studies of the sexual experiences of adolescents in a number of African countries.⁶⁹

Table 1.1 Summary of major research methods used in adolescent health

Method	Main uses	Advantages	Disadvantages
Self-completion questionnaires	Collecting quantitative data from large populations, especially in schools	Large scale, quick, cheap. Can cover large number of subjects Easy to ensure anonymity and confidentiality	Poor source of qualitative information.
Interviews	For collecting a wide range of quantitative and qualitative types of data depending on format used.	Broad ranging and versatile	Expensive, requires trained interviewers. Lack of anonymity may bias responses
Focus groups	For exploring consensus beliefs, group behaviours and sensitive health topics such as reproductive health	Quick, relatively cheap. Opinions may be forthcoming which wouldn't come from individuals.	Requires trained facilitators. Participants may be deterred from honest responses because of peer pressure.
Narrative research methods	Designed for exploring sensitive issues amongst adolescents.	Involves adolescents in the development of stories and questionnaires, so very participatory.	Peer pressure may marginalize those with views which don't conform with the main consensus.

1.6 THE ETHICS OF ADOLESCENT HEALTH RESEARCH

There has been criticism of these approaches to adolescent health research from an ethical standpoint.⁵² Firstly, it has been argued that asking young people about risk behaviours will make them more likely to engage in these behaviours. In fact, there is very little evidence for this, though naturally this is hard to prove without a trial designed specifically to answer this question. However, there is evidence to refute this premise from health education interventions in young people. A review of 270 sexual health education interventions conducted in the developed world, showed that only two demonstrated any impact on the sexual behaviour of young people.⁷⁰

Secondly, opponents argue that adolescent health research represents an invasion of privacy, forcing young people to confront issues and admit to feelings and behaviours which may be uncomfortable to them.⁷¹ This is of serious concern, but should not prevent research from taking place. Rather measures can be taken to minimise these problems. For example, young people must have the right of refusal to participate, the right not to answer

any question, the assurance that data is confidential and anonymous, and access to some form of professional help, if they feel the need to explore issues further.

Thirdly, asking questions of adolescents violates the rights of parents, whose responsibility it is to deal with the problems of adolescents.⁵² Therefore, it is argued that in adolescent health research parents should have the right to see the protocols where appropriate and should have the right to refuse consent. Where necessary, researchers should persuade parents that research is aimed to help parents to protect and improve the health of their children. In some cases it may be possible to encourage active involvement of parents in the issues under discussion.

While researchers counter these arguments easily, they need to be considered seriously, especially when carrying-out research in a setting where there is little or no experience of research in this age group.

1.7 AIM AND OBJECTIVES OF THE STUDY

When the aims, objectives and subsequent plans for this study were being considered the issues above were taken into consideration. In drawing-up the aims and objectives emphasis was on ensuring that the research could inform policy in the area of adolescent health throughout urban and rural Zhejiang Province.

AIM:

To determine differences in the health profile of adolescents in urban and rural areas of Zhejiang Province

OBJECTIVES:

- * *To develop and test an instrument for investigating adolescent health, nutritional and behavioural indicators in Chinese populations*
- * *To use the results to make recommendations for the development of adolescent health services and for the school-based health education programme in Zhejiang Province, China*

1.8 SUMMARY

Adolescence has been defined in many different ways, but generally describes the transition between childhood and adulthood. Its importance has only recently been

recognised by policy makers and now information is needed on which to base policy decisions. There are a number of specific methodological and conceptual problems which must be taken into consideration when undertaking adolescent health research. Surveys using self-completion questionnaires, interviews, focus groups and the narrative research method have all been widely used in adolescent health research.

CHAPTER 2: THE CHINESE CONTEXT

2.1 INTRODUCTION

This chapter provides background about China and Zhejiang Province. It presents a brief introduction to the history of China and the current issues facing China, with a particular emphasis on health. Drawing on this background it then goes on to explore the nature of adolescence in the Chinese context. There follows a description of Zhejiang Province, an outline of health services for adolescents in the Province, and an introduction to the three areas where the research was carried-out.

2.2 HISTORICAL CONTEXT

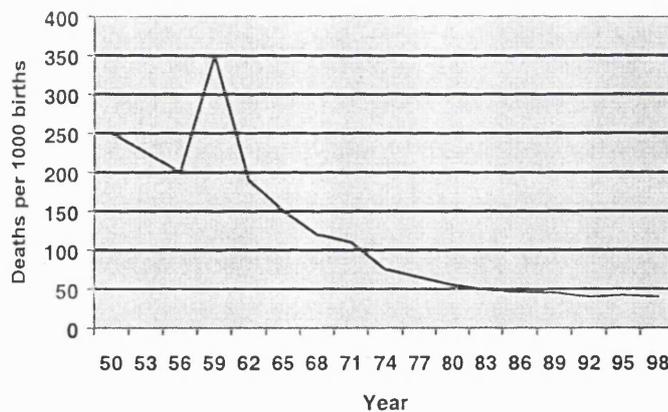
2.2.1 The early Mao Ze Dong Years

An understanding of the Chinese of today requires some awareness of Chinese history. For most of its 3500 years of recorded history China led the world in agriculture, science and the arts. But in the nineteenth century the Western powers acquired considerable economic and military superiority following the Industrial Revolution.⁷² During the first half of the twentieth century China was further weakened by major famines, foreign occupation, and virtually constant conflict: local wars between supporters of neighbouring warlords, the anti-Japanese war and the civil war between the Nationalists and the Communists. In 1949 the Communists under Mao Ze Dong were victorious and the People's Republic of China was declared.

Mao Ze Dong responded to the daunting task of governing the huge impoverished country by introducing massive social and economic change.⁷³ A centralized economy was imposed. Agricultural land was organized in collectives and in many areas communes replaced family life, sweeping away millennia of tradition. The commune became responsible for employment, food supply, childcare, education and health. Basic health care and preventive services were provided to everyone as part of the co-operative medical system (CMS). This scheme was a pre-payment plan which consisted of contributions, at a level of 0.5-2% of a family's income, together with subsidies from higher level governments.⁷⁴ By the early 1970s 90% of the rural population were covered by CMS schemes.⁷⁵

During this period China was isolated from the Western Powers, the Soviet Union being China's only ally. By the late 1950s Mao felt increasingly that he needed to prove the strength of the Communist system by expanding its industrial base. To achieve this goal peasants were abruptly diverted from agricultural work to other tasks, such as irrigation schemes and the new rural industries. As a result in some areas crops were left to rot, because it was no-one's responsibility to harvest them. Ludicrously high production targets were set with disastrous consequences. To meet steel production targets peasants were encouraged to set-up backyard steel furnaces. Cooking pots, redundant in these days of communal eating, were melted down. Grain production targets were set as well, and peasants were encouraged to overfarm the land, which in turn ruined the soil. The results of all this economic and agricultural mismanagement were disastrous, culminating in The Great Famine of 1959-1961. Estimates for the number who starved to death vary between 20 and 50 million.⁷³ Infant mortality rates increased dramatically (Figure 2.1).

Figure 2.1 Trends in Infant Mortality 1950-1998



Source: Comprehensive statistical data and materials on 50 years of New China. National Bureau of Statistics. China Statistics Press. Beijing 1999⁷⁹

2.2.2 The Cultural Revolution 1966-1976

There followed the chaos of the Cultural Revolution. Political struggles in the senior echelons of the Communist Party led Mao to intensify his dictatorial rule. Policy reversals were abrupt and had to be implemented without question or adaptation. People were encouraged to report the most minor political misdemeanours to the authorities and punitive measures were swift. This led to an atmosphere of paranoia as people were encouraged to report the political indiscretions even of friends and relatives. Formal

education systems collapsed. Primary and secondary schools were mostly open for half-days only, and teaching consisted of political doctrine, and memorisation and recitation of long political tracts. Mao also launched an onslaught on those in positions of privilege, including professionals. Universities, medical schools and specialist units were closed. Party cadres and professionals were persecuted and tortured by the Red Guards, anarchic groups of young people who rampaged with impunity through the streets, destroying anything representing the Four Olds: old customs, old culture, old ideas, old habits. Many urban dwellers were also “sent to the countryside” to experience hard peasant life. Some young people, caught up in the Maoist ideological fervour, actually chose to go and work in remote areas.

These periods spent in the countryside severely disrupted family life. In fact, family life was in a constant state of flux from the early-1950s with the establishment of the communes to the end of the Cultural Revolution. Urban families in particular suffered constant periods of separation. Arrangements for children left behind were often haphazard, with relatives or neighbours acting as guardians in parents’ absence.

But the Mao Ze Dong years were notable for outstanding health achievements.^{76,77} The Maternal Mortality Rate dropped from an estimated 250/100,000 in 1949 to 50/100,000 in the early 1970s.⁷⁸ Declines in Infant Mortality Rate were equally steep: from 200/1000 to around 60/1000⁷⁹ as illustrated in Figure 2.1. These reductions have been largely attributed to socio-economic improvements resulting from stability after decades of war.⁸⁰ In addition universal access to basic health care was achieved through the training of over a million barefoot doctors and the introduction of the Co-operative Medical System. But another key factor was the emphasis on prevention. Massive immunization campaigns were carried-out, brothels were closed and there were campaigns against opium use. The Great Patriotic Health Campaigns mobilised the masses in tasks aimed at improving nutrition, sanitation and water quality, and attacking certain diseases. The anti-schistosomiasis campaign included organising teams to lance snails with sharpened chopsticks. Another campaign targeted sparrows, because they ate the grain. For days and nights people shouted and banged saucepan lids until the birds fell dead with exhaustion. But the result was that insects, which would have been eaten by the birds, now devoured the grain instead. Although much of this sounds eccentric, the results were remarkable. A

number of infectious diseases such as schistosomiasis, and sexually transmitted diseases, leprosy and plague were virtually eradicated during these years.⁷⁷

2.2.3 Economic reform

The death of Mao Ze Dong in 1976 brought an end to the Cultural Revolution and the power vacuum was soon filled by Deng Xiao Ping. China was at this time one of the poorest countries in the world, with 80% of the population living on incomes of less than \$1/day and only a third of adults able to read and write.⁷² Deng realised that two decades of economic stagnation meant that radical reform was essential to China's survival and growth.⁸¹ The centralized economic system was rapidly replaced by a market system. The communes were dismantled and families could sell surplus produce at the newly-opened free markets. The result was a doubling in agricultural output in five years.⁸² Manufacturing enterprises were encouraged with local managers being allowed considerable authority. The economy was gradually opened to foreign trade and investment.

What is now termed a "socialist market economy" is characterised by the maintenance of tight political control, considerable freedom for market-oriented institutions, but with state enterprises still dominating key industries. The Gross Domestic Product has quadrupled since 1978, with growth now running at 7.4%.⁸³

2.3 CHALLENGES FOR CHINA TODAY

The last twenty years have seen the longest period of political and economic stability in centuries. Even the popular uprising of 1989, which resulted in the Tiananmen Square Massacre of June 4, only caused a temporary setback. However, China faces new challenges which could ultimately represent a threat to current growth and stability:

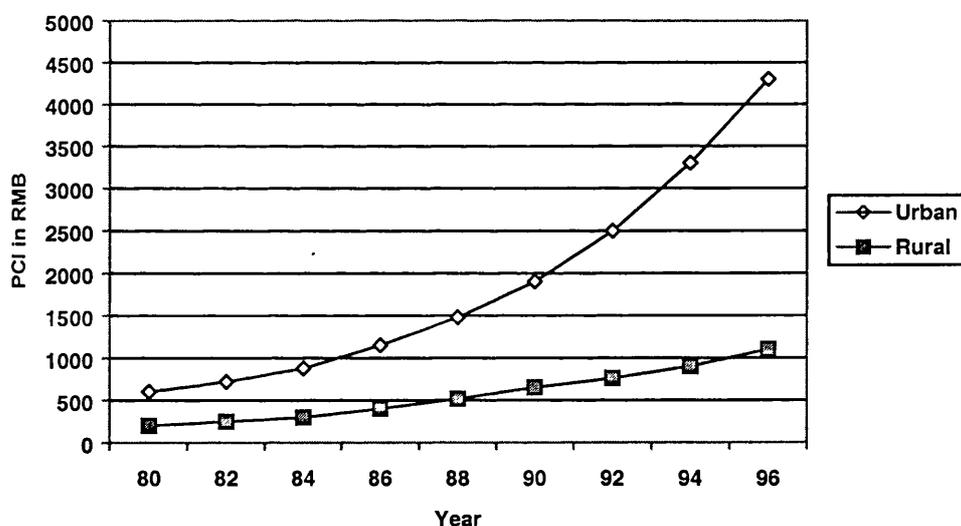
a. The urban/rural divide

Economic growth has led to steady rises in income for both rural and urban populations. But an increasing income gap between rural and urban populations has developed.⁸⁴ (Figure 2.2). Survival on the land has become increasingly difficult over the last ten years, mainly because of high taxation of farmers.⁸⁵ Anger about rural taxation levels has led to sporadic demonstrations across the country, clearly unnerving the Government. As a result in early 1999 it was announced that the tax burden on farmers must be reduced as a

disincentive to migration. But implementation is up to local governments and until now few have acted. Farmers' incomes are likely to be further eroded with imminent entry into the World Trade Organisation, which will open-up food markets to cheap imports and force down prices of local produce.⁸⁶

The difficulty of making a living on the land has created a huge surplus rural workforce of around 120 million, who drift between their villages and the cities, subsisting through part-time low-paying jobs. Increasing urban crime rates are blamed largely on the migrant workers; Shanghai police officials say they are responsible for 60% of the city's crime.²⁴ This creates considerable tensions between migrants and local people. But the migrants themselves are helping to improve conditions in the countryside by sending their earnings home. For poor inland provinces such as Hunan and Henan over 5% of provincial GDP is accounted for by the earnings of migrant workers.⁸⁵

Figure 2.2: Average per capita incomes in urban and rural China: 1980-1996



Note: US\$1=8RMB

Source: Comprehensive statistical data and materials on 50 years of New China. National Bureau of Statistics. China Statistics Press. Beijing 1999⁷⁹

b. The rich/poor divide

The division between rich and poor is now more complicated than just urban/rural differences. During the Mao years absolute poverty was a rural issue. It is still true that those who suffer the most intractable poverty are concentrated in remote upland areas, where the low quality of land makes it difficult to achieve a subsistence level of crop

production. An estimated 140 million people live in such conditions on less than \$1/day.⁷² But there is now a new phenomenon of urban poverty. Before the economic reforms urban workers almost all had jobs-for-life, a system known as “The Iron Rice Bowl”. Now the market economy has forced the closure of many inefficient State-Owned Enterprises, which had previously been subsidised by the Government. Estimates of the numbers of resulting urban unemployed vary widely, though they probably account for as much as 10% of the workforce in some cities.⁸⁷ New welfare benefit rules, introduced in October 2000, define guaranteed minimum incomes by area with financial assistance to be provided to those who fall below the level. However, the regulations are unclear, and calculation of payments is open to interpretation.⁸⁸

c. Environmental deterioration

Rapid economic development has occurred at a cost to the environment. It is acknowledged that unless strict control measures are taken against pollution this destruction represents a threat to China’s sustainable development.⁸⁹ Until recently there was virtually no enforcement of regulations about the disposal of industrial waste. Air pollution, mostly industrial in origin, is a problem of all China’s major cities.⁷² Half of China’s major rivers are heavily polluted.⁸⁹ Deforestation and overcultivation have caused soil erosion with increasing loss of arable land.⁹⁰ New regulations to control industrial pollution have been promulgated, but enforcement is impeded by the costs of introducing improved waste disposal systems.

d. Corruption

Corruption in Chinese terms refers mainly to corruption by Communist Party officials. Twenty years of economic reform have created alluring opportunities for hundreds of thousands of officials to enrich themselves. They have been assisted by a political climate which encourages private enterprise, but which forces entrepreneurs to obtain approvals and permissions from party bureaucrats, who still hold considerable economic power.⁹¹ Popular discontent with corruption is high, fuelled by a press which revels in stories of luxury, crime and punishment in high places. The government is now ostentatiously pledged to fight corruption, seeing it as a major threat to public confidence in the leadership.⁹² During the Year 2000 45,000 cases of corruption were investigated by prosecutors and several high profile officials were executed.

e. The demographic time-bomb

The demographic structure of the Chinese population is changing rapidly with massive population ageing over the coming decades. By the Year 2050 the proportion of the population over the age of 60 will increase from the current level of around 10% and 12% in urban and rural areas respectively to 30% and 34%, assuming continued low fertility and, to a lesser extent, improvements in life expectancy.⁹³ This trend is mirrored by a parallel decline in the child and adolescent population as described in Chapter 1 and illustrated in Figure 1.1. This scenario presents a huge challenge. Traditional reliance on family support for the elderly is no longer feasible, particularly in urban areas, where the one child policy has been more strictly implemented and where migrants from rural areas live far from their families. But measures are being taken to pre-empt the worst case scenarios: for example, there has been a relaxation of the one child policy in some areas, so that if both partners are only children a couple may have two children themselves, reducing the four-two-one phenomenon of one individual being responsible for the care of four grandparents.⁹⁴ There has also been a recent burgeoning of private pension schemes.⁹⁵

Table 2.1 China: Some basic facts and figures

Population	1,258 million (Jan 2000 official estimate)
Age structure	0-5 years: 11% 5-9: 9% 10-19: 19% 20-64: 55% Over 65 years: 6%
Population growth rate	1.03%
Birth rate	15.1 births/1000 population
Death rate	7/1000
Total fertility rate	1.8
Net migration rate	-0.41/1000
Urban population	30%
Infant mortality rate	43./1000
Maternal Mortality Rate	95/100,000
Life expectancy at birth	Total: 70 Male: 68.6 Female: 71.5
Literacy (definition: age 15 and over can read and write)	Total: 81.5% Male: 90% Female: 73%
Unemployment rate	Officially 3%, 8-10% in some cities, substantially higher in many rural areas
Gross Domestic Product growth (2001)	7.4%
Access to safe water	67%
Inflation rate	-0.8%

Sources: World Bank, IPPF, CIA Web sites.^{72,90,96} All based on latest available figures and estimates.

2.4 HEALTH IN CHINA

2.4.1 The health care system

With the introduction of market economy in the early 1980s there were fundamental changes in the way that the health care system was financed.

Firstly, the concept of free health care at the point of delivery, which had been enshrined in the Co-operative Medical System (CMS), disappeared with the collapse of the collective agricultural system in the countryside. Financing of healthcare became the responsibility of provincial and county governments who raise their own taxes. But the amount of money available from taxation for healthcare only covers basic salaries and new capital investments totalling around 20-30% of hospital expenditure. The shortfall has to be found from user fees.⁷⁵

Secondly, a new pricing structure was introduced. This attempts to facilitate equity by providing basic health care, such as the consultation, below cost, but profits can be made from drugs and the use of investigations. This creates clear incentives to overprescribe and overinvestigate.⁹⁷ Overprescribing is encouraged further in China by the co-existence of Traditional and Western therapies which are frequently used concurrently.^{98,99} Unnecessary treatments have been estimated to account for 20-30% of the country's total medical expenses.¹⁰⁰

Finally, the market has introduced a variety of payment methods for healthcare. These include state-controlled insurance schemes: around half of urban workers or 14% of the total population are covered by either the Government Employee Health Insurance or the Labour Health Insurance. Now there is a small but growing private insurance sector. Modified versions of the CMS now cover around 10% of Chinese rural inhabitants.⁷⁴ The insurance schemes, however, vary enormously in the amount of cover they provide and full reimbursement is unusual. Coverage for dependents is exceptional, so the overwhelming majority of children have no health insurance cover at all.¹⁰¹ In rural areas almost all health costs are paid out-of-pocket. Serious illness is still a major cause of poverty. It has been estimated that 30% of all those living below the poverty line became impoverished because of serious illness.¹⁰²

2.4.2 Epidemiological transition

Since the early 1950s China has undergone rapid epidemiological transition, that is a shift from a high fertility, high mortality pattern dominated by infectious and deficiency diseases to a low fertility, low mortality pattern dominated by non-communicable disease.¹⁰³ But the rates of transition have varied widely across the country. Deaths from cancer, cardiovascular disease and morbidity from disease like diabetes are increasing rapidly in the more developed regions, as deaths from nutritional deficiency and infectious disease become rare, while in poor remote regions pre-transition patterns still predominate. By 1996 66% of the total deaths in China were caused by chronic disease and in urban areas this figure was 76%.¹⁰⁴ The infant mortality rate (IMR) for Zhejiang was 22/1000 in 1995 compared with an estimated 100/1000 for Qinghai Province.¹⁰⁵ There are also substantial differences between populations within provinces, which are concealed by the routine reporting by provincial aggregates.¹⁰⁶ The aggregate IMR figure for Zhejiang covers a range of 14/1000 to 45/1000 across different counties.⁸⁰

2.4.3 The One Child Family Policy

In setting-out his economic reform programme Deng Xiao Ping realised that control of population growth was essential to China's future economic growth. The Total Fertility Rate (average live births per female of reproductive age) had already fallen dramatically from 5.9 in 1970 to 2.6 in 1979, through the "late-long-few" policy introduced in the early 1970s. This was largely a conventional family planning programme encouraging later child bearing, longer spacing and fewer births.¹⁰⁷ But by 1979 around two-thirds of the population were under 30 and population projections for the Year 2000 were very high. This convinced Deng Xiao Ping that Draconian population control measures were necessary to assist economic growth.¹⁰⁸ The One Child Family Policy was actively enforced from 1982. By 1985 the fertility rate was reported to have dropped to 1.9, although it was later discovered that there was considerable under-registration of births in rural areas and the actual fertility rate was probably closer to 2.5.¹⁰⁹ But this apparent success, together with its unpopularity, especially in the countryside, led to some relaxation. Since 1985 there have been alternate relaxations and tightenings according to population projections and local conditions.¹⁰⁸

The policy consists of a package of measures, including education, access to contraception, encouragement of late marriage and spacing and economic incentives for couples having only one child. In practice, the one-child-per-family rule applies only to urban residents and government workers. In rural areas a second child is allowed after five years. In some places a second child is only allowed if the first child is a girl, an acknowledgement of the traditional Chinese preference for boys. The programme is supported by massive propaganda campaigns about the personal and societal benefits of small families.¹⁰⁷ Implementation of the rules depends on local interpretation. Local officials have the power to impose penalties and give rewards for those complying with the Policy: Penalties include loss of employment, fines and confiscation of personal belongings.

There are emerging concerns that the population control programme is weakening. With the new economic freedom it will not be possible to contain family size through communal pressure and economic disincentives. Furthermore, the increasingly mobile population makes it difficult to track individuals, and the erosion of Communist Party power with the market economy has meant the loss of authority of rural party officials.

The Policy was never intended as a long term measure and several options are being considered for the future.¹¹⁰ The Government is hoping that there will gradually be a shift towards a “small family culture” reinforced by improved living standards, assured survival of children and financial security in old age. There is evidence that this is already taking place in the wealthier eastern cities.⁹⁶

2.5 CHINA AND ADOLESCENCE

The introductions to adolescence in general in Chapter 1 and to China in this chapter have highlighted many of the issues which impact on the lives of adolescents in China today. Nearly one quarter of the world’s population lives in China. Of these 19% or around 250 million are aged between 10 and 19 years.²¹ The numbers alone make the subject compelling, but there are other factors that make adolescence in China unique and fascinating:

a. China’s recent turbulent history

As outlined above, the parents of today’s adolescents have lived through a period of massive political and social upheaval. Many urban parents suffered the dislocation of their family lives as their own parents were “sent to the countryside” usually with little notice or preparation. All suffered disrupted and neglected education. The effect of the privations of today’s parents on the raising of their own children has not been formally examined.¹¹¹ A range of current problems in Chinese children has been blamed on the disrupted childhood and adolescence of these parents, as they strive to give their children all the opportunities they lacked. The problem of childhood obesity, which is just beginning to be recognised, has been blamed on parents making up for their own nutritional deprivation by overfeeding,¹¹² and the pressure which is now placed on children to succeed academically has been described as a reaction to the parents’ own neglected educations.¹¹³ But obesity and parental expectations are high in many countries, and particularly in other Asian cultures, such as Japan, Taiwan, Hong Kong and India,¹¹⁴ and is certainly not a uniquely mainland Chinese phenomenon.

b. First generation of the One Child Family Policy

The pressures placed on children and adolescents have also been blamed on the One Child Family Policy. This is the first generation of the One Child Family Policy and its effects have been the subject of intense interest to Chinese psychologists. Some commentators

have labelled these children The Spoiled Generation.¹¹⁵ However, hard evidence for them being any more “spoiled” than their counterparts elsewhere is weak.¹¹⁵ What is clear is that there is enormous expectation for academic success, but there is no evidence that this is different for one and two child families. A recent survey in Mainland China showed that 26% of rural mothers want their children to receive a higher education, irrespective of the number of children in the family. For urban mothers the number was 64%. For daughters the proportions were 17% and 45% respectively.¹¹⁶

c. Education for conformity

Chinese society still emphasises harmony and social order. Open displays of anger and confrontation are not encouraged.¹¹⁷ Schools demand that students show qualities of conformity, obedience and stoicism. Teaching is largely didactic with little nurturing of imagination and creativity. Chinese parents place a high value on education and academic achievement is highly prized.¹¹¹ This is all against a background of huge workloads for students, vicious competition for places in higher education, and even tougher competition to get a good job. This approach to education is widely believed to have a deleterious effect on general and psychological well-being, facilitating psychological problems related to over controlled behaviour, such as stress, depression, anxiety and somatisation.¹¹² But again it is hard to find evidence for actual causation and this is one of the areas explored in this study.

d. Tensions between the rapid change and tradition

The last ten years have seen huge change: an opening-up to the outside world, the effects of globalisation, massive economic growth in urban China, huge increases in disposable income, with access to a wide range of commodities beyond the dreams of Chinese only a decade ago, and the disappearance of jobs-for-life. To improve living conditions in the overcrowded cities whole areas of old dwellings have been demolished to make way for new apartment blocks. Despite this living conditions are still cramped for most people, with three generations frequently cohabiting. Studies in Hong Kong have shown that such high density living is associated with high rates of neurotic illness (anxiety and depression) in adolescents and adults.¹¹⁸

On the social front family life is now under threat more from divorce than any external force. This has been attributed mainly to the rising position of women in Chinese

society.¹¹⁶ Estimates for the numbers of divorces are not reliable, but they have been quoted to be as high as 1 million per year.¹¹⁹

But while change is taking place many aspects of the traditional society persist: respect for elders and authority, dependence on the extended family and the need for *guanxi*, literally relationships, but meaning the social network of good connections and reciprocal favours which facilitates social and business transactions. There also persists an official highly moralistic attitude towards sex and some types of risk behaviour. For example, the new marriage law, currently being debated, is considering new definitions of bigamy, punishable by long prison terms. These include cohabiting for more than six months or keeping a mistress.¹²⁰

e. “Adolescence” in China is relatively long

For the Chinese the period of transition between dependent childhood and independence is relatively long. This is for three main reasons: long formal education, late marriage, and a tradition of continuing to live with parents well into adulthood.

The long formal education is promulgated in law: in 1986 the State Council issued a law on the “compulsory nine years education of citizens”. Following this action was taken to enable every child to attend school even in remote regions. As a result the total enrolment in school for 6 to 15 year olds increased from 49% in 1952 to 95% in 1997. Enrolment in senior secondary school (age 16-18) also increased significantly during this period from 20% to 65%. The proportion of female students has also increased steadily over time: in 1997 49% of primary students, 45% of secondary students and 37% of college students.⁹³ There is an on-going debate about increasing compulsory education to 12 years, that is to the end of high school.¹²¹ Further education offers a wide range of options from vocational schools training for specific skills to traditional university. Fifty-eight percent overall go on to some form of further education after completing middle school. But there is large variation in different parts of China: for example in rural Henan 16% and Shanghai 85%.⁷⁹

Late marriage and child-bearing are dictated by family planning policy which prohibits marriage before the ages of 25 for men and 23 for women in urban areas, and before the ages of 22 and 20 respectively in rural areas.¹⁰⁸ Young adults almost always continue to live with their parents until marriage and very often afterwards. This is partly because of

tradition, convenience (particularly with respect to sharing of child-care) and partly because of housing shortages in the rental sector.

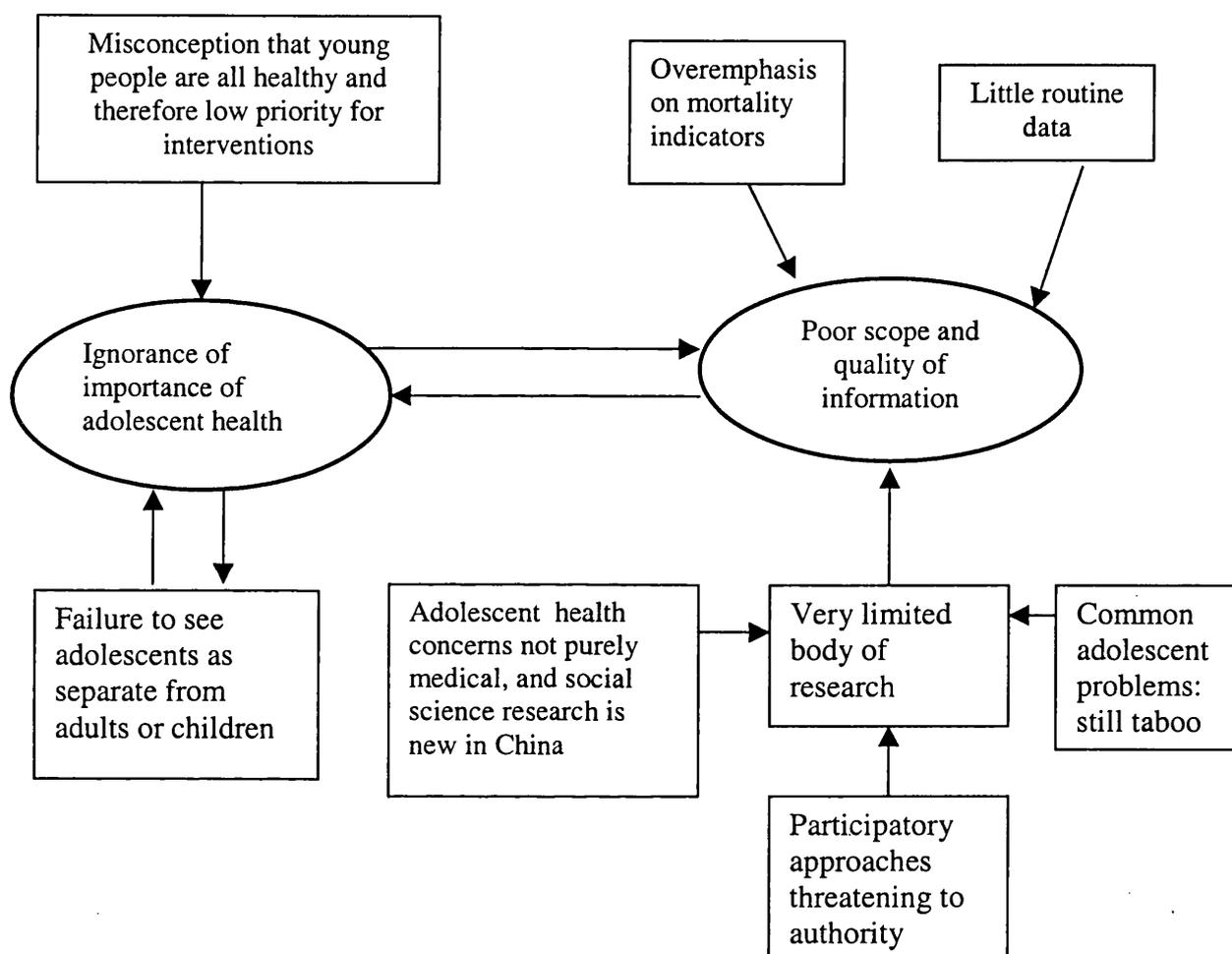
2.6 ISSUES IN ADOLESCENT HEALTH RESEARCH IN CHINA

The issues for adolescent health research in China include all of the general points referred to in Chapter 1, but there also are a number of specific considerations. As in many countries adolescence in China has entered the classic measurement trap, whereby lack of data leads to situations in which the importance of a problem is not recognised and therefore little attention is given either to the problem or to its measurement. (Figure 2.2) This idea was originally developed in relation to the health needs of women.¹²²

There are a number of specific reasons why young people's health in China has entered this cycle of entrapment:

- As elsewhere, young people are regarded as healthy, because of their low mortality and morbidity and therefore low priority.
- There is a failure to recognise that adolescents have their own needs, which may be different from those of children or adults.
- Many of the more obvious health concerns of adolescents such as incipient substance abuse, and stress, fall outside the sphere of the health sector with its biomedical models of investigation, and social science research is in its infancy in China.
- Issues of risk behaviour, sexual activity and mental disorders are taboo in many areas of Chinese society and therefore research or intervention programmes in these areas meet considerable barriers, especially amongst Chinese officialdom.
- The concept of participatory research is very new in China. In a society where children are not encouraged to think for themselves, but rather to absorb political and cultural doctrine the idea of eliciting individual views in general, let alone the views of young people, is very threatening to authority.

Figure 2.3
The measurement trap in adolescence in China adapted from Graham and Campbell ¹²²

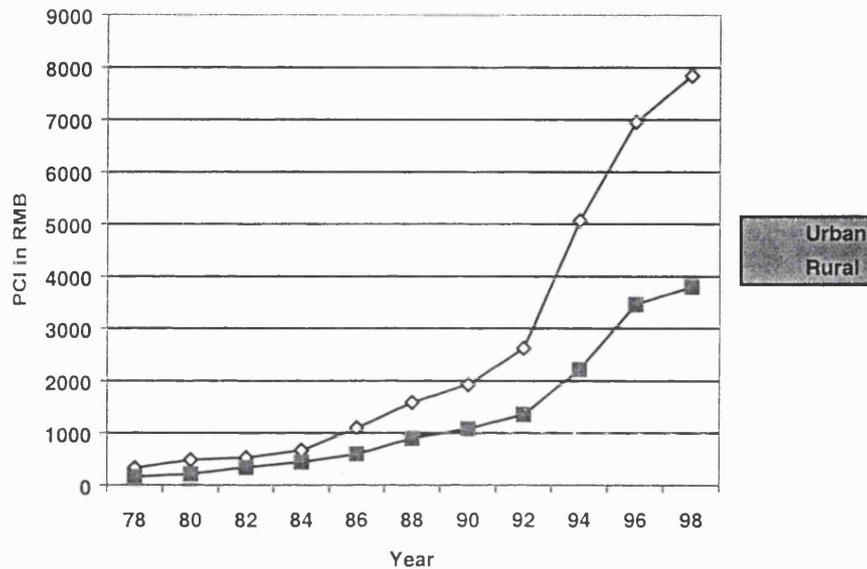


2.7 INTRODUCTION TO ZHEJIANG PROVINCE (see map, Fig 2.5)

Zhejiang Province is a coastal province in eastern China located just south of the municipality of Shanghai. Its population of 45 million is mainly concentrated in the coastal plain regions. From early times Zhejiang has been one of the most prosperous of China's thirty-three provinces, owing to its fertile farmland and long coastline which has facilitated good trading links. It is in the vanguard of change in China in areas as diverse as economics, health, family planning, education and tourism. Zhejiang's economy grew rapidly following the instigation of market reforms in the late 1970s. This has resulted in large increases in per capita income. Figure 2.3 shows this steady increase in income since 1978, and it also illustrates how the benefits of the boom have been unevenly distributed with a widening gap between urban and rural incomes.

Figure 2.4

Urban and rural annual per capita income for Zhejiang Province: 1978-1998



Source: Comprehensive statistical data and materials on 50 years of New China. National Bureau of Statistics. China Statistics Press. Beijing 1999 ⁷⁹

Comparison with Figure 2.2 shows that the inhabitants of Zhejiang are considerably wealthier than the national average. In 1996 the national average for urban per capita income (PCI) was 4300 RMB compared with Zhejiang's 7000 RMB.⁷⁹ For rural PCI the differences are more stark with the average for Zhejiang almost three times that of the national average: 3300 RMB compared with 1150 RMB. (US\$1=8RMB) But these absolute figures conceal the differential in prices of basic commodities in different areas. In Zhejiang these increases have been especially steep, disproportionately affecting the poor, and reinforcing the argument made by some commentators that poor households in richer areas are the most disadvantaged of all.¹²³ Expenditure on food in Zhejiang has increased 10-fold in urban areas since 1980 rising from 264 RMB per capita per annum to 2644 RMB in 1998, while in rural areas the increase has been 12-fold from 109 to 1362 RMB.⁸⁰ Thus expenditure on food averages around one third of total income in urban areas and one half in rural areas. Since 1980 living space per person in Zhejiang has increased from 6m² to 12m² per person in urban areas and from 16m² to 38m² in rural areas.⁷⁹ Moreover great improvement in access to goods and commodities, improved infrastructure and reliable power supplies have transformed life for many over the past two decades. For example, ownership of air conditioners in Hangzhou has increased from less than 1% to 59% of households between 1986 and 1998.¹²³

Figure 2.5 Location Map: Zhejiang Province



Zhejiang presents a post-epidemiological transition mortality and morbidity picture with non-communicable diseases dominating: cardiovascular disease, respiratory disease, cancers and injury. The official infant mortality rate is 15/1000, among the lowest in China. The average life expectancy is 72.1 years, 70.5 for men and 73.8 for women, higher than the national average.¹²⁴ However, Zhejiang has also seen a marked resurgence of some types of infectious disease in the past decade, especially tuberculosis and sexually transmitted disease, including syphilis. Preventing the spread of these diseases, together with the demands of an ageing population, are regarded as major challenges for the health service.

There are three major types of socio-economic development recognised in Zhejiang and throughout eastern China: urban, rich rural and poor rural. The three areas selected for the study represent these three types and are described here, though further details about the selection process are explained in Chapter 3.

- **Urban: Hangzhou**

This is the capital of Zhejiang province, a city of great importance in Chinese history and culture. In the Twelfth Century it became the capital for rulers of the Southern Song Dynasty. It's favourable location on West Lake has made it a major tourist attraction and a favourite haunt of Chinese leaders. A massive re-building programme with the destruction of whole sectors of the old city, has created a construction boom which has attracted large numbers of migrant workers. The Gross Domestic Product has increased 6-fold since 1990.¹²⁴ But the closure of many loss-making State Owned Enterprises has resulted in unemployment levels of around 3%.

- **Rich rural: Xiaoshan**

This county is adjacent to Hangzhou. Although classified as rural it has become wealthy as a result of the successful development of rural enterprises. It is now a designated development zone, creating a favourable investment climate, and attracting many Taiwanese-owned enterprises. Its GDP growth was 13% in 1998-9. It is typical of the new rural manufacturing economy which has underpinned China's rapid development and which fosters an entrepreneurial culture. Now in farming families it is the norm for one member to continue to work the land, while others work in manufacturing enterprises or develop their own small businesses.

- **Poor rural: Chunan**

This is a poor farming area in a mountainous region about 200 km south west of Hangzhou. Chunan is the site of one of the biggest man-made lakes in China, Thousand Island Lake. This was developed in the mid-1960s with the forced migration of 50,000 people, and the loss of low-lying agricultural land. Although one of the poorest counties in Zhejiang Province, it is classified as medium-income rural by national standards. A growing number of farmers have become migrant workers: an estimated 30% of the 18-25 age group in Chunan are working or studying outside the county. Seven percent of the county's GDP is derived from this source.

Table 2.2 Key Indicators for Hangzhou, Xiaoshan and Chunan

	Hangzhou	Xiaoshan	Chunan
Population	1.7 m	1.3m	0.6m
Population age (10-19)	290,000	230,000	130,000
Annual PCI in RMB (1998)	8,200	6500	3100
Infant Mortality Rate	15	18	31
Middle school enrolment	99.5%	98.5%	96%

Source: Zhejiang Bureau of Public Health 1998

2.8 ADOLESCENTS IN ZHEJIANG

2.8.1 Demography

There are approximately 8.2 million adolescents in the 10-19 age group in Zhejiang, accounting for 18% of the total population. According to official statistics 99% of them are enrolled in middle school, though in rural areas actual attendance is believed to be somewhat lower than that, probably around 90-92%.⁷⁹ In urban areas an average of 88% continue education after middle school compared with 60% in rural Zhejiang. Currently 15% of Zhejiang residents go to University and 1.5% go on to postgraduate studies.

As elsewhere mortality is low in Zhejiang adolescents. Crude mortality rates for the 5-19 age group are available from the Chinese Ministry of Health Sentinel Surveillance Points. Table 2.3 shows crude mortality rates for Zhejiang compared with rates for the whole of China and for urban and rural areas.

Table 2.3 Crude Mortality Rates in 5-19 year olds for 1996 (rates per 100,000)

	Total	Male	Female
All China	7.4	8.3	6.0
Urban China	3.8	4.2	3.4
Rural China	8.1	9.5	6.6
Poor rural China	11.1	11.5	10.1
All Zhejiang	6.8	7.8	5.8

Source: China Preventive Medicine Institute Mortality Survey 1998 ¹²⁵

Zhejiang's mortality rate is slightly lower than the national average with an excess of male deaths consistent with other areas of China. When examined further by cause the excess of male deaths is explained by more accidental deaths in boys, particularly drowning and traffic accidents.

Cause-specific mortality data disaggregated for the 10-19 age group was available for Zhejiang's two sentinel surveillance sites (one rural and one urban). Although the data from these sites is regarded as high quality, the causes are taken from death certificates, with all the problems of inaccuracy which are inherent in them. Data are presented for three years 1996-1998 in absolute numbers in Table 2.4.

As in most other countries,³⁴ the major cause of death in this age group is accidents. Infectious diseases only just exceed cancers. Figures for suicide are almost certainly underestimates. There is reluctance to record verdicts of suicide, except in cases of certainty. In the urban area road traffic accidents are the single most common cause of death, while it is drowning in the rural area. Death from infectious disease is twice as common in the rural area. The excess of deaths from cancers in the rural area is at least in part explained by the high cost of cytotoxic drugs.

2.8.2 Health services for adolescents in Zhejiang

There are no separate services for adolescents in Zhejiang Province at present. Children's departments manage children up until around the age of twelve and then adult services are

used. The one exception in Zhejiang is in psychiatry: at the Provincial Psychiatric Hospital in Hangzhou there is a clinic which deals specifically with the psychiatric problems of adolescents.

Table 2.4 Cause-specific mortality for 10-19 year olds in Zhejiang
Three-year aggregate data 1996-1998

Cause	Total deaths	Urban deaths	Rural deaths
	No (%) n=447	No(%) n=205	No (%) n= 242
Road Traffic Accidents	80 (17.9)	51(25)	29 (11.9)
Drowning	64 (14.1)	26(12.6)	38(15.7)
Suicide	29 (6.4)	16(7.8)	13 (5.3)
Burns	6(1.3)	0	6(2.5)
Homicide	3(0.6)	0	3 (1.2)
Other	12 (2.6)	8(3.9)	3 (1.2)
Total Accidents	193 (38.2)	101(43.5)	92 (38)
Pneumonia	14 (3.1)	4 (2.0)	10 (4.1)
Meningitis	10 (2.0)	3(1.5)	7(2.9)
Diarrhoea	6 (1.3)	2 (1.0)	4 (1.6)
TB	3 (0.6)	0	3 (1.2)
Other infectious disease	14 (3.1)	6 (2.9)	8 (3.2)
Total infectious disease	47 (10.5)	15(7.3)	32 (13.2)
Leukaemia	24 (5.1)	10(4.9)	14 (5.8)
Other cancer	17 (3.6)	7(3.4)	10 (4.1)
Total Cancer	41 (8.7)	17 (8.3)	24 (9.9)
Cardiac	20 (4.0)	9 (4.4)	11 (4.5)
Respiratory	11 (2.3))	5 (2.4)	6(2.5)
Neurological disorder	7 (1.6)	4 (1.9)	3(1.2)
Other	71 (15.8)	30 (14.6)	41(16.9)
Unknown	57 (12.7)	24(11.7)	33(13.6)

2.8.3 The school health service in Zhejiang

In 1990 the State Council decreed that all schools should have a school health programme.¹²⁶ The content of such a programme was specified under five major headings:

- a clinic must be established on the school premises
- there should be access at all times to a trained health worker(school nurse/doctor) trained to diagnose and treat common diseases, to prescribe a limited range of

drugs, treat minor injury and to carry-out routine checks for height, weight, and visual acuity

- hygiene standards must be adhered to and a process of regular inspections instituted
- the nutritional content of school meals must meet defined standards
- all schools must allocate curriculum time to health education

The degree to which these recommendations have been implemented varies widely across the country. There is no specific budget allocation for the school health services, so schools have to find resources from already overstretched education budgets, or from additional charges on parents. An additional problem is the difficulty recruiting health workers for the very poorly-paid school posts. In Zhejiang, around half of the school health worker posts remain unfilled.

In 1992 a joint decree from the Ministry of Health and the State Education Commission stated that all middle schools should provide formal health education.¹²⁶ It was recommended that every middle school allocate a teacher to co-ordinate the health care curriculum. In most cases one of the sports teachers has taken on this role.

Following this decree Zhejiang was the first province to introduce a modernised health education curriculum. It was implemented from September 1994. The curriculum is divided into three parts: science, sports and health, and 'family and life', with a textbook for each section. It is designed to be taught in the second and third years of middle school when the students are 14 to 16 years old. The science course is designed to utilise twenty-five hours of curriculum time. It is the responsibility of individual schools to decide the curriculum allocation time for the other two components. The content of the science component reads like a medical school physiology curriculum with sections on all the body systems. "Sports and Health" is usually incorporated into existing sports classes, with the teacher emphasising the health benefits of exercise. The course "Family and Life" includes sections on human development, and puberty. But it has a distinct moral tone with emphasis on the importance of family life, respect for parents and elders, and laws relating to family life, for example, the Marriage Law and the Maternal and Child Health Law. There is also a section about personal hygiene, for example, hand washing, teeth-cleaning, and (not!) spitting.

The curriculum is notable more for its omissions. There is only passing reference to the dangers of smoking in respiratory physiology, there is no mention of road safety, sex is dealt with in biological terms with no mention of contraception (except in demographic terms, in the context of the One Child Family Policy). There is no mention of HIV or other sexually transmitted disease (although at the time the material was prepared HIV was not perceived as a public health priority in China). The Family and Life component is often regarded as an optional extra, with many schools handing-out the textbooks, expecting students to read them in private time.

2.9 SUMMARY

During the years following the establishment of the People's Republic of China in 1949 there were impressive improvements in health indicators. In 1978 Deng Xiao Ping introduced a market economy which resulted in rapid growth, the benefits of which have been unevenly distributed. Adolescence in China is of particular interest, because of the country's recent turbulent history, the rapid change in contemporary society, and the fact this is the first generation of the One Child Family Policy. Zhejiang shows a post-transition pattern of mortality. There is a well-established school health service but the current school-based health education programme for middle schools has a number of shortcomings.

CHAPTER 3: THE METHODS

3.1 INTRODUCTION

This section describes the evolution of the research. The process was dictated by local need. Hence, the planning and preparation, as well as the methods themselves, are described here in detail. The reliability and validity of the data are also discussed, and potential sources of bias are highlighted.

3.2 PLANNING MEETINGS OF THE LEADING GROUP

3.2.1 The leading group: composition and terms of reference

The key individuals who would ensure the smooth facilitation of the research project were convened as the 'leading group'. This group was essential to the process: to carry-out a project of this size in China the support of local leaders is crucial. The composition of this group is in Table 3.1. I convened two meetings of the leading group in spring 1997. These achieved three aims:

- clarification and agreement of the aims and objectives of the research
- preparation of terms of reference
- identification of research methods which would be appropriate and acceptable.

Once these had been agreed I took the lead throughout the whole process of the research which is described in this chapter. The leading group met for a third time to determine the content of the second stage of the research and then again at the end of the project to draw-up recommendations.

3.2.2 Selection of research methods

The options in terms of research methods (as outlined in Chapter 1) were presented to the leading group for discussion. The desirability of combining quantitative and qualitative methods was a source of contention. The consensus of the leading group was that qualitative approaches were "unscientific". Furthermore it was felt that the cost constraints of the project would not only preclude adequate training of researchers in qualitative techniques, but would limit sample size, so that inferences for the whole population would be questionable.

Table 3.1 Leading group members and terms of reference

<p><u>Leading group members</u></p> <ul style="list-style-type: none">• Vice-Chairman of the Provincial Bureau of Public Health• Director of school health from the Provincial Bureau of Public Health• Vice Chairman of the Provincial Education Committee• Vice-director of health education, Provincial Education Committee.• Epidemiologist from Zhejiang Medical University• Psychologist from Zhejiang Medical University• Myself <p><u>Terms of reference of the leading group</u></p> <ul style="list-style-type: none">• To develop the methodology• To identify sites for research• To oversee implementation at all stages• To ensure timely analysis of the data• To ensure the appropriate use of findings in terms of health education and service delivery

Focus groups were ruled-out at the outset. This was because it was acknowledged that there was no experience of focus groups among members of the leading group, because the selection of students would be inevitably biased (to choose students randomly would be unacceptable to school leaders, who would be inclined to choose “good” students) and because it was felt that students would be unwilling to discuss sensitive issues in the presence of peers. Face-to-face interviews were likewise ruled-out, because of concerns that lack of anonymity would bias responses. The selection of a self-completion survey as the research method was justified on the grounds that given the dearth of information already available, a broad baseline survey was necessary. Results from the first survey would inform the content of a second stage by highlighting areas of interest and concern which warranted further investigation.

However, it was decided that some initial qualitative work would be useful to determine the content of the questionnaire. This consisted of discussions with medical students, an easily accessible group, who it was felt by the leading group would have the necessary insight to provide informative responses. Two discussion groups, with 12 students in each group, were facilitated by the epidemiologist, the psychologist from Zhejiang Medical University together with myself. The specific questions were chosen deliberately in order

to depersonalise. As has been noted by other researchers this is thought to increase the accuracy of the information obtained.¹²⁷

- *What do you think are the main health concerns for teenagers?*
- *What do you think are the main health risks taken by teenagers?*
- *What would you like to have learnt in your health classes in school?*

The facilitators gave no prompting and allowed the students to discuss freely. Because these discussion groups were carried-out informally they are not reported further here. But they were crucial in informing the content of the questionnaire.

3.3 DEVELOPMENT OF THE FIRST QUESTIONNAIRE

The process of development of the first questionnaire is shown in Figure 3.1. Data from the two discussion groups were fed back to the leading group to inform the content of the first questionnaire. The aim was to draw-up a questionnaire covering a broad range of issues within a document which could be completed during one class period of 45 minutes.

There was debate about the use of open and closed questions. The advocates of closed questions were concerned about the problems of interpreting responses and coding for data entry. Advocates of open questions were concerned about the limitations imposed by closed questions, which could introduce bias. A compromise was reached whereby the pilot would include some open questions, which could then be converted to closed questions, using the most common responses given by the pilot group.

A subgroup then drew-up a draft questionnaire. Demographic questions conformed with those used by the Chinese Ministry of Public Health Sentinel Surveillance Department.¹²⁸ Other questions were drawn from a variety of sources: validated questionnaires used in other countries: the WHO Cross Sectional Survey¹²⁹ the Child Health and Illness Profile⁴⁹ the US National Longitudinal Study of Adolescent Health,¹³⁰ the US Youth Risk Behaviour Survey 1992,¹³¹ the UK health-related behaviour survey¹³² and surveys used by the UK Health Education Authority.¹³³ The key questions on smoking conformed with international standards.¹³⁴ A number of new questions specific to the Chinese setting were added.

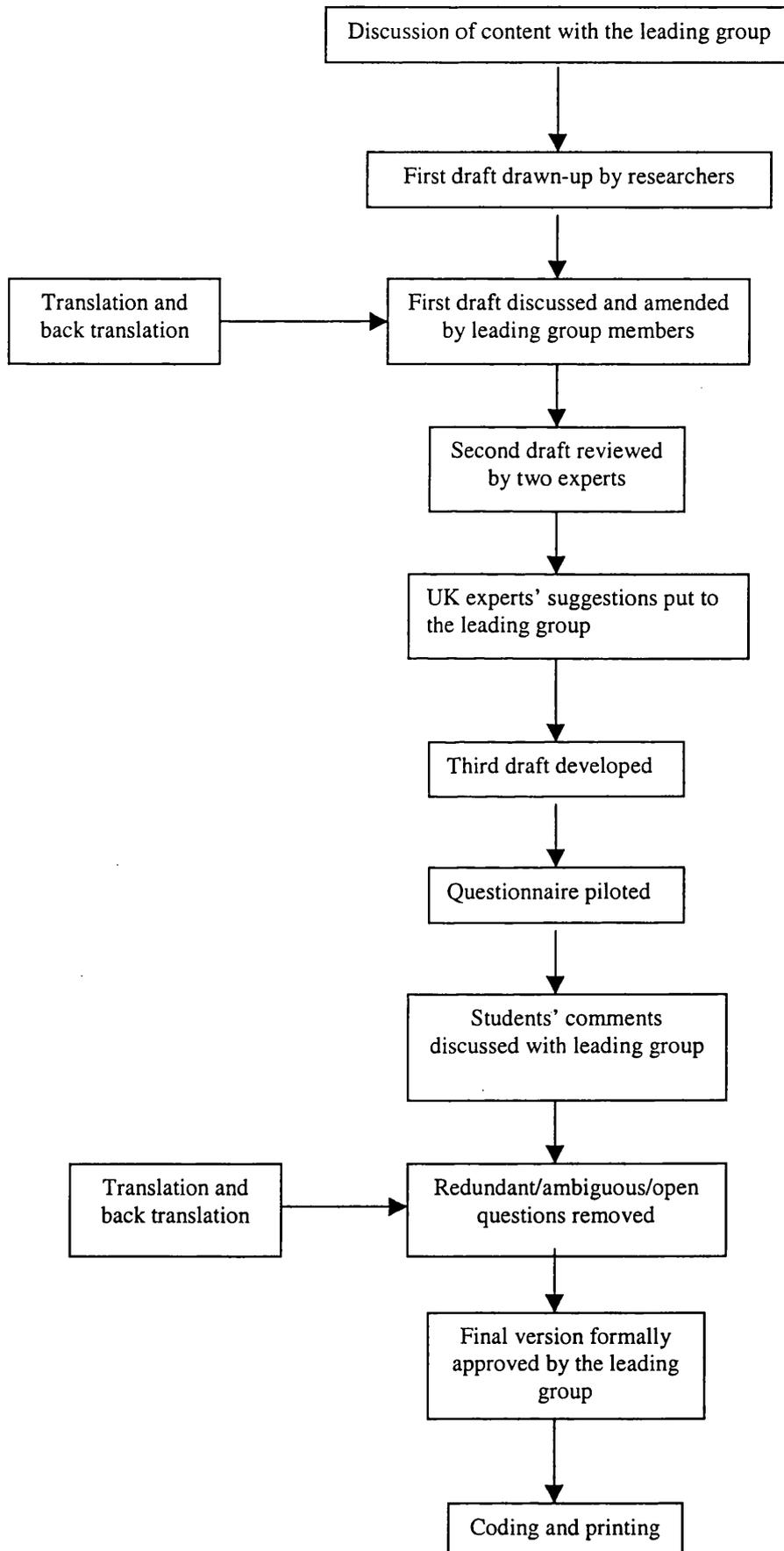
By drawing together these sources a first draft was produced. This was then discussed and amended by the leading group members. This second draft was then reviewed by two UK experts, and the suggestions were put to the leading group for approval. This second draft was then piloted across three age groups in a school in Hangzhou (150 students in total). Students were asked to comment freely on the questionnaire. The feedback comments were then further discussed by the leading group. Some amendments were made and open questions, such as those referring to morbidity, were converted to closed ones. Redundant and ambiguous questions were removed and then the final version went for formal approval to the leading group.

Apart from suggestions about content the UK experts had also recommended that the questionnaire be presented in a user-friendly format with pictures, cartoons or jokes, and short introductions to each section to explain its importance. This kind of format is widely used elsewhere and is thought to improve response rates in young people.⁵² However, the leading group felt that such “cosmetic considerations” were unnecessary, would not alter response rates, and that the extra paper required would be expensive, wasteful, and heavy for those whose job it would be to carry the questionnaires to and from the schools.

Table 3.2 Content of the first questionnaire

<p>Demographic information: family size, household composition, parents' occupation/education</p> <p>General health: disability, self-reported height/weight, visual acuity, age of menarche</p> <p>Morbidity: common symptoms, chronic illness, oral health, mental health</p> <p>Health care seeking behaviour: type of facility used, costs of care, self-medication, regular health checks, preferences for services, regular medications</p> <p>Lifestyles: transport to school, homework, after school activities, alcohol, smoking, diet</p> <p>Health education: Health knowledge, preferences for health education.</p>
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Figure 3.1 The development of the questionnaire



Accurate translation of those questions which were originally in English was very important. Where questions came from English originals great care was taken to ensure that the wording conveyed the same meaning in translation. The questionnaire was back-translated in draft form and in the final version by two different independent translators to ensure accuracy and avoid ambiguity.

The questionnaires for the two stages are in the Annex.

3.4 POPULATION TO SAMPLE

3.4.1 Sampling Schools

The potential target population was all middle and high school students, predominantly 13-18 year olds, in Zhejiang Province. Before the first meeting of the leading group permission had been obtained in principle to carry out the research in three areas, which represent the three distinct geographical and socio-economic types characteristic of Eastern China as described in Chapter 2.

- Urban: Hangzhou
- Rich rural: Xiaoshan
- Poor rural: Chunan

But selection of schools raised problems. A cluster sampling approach or a random sample of students across most or all non-specialist schools in the areas selected was suggested as best practice. But this was rejected by the leading group for three reasons:

- sampling in a large number of schools would be logistically cumbersome
- resource constraints limited the number of schools which could be involved
- since this was the first research in adolescent health in Zhejiang, to obtain crude estimates from representative schools was sufficient at this stage

To aim to achieve representativeness, schools were selected on the basis of the individual school's *academic score* or the percentage of final year students entering university. The academic scores for schools are tabulated in the same way as school league tables in the UK. Schools were selected from the lists of schools, ranked by academic score, for the three areas. In selecting schools the aim was therefore to reflect the range of academic scores across the province. The range of the schools selected was 20% to 85%. I personally made the selection on the basis of the academic score alone, since I had no other knowledge of the schools. All schools approached agreed to participate, though there was initial reluctance on the part of three schools, because of concerns about finding curriculum

time for administering the survey. The names of the schools which participated in Stage 1, together with the total number of pupils in each school and the academic score is shown in Table 3.3.

Table 3.3 Participating schools Stage 1

	Academic Score	No of pupils
Hangzhou Xinwan	85	1800
Hangzhou No 7	35	1550
Xiaoshan No 1	64	1220
Xiaoshan Fengkou	29	600
Chunan No 1	43	600
Chunan Xinhua	20	850

3.4.2 Sampling students

Sample size was dictated by logistic rather than statistical considerations. The aim was to have 100 students per age group per school across the six age groups, to give a total sample size of 3600. This would allow for analysis by demographic variables. Again the type of sampling agreed was a logistic compromise. Although random selection of a number of students from each class would have represented best practice, the head teachers felt that it should be all-or-none, that the interest generated would mean that all students in the class would want to participate. So the sampling unit was the class. In each year there are three to five classes with around 50 students per class, so two randomly selected classes per year group per school were selected. Selection of classes was carried-out by researchers (by drawing from a hat!)

3.5 MEETING OF THE TEACHERS AND STUDENTS GROUP

The head teachers and other selected teachers from the six schools (a total of 15 teachers) and two student representatives from each school were invited to a one-day meeting in Hangzhou. The aim of the meeting was to explain the objectives and mode of implementation of the research, the roles of the teachers and the use of the questionnaire. It was also hoped that the meeting would inspire interest and enthusiasm in the teachers and the students and would enhance local ownership of the project. Indeed some of the teachers were sceptical and even hostile at first, resenting the increase in their workload

and expressing cynicism about the outcome. Discussions allayed doubts in some and the payment of an honorarium to all participating teachers, equivalent to around one week's salary, meant they left at least willing to co-operate! The inclusion of the student representatives had initially been regarded as unnecessary by the teachers, but they were persuaded to accept the idea on an "experimental basis". It transpired that the opinions of the student representatives were actively and enthusiastically elicited by the teachers.

3.6 DISSEMINATION OF THE FIRST QUESTIONNAIRE

This took place in October and November 1998. The questionnaire was distributed in the classrooms (72 in total) by a Chinese researcher with the teacher present. A short explanation was given and total anonymity and confidentiality were assured. Students were again told that they had the right not to participate. They were encouraged to complete the questionnaire as fully and truthfully as possible. The questionnaire was completed under exam conditions. A member of the leading group (epidemiologist and/or psychologist) presented a standard preamble, and was available to answer queries in a consistent way. On completion the questionnaires were placed in a box, which was sealed in the classroom before being taken to the Medical University for data entry.

3.7 ETHICAL CONSIDERATIONS

Consent was handled according to local requirements. This involved obtaining written permissions from all the authorities involved: the Provincial Bureau of Public Health, Provincial Education Commission, Provincial Foreign Affairs Office (because a foreign institution was involved in the research) and from the education bureaus in Hangzhou city, Xiaoshan and Chunan county. Then permission was obtained from the headteacher of each school. Thereafter in accordance with local guidelines, it was deemed unnecessary to formally consent the students or parents. However, students were informed a week before the questionnaire was administered that they had the right not to participate. No student refused to participate, probably because it was treated like a normal classroom activity, and the number of absentees was actually lower on the survey days than would be expected.

3.8 STAGE 1 FEEDBACK AND DEVELOPMENT OF STAGE 2 PROTOCOL

The process for Stage 2 was similar to Stage 1 and so some detail is omitted. The initial analysis of the first stage was fed back to the leading group. Based on this information the leading group discussed possible content, target age group and sites for the second stage.

The final consensus was that two topics warranted further exploration:

1. Psychological morbidity. The first survey had revealed very high rates of psychological morbidity on crude questioning, with academic pressure cited as the major source of worry. There had been no previous studies of psychological morbidity in schoolchildren in Zhejiang, though there was growing awareness about the psychological dangers of the academic pressures on young people. Before exploring interventions it was acknowledged that more information was needed.
2. Nutritional status. The first survey had included self-reported heights and weights. In these schools anthropometry is included in the annual school medical, and students are expected to remember these figures. But the anthropometry wasn't validated, and some figures were clearly erroneous. Concerns among some of the leading group about the widely publicised recent emergence of childhood and adolescent obesity in eastern China, made this area a priority for further investigation. Furthermore 20% of the first survey respondents had reported that they were anaemic, and the leading group felt that haemoglobin measurements should be carried-out to determine actual levels of anaemia in this population.

In terms of target population it was decided that the second stage should focus on the middle school age group of 13 to 16 year olds for two reasons: firstly, this is the age at which the proposed health education programme would be aimed, and secondly, around 15% of urban students and 25% of rural ones leave after middle school, so the high school population is not representative of the age group as a whole.

Finally, it was decided to include just a poor rural area (Chunan) and the urban area (Hangzhou) largely on grounds of logistics and cost.

The second stage therefore consisted of anthropometry and haemoglobin measurement together with a health and lifestyles survey, with more detailed questions on psychological morbidity and diet. The questionnaire survey used the same demographic indicators and lifestyle questions as the first survey. In addition detailed questions on psychological morbidity were added. These were drawn from the British Survey of the Development and Well-being of Children and Adolescents.¹³⁵ The further addition was a food frequency questionnaire. This was developed specifically for the study, but was based on a model which had been used for ethnic Chinese in Singapore.¹³⁶ Data on menarcheal status were

based on questionnaire responses about whether the girl had started menstruating and age of onset in years and months. (Where years only were given (n=214) a value of x+0.5 years was ascribed.) Age at menarche was to be calculated using Probit analysis of the percentage of affirmative responses given at each age.¹³⁷

Translation and back translation were carried-out as before. The questionnaire was piloted among 60 students in Hangzhou and a number of amendments were made based on the subsequent feedback.

Table 3.4 Content of the second questionnaire

<p>Demographic information: family size, household composition, occupation/education of parents, household income</p> <p>General health: disability, age of menarche</p> <p>Morbidity: common symptoms, chronic illness, oral health, mental health</p> <p>Health care seeking behaviour: self-medication, regular medications</p> <p>Lifestyles: homework, after school activities, smoking, diet</p> <p>Psychological health: anxiety and depression, suicide ideation, relationships, bullying</p> <p>Nutrition: food frequency questionnaire,</p> <p>PLUS</p> <p>Anthropometry and haemoglobin measurement</p>
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3.9 POPULATION TO SAMPLE: STAGE 2

The academic score was again used as the basis for sampling. Three middle schools in each of the two areas were selected as in Stage 1 to represent the Provincial Range on the basis the *academic score*. (range 25% to 76%) Schools which had participated in the Stage 1 were excluded.

Table 3.5 Participating schools Stage 2

	Academic Score	No of Pupils
Hangzhou Wen San	76	1650
Hangzhou No 4	53	1210
Hangzhou Renmin	38	1100
Chunan No.2	37	1050
Chunan No.4	34	1300
Chunan Xin Hua	25	950

The sample size was calculated for Haemoglobin measurements. To detect a difference in Hb of 5 g/L between the urban and rural populations with a significance level of 5% and power of 80% required a minimum sample size of 141 in each group. To allow for gender differences this was doubled, so a minimum of 282 in each group was required. Two classes in the three age groups in all six schools were selected randomly as in Stage 1. A meeting of teachers and student representatives from the participating schools (the implementation group) was held to explain the aims, objectives and implementation of the research as for Stage 1.

Two school nurses were trained in standardised anthropometry and in the use of the Hemocue for haemoglobin measurement.¹³⁸ They carried-out all the data collection in the six schools over a period of 5 weeks in November and December 1999. They were supervised by a member of the leading group. Anthropometry was carried-out with a stadiometer with measurements to 0.5cm and a beam balance scale with measurement to 0.1kg (subjects lightly clothed in bare feet). One nurse took the measurements. The second checked the measurements and recorded the readings. Haemoglobin measurements were carried-out with Hemocue with blood taken by fingerprick.¹³⁸ Again one nurse carried-out the test, with the other checking and recording. Re-calibration of the Hemocue was carried-out on a daily basis. Haemoglobin results were feedback immediately. All with recordings below 100g/L were advised to consult a doctor. Two school nurses were specifically trained to carry-out this research. Questionnaires were completed anonymously under exam conditions, and were linked with anthropometry and haemoglobin data with the use of code numbers. Students were assured of the confidentiality of the questionnaire information.

3.10 DATA ENTRY AND ANALYSIS

Data entry was carried-out locally by medical students under the supervision of the epidemiologist member of the leading group and myself. One student entered the data and it was checked by a second. I personally checked 1% or 60 questionnaires at random for accuracy of data entry and found around 0.1% of the cells were incorrectly completed, and none in the important demographic variables, which were to be used for cross-tabulation in the analysis. All analysis was carried-out on SPSS.¹³⁹

Specific recoding and definition of individual variables for analysis purposes is explained in the respective results chapters: Chapters Four to Chapter Eight. The prevalences of health and lifestyle indicators were drawn-up and then analysed (Pearson Chi-squared with 95% confidence intervals) by a range of demographic variables. Multivariate analysis was then carried-out, where appropriate, to identify independent risk factors and associations for the major health and lifestyle issues identified. Significance where quoted is taken as a P-value of <0.001. This is in line with recent recommendations¹⁴⁰ and is particularly relevant where large databases have been generated and where significance at the P<0.05 level is common and often of doubtful clinical importance.

3.11 NOTE ON SENSITIVE ISSUES

To ask teenagers about sexual behaviour and attitudes was ruled out on the grounds that the truth would be hard to elicit, sexual attitudes “were not yet formed” and that questions on sex would cause resistance in parents, teachers and local authorities. Questions about menstruation, masturbation, nocturnal emissions and knowledge of HIV transmission met with no resistance from members of the leading group or implementation groups. The first draft of the questionnaire did include questions on violence and abuse, but the consensus of the leading group was to remove them, for fear that that such questions would not be approved by the authorities, thus jeopardizing the whole project. In the second questionnaire a question on bullying was permitted. At the time of writing the context is changing very rapidly and there is now much more open and informed debate about sexuality in the press, amongst officialdom and between individuals. This changing climate certainly will open the door to exploration of the sexuality of adolescents in the future.

Table 3.6 Project Timetable

Development of the proposal	Oct 1996-Jan 1997
Ethical permission acquired	Feb 1997
Planning meetings of the leading group	April 1997
Permission of local authorities acquired	June 1997
Selection of schools/permissions of school authorities acquired	July-Sep 1997
Discussion groups with medical students	Oct-Nov 1997
Development of Questionnaire 1	Jan-May 1998
Meeting of teachers and students group	June 1998
Data collection Stage 1	Oct-Nov 1998
Leading group meeting to discuss results of Stage 1 and plans for stage 2	February 1999
Selection of schools/methodology/questionnaire Stage 2	April-July 1999
Data collection Stage 2	Sep-Oct 1999
Discussion groups with students	Oct 1999
Feedback to leading group: recommendations made.	Nov 1999

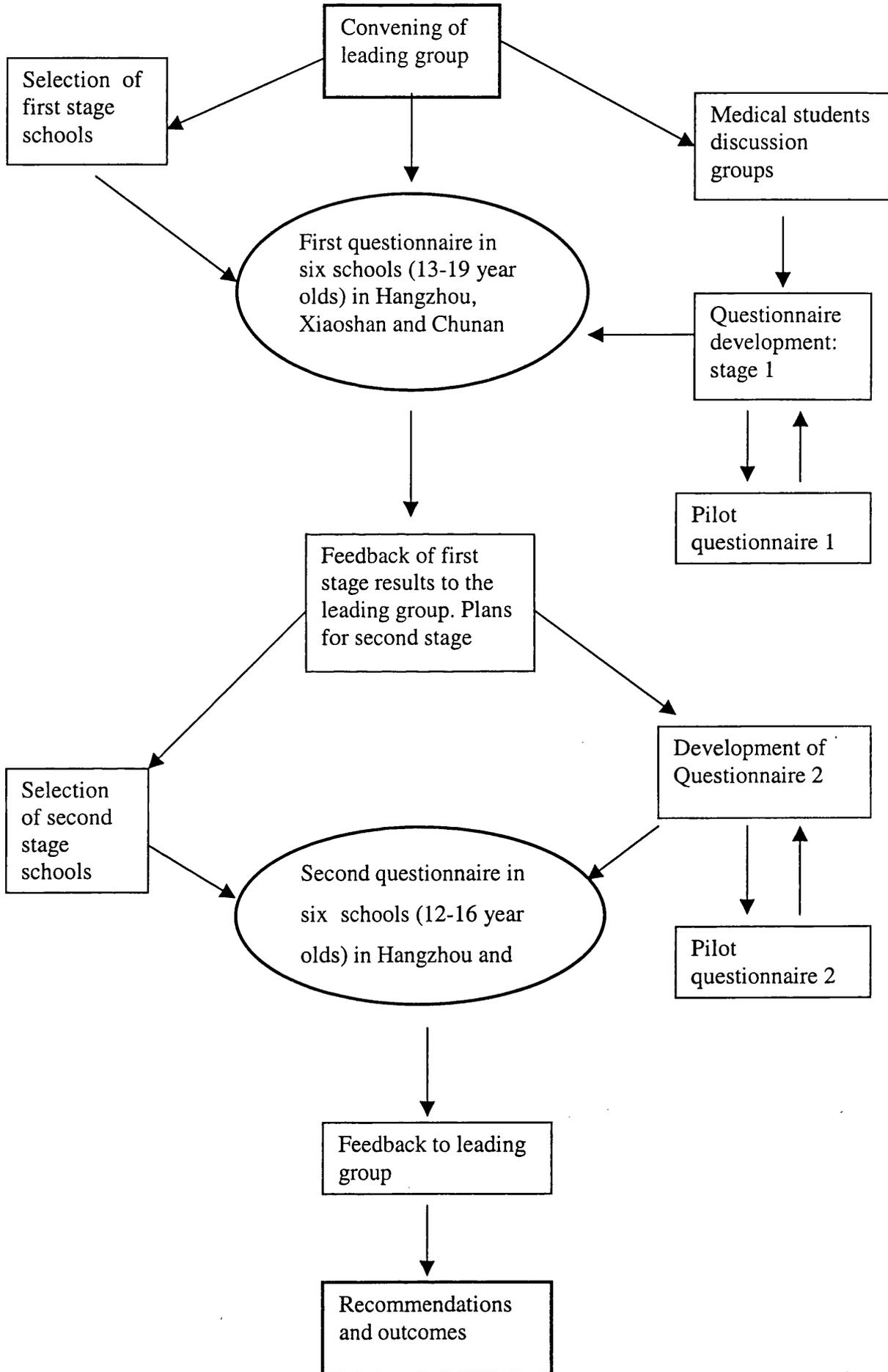
3.12 VALIDITY AND RELIABILITY OF THE DATA

The validity of a study can be defined as the degree to which inference can be drawn from the study. The reliability of a study is the degree to which the results obtained using the instrument can be replicated.¹⁴¹ The reliability and validity of such survey methods have been widely questioned especially when used in young people.⁷¹ So for this study a number of measures were taken to try to maximise the validity and reliability of the data.

The questionnaire used demographic questions, which are well-validated in China, and many of the questions came from internationally-validated sources, as noted above. The questionnaire was piloted and the questions adapted accordingly. Just two researchers supervised the questionnaire distribution in the classrooms of all twelve schools. A standard explanatory pre-ambule was given every time and responses to queries handled in a consistent way.

Although questionnaire completion was entirely anonymous and confidentiality was assured, it is acknowledged that students may not have been truthful. There is still a strong culture of saying what is expected in China.¹⁴² However, the students certainly did take the process very seriously, as evinced by the high response rate and quality of completion.

Figure 3.2 Algorithm of research process



Those questions which did point to internal validity were reassuring. This was measured by using the Kappa statistic, which is a measure of non-random agreement with a Kappa equal to one representing total concordance, and a Kappa of zero indicating that agreement is no better than chance.¹⁴³ Levels of agreement between different pairs of questions about depression were very high (Kappa=0.68-0.88 for four pairs) and the number of students admitting to a disability was consistent with the individual schools' own records. In addition, as described in Chapter 9, feedback sessions with students and teachers in specific subject areas led to the conclusion that, in general, the data demonstrated an acceptable level of validity.

With respect to external validity, or generalisability to the target population of adolescents in Zhejiang as a whole, the number of respondents was large and the response rate was very high, 98% overall. The latter is a reflection of the conformity expected in Chinese schools and the novelty of the process which engendered curiosity. Other issues of external validity are discussed in Chapter 9.

A measure of reliability was *de facto* incorporated into the study because the same questions were used in the two surveys, for different students in different schools at a different time. Kappa scores for repeated questions, such as smoking frequency were high: Kappa = 0.81-0.92 for three selected questions on smoking. However, there were also some marked differences, for example in demographic measures, but (as discussed in Chapter Four) this could reflect actual differences in the population rather than poor reliability of the instrument

3.13 POSSIBLE SOURCES OF BIAS

3.13.1 Selection bias

It has been said that sampling for surveys in China is “almost invariably biased”.¹⁴⁴ Having to work under the constraints imposed by the Chinese authorities, who will not allow freedom to the research process is something that has to be accepted when working as a foreigner in China. Thus, we were limited to working in only six schools at each stage and, although selection was made to maximise their representativeness by using area and university entrance scores, cluster or random sampling across a large number of randomly selected schools would have been preferable for drawing inferences about the population.

Using two classes per year was again a logistic compromise. However, since selection into classes within the year is random, it was felt that selection of two classes in each year group was reasonable. But again different classes may have different characteristics, and sampling across the year group would have been less open to bias.

No attempt was made to follow-up those absent on the day. The actual number of absentees on the day was 103 across both surveys or 1.5%, which though small could still bias results, since this group is likely to be highly unrepresentative (more illness, more rebellious, under-achieving). As previously noted school attenders are not representative of all adolescents in this age group, particularly in the rural areas and the older age groups. Those who have left school are likely to be poorer, less well-educated and hence probably a more vulnerable population in public health terms.

3.13.2 Information bias

The involvement of a foreigner and a foreign model of research could lead to information bias, because of the Chinese desire to create a good image for foreigners.¹⁴² For this reason, although I personally convened the meetings of the leading and implementation groups, I did not go to the schools to administer the questionnaires to minimise foreigner-induced bias. The students themselves were unaware that a foreign institution was involved in the research. The questionnaire consisted almost exclusively of closed questions, which were regarded as 'more scientific' and which facilitated data entry and analysis. In a number of instances the closed question probably produced bias in particular directions. Examples are, giving a checklist of attributes of smokers rather than the students writing their own impressions and the closed question on preferences for the health education curriculum.

There was concern about the quality of data entry, since medical students were paid a fixed fee for the job, a clear incentive to complete the task as quickly as possible. But the double-entry system with checks seems to have produced high accuracy data entry.

3.14 ADDRESSING THE METHODOLOGICAL AND CONCEPTUAL ISSUES INHERENT IN ADOLESCENT HEALTH RESEARCH

Finally, the way in which the methodological and conceptual issues in adolescent health research (see Section 1.4) were considered in the process of this research is outlined.

Limitations on the use of routine data sources. Routine data sources were used for the mortality and morbidity data in Chapter Two. The source used, the Disease Sentinel Surveillance Points, are taken from an urban and rural site in Zhejiang and not from the areas studied. The cause-specific data is quoted for the 10 to 19 age group and is regarded by Chinese authorities as high quality. But the accuracy of death certificate diagnoses which provided the raw data is by no means certain, although this data is the best available.

Adolescents' involvement in the research process. Participatory approaches are considered vital to obtain an accurate picture of adolescent health.⁴¹ This was done as far as possible, given local political and cultural constraints. Adolescents were involved in the initial discussion groups, in piloting the questionnaire, in completion of the questionnaire, at feedback sessions, and most radically for China, as members of the Implementation Group (described in Chapter 9).

Adolescents should not be regarded as a homogeneous group. Because of the big changes which take place in terms of physical and psychosocial development during the adolescent years it is important to analyse by age and sex.⁵² All key analyses were carried out by age and sex as well as a range of socio-demographic variables.

Caution must be taken with interpretation when confining research to certain groups. This research was confined to school attendees. In the middle school age group, in Hangzhou, this is truly representative of the population as a whole except those severely disabled who are unable to attend mainstream school. In Xiaoshan and Chunan there are probably a small number not attending school, but even in Chunan, no more than 3%. For high school, however, the limitations of using the school population were recognised. In Chunan around 30% are not enrolled in high school. This was one of the reasons for only using middle school students for the second questionnaire, that is, they are regarded as representative of their age group.

The importance of the psychosocial environment must be considered. This is described in the background chapter on China (Chapter Two), the socio-demographic profile (Chapter Four) and in Chapter Eight on psychological morbidity.

Clustering of health problems should be examined. This is considered in a number of instances, for example, in the analysis of the relationship between risk behaviours, such as smoking and drinking, and the correlation between different parameters of psychological morbidity.

Western models should not be simply transferred to other countries. In developing the two survey tools questions from surveys used elsewhere were drawn-upon, but they were meticulously scrutinised and adapted for the Chinese setting. A number of new questions were also developed.

CHAPTER 4: THE SOCIO-DEMOGRAPHIC PROFILE

4.1 INTRODUCTION

This chapter presents the demographic and socio-economic profile of the two samples. To facilitate clarity the first stage sample is set-out in detail. The profile of the second stage sample is then described, and focuses particularly on the similarities and differences between the two samples. The discussion examines the degree to which the two samples mirror aspects of contemporary Chinese society. The final section shows how the demographic variables were adjusted for analysis purposes.

4.2 SOCIO-DEMOGRAPHIC PROFILE: STAGE 1 SAMPLE (Table 4.1)

4.2.1 Age and gender

The first stage was carried out in 72 classes in six middle and high schools in the three areas: urban Hangzhou, rich rural Xiaoshan and poor rural Chunan. The socio-demographic profile of the respondents is in Table 4.1. Because many of the classes had more than 50 pupils, 4286 questionnaires were returned. Eighty-nine were inadequately completed (more than 10% missing answers across key variables). There were therefore 4197 completed questionnaires, a response rate of 98% (99% in Hangzhou, 97% in Xiaoshan and 98% in Chunan). The age range of the sample was 12 to 21 years with a mean of 15.22 and a standard deviation of 1.69 years. The large number of 19-21 year olds in school (1.8% of the sample) is explained by repetition of years because of illness or failure. The mean ages were 15.17 (SD 1.54) for Hangzhou, 15.79 (SD 1.71) for Xiaoshan and 15.56 (SD 1.91) for Chunan ($P=0.008$). The larger and younger sample in Hangzhou is explained by the fact that class size in the Hangzhou middle schools was higher. The gender breakdown was 52.7% male and 47.3% female, with the differential in Chunan being greatest. Figures 4.1 and 4.2 show the sample by sex and age, and by sex and area. There are equal numbers of girls and boys in the middle school age groups, but in high school, the proportion of boys increases in the two rural areas, most markedly in Chunan. In Hangzhou equality is maintained.

Table 4.1 Demographic and socio-economic variables by area: Survey 1

	Total		Hangzhou		Xiaoshan		Chunan	
n(%)	4197		1577(37.6%)		1388(33.1)		1232(29.4)	
Male	2211 (52.6)		791 (50.1)		720 (52)		702 (57)	
Female	1985(47.2)		786 (49.8)		668(48)		530 (43)	
% One child family	56		90		55		8	
Age breakdown n (%)								
12	167 (3.9)		119 (7.6)		26 (1.9)		22 (1.8)	
13	452 (11)		193 (12)		144 (10)		115 (9.3)	
14	691 (16)		242 (15)		229 (16)		220 (18)	
15	774 (18)		276 (17)		251 (18)		247 (20)	
16	752 (17)		280 (18)		264 (19)		208 (17)	
17	650 (15)		257 (16)		205 (15)		188 (15)	
18	534 (13)		193 (12)		194 (14)		147 (12)	
19	161 (3.8)		12 (0.8)		73 (5.3)		76 (6.2)	
20	10 (2.4)		0		9 (0.7)		1 (0.1)	
Mean Age (SD)	15.46 (1.69)		15.17(1.54)		15.79(1.71)		15.56(1.91)	
Parents' occupation %	Father	Mother	Father	Mother	Father	Mother	Father	Mother
Professional	10	5.3	16	10	9.6	3.5	4.3	1.1
Managerial	11	3.9	17	7.2	9.1	2.7	6.6	1.1
Office Worker	6.3	5.0	10	9.6	6.2	2.7	2.3	1.8
Self-employed	8.3	8.6	13	15	7.9	7.2	3.0	2.6
Service	4.1	10	6.8	19	2.0	6.2	2.3	2.1
Factory worker	20	21	27	29	23	27	6.4	3.7
Farmer	25	28	0.6	0.4	21	23	61	70
Unclassified	13	17	8.3	7.9	13	26	13	16
Army	0.8	0.1	1.0	0.2	0.8	0.2	0.7	0
Parents' education %	Father	Mother	Father	Mother	Father	Mother	Father	Mother
Illiterate	7.4	28	0.7	1.3	13	43	9.7	45
Primary School	29	26	6.6	7.0	50	43	35	31
Middle School	40	30	51	56	29	11	37	17
High School	17	14	27	30	5.8	2.8	16	6.0
Tertiary education	6.7	2.6	14	5.7	1.6	0.6	2.8	0.9
Household composition: % children living with:								
Natural parents + siblings only	77		75		80		77	
Parents and other relatives	15		12		14		17	
One parent/relatives: Parents working away	2.2		1.5		1.9		3.4	
One parent/relatives: Parents divorced	2.4		6.0		1.2		0.08	
One parent/relatives: death of parent(s)	1.9		1.8		1.4		2.5	

Note: not all columns add up to 100% because of missing data

Figure 4.1 Sample by age and sex: Survey 1

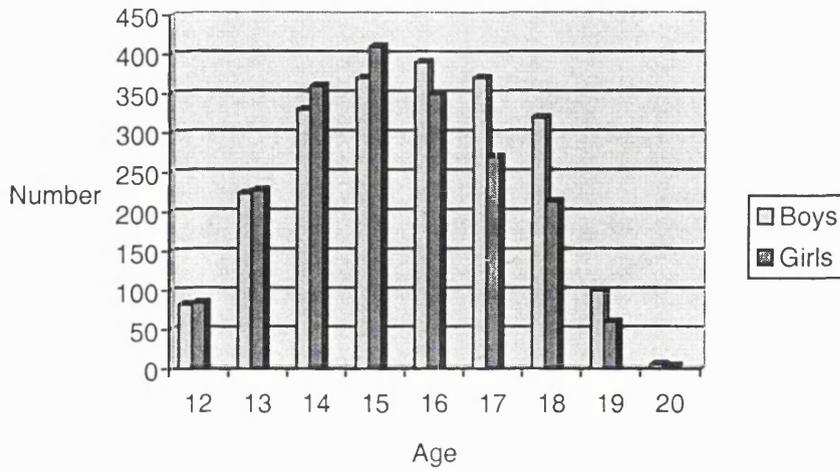
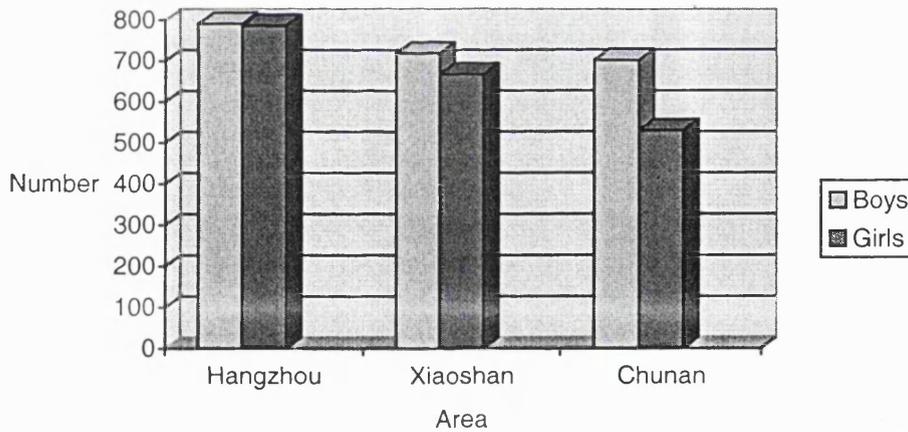


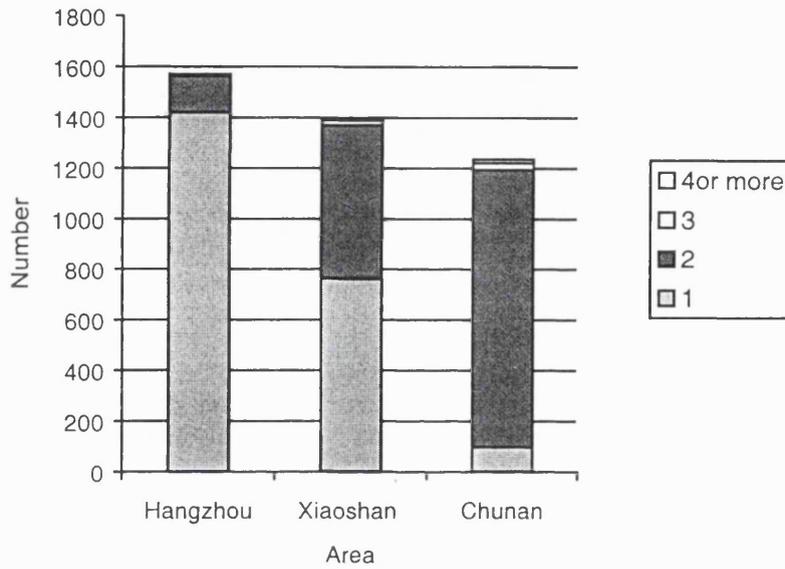
Figure 4.2 Sample by sex and area: Survey 1



4.2.2 Family Size

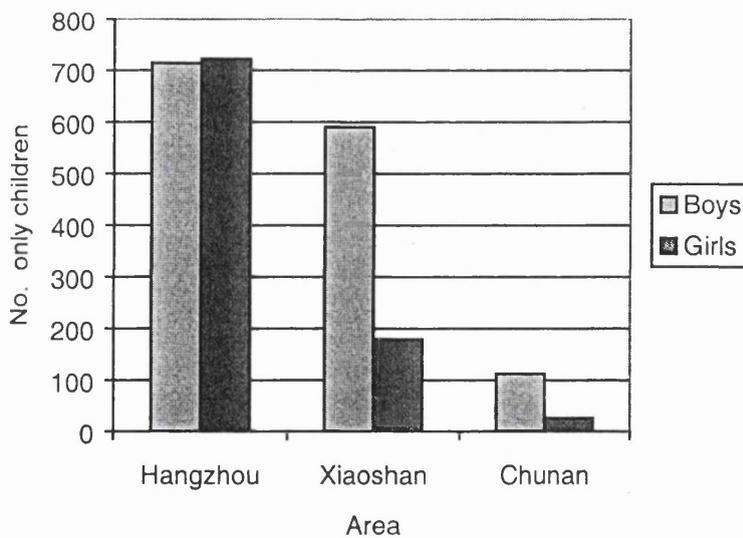
Fifty-six percent of the whole sample were only children. But there were huge differences across the three areas: in Hangzhou 90% were only children, in Xiaoshan 55% and in Chunan only 8%. In Chunan 6% of families had three or more children and there was one family here with seven children. (Fig 4.3).

Figure 4.3 No of children in family by area



In Hangzhou almost equal numbers of girls and boys were from one child families. (49.7% and 50.3% respectively). In sharp contrast in Xiaoshan and Chunan many more boys were only children: 77% in Xiaoshan and 81% in Chunan. These gender differences are shown in Figure 4.4

Figure 4.4 Number of only children by sex and area



4.2.3 Socio-economic background

Fathers are generally better educated than mothers. Fathers are nearly three times as likely to have completed a tertiary education (6.7% compared with 2.6%) and mothers are nearly four times as likely to be illiterate: 28% vs 7.4% (figs 4.5 and 4.6) There are marked urban/rural differences in literacy rates with particularly low rates in rural women. In Hangzhou 97% of mothers were literate, compared with 60% and 58% respectively in Xiaoshan and Chunan. In fathers the urban/rural literacy divide is much narrower with literacy rates of 98%, 84% and 90% in Hangzhou, Xiaoshan and Chunan respectively.

Education levels overall are highest in Hangzhou and lowest in Xiaoshan. Nearly 80% of both fathers and mothers with a tertiary education live in Hangzhou. In Xiaoshan fathers are more likely to be illiterate than in Chunan (13% vs 9.7%) and are less likely to have a high school or tertiary education (7.4% vs 19%). Although illiteracy is slightly higher in Chunan mothers (45% vs 43%) they are otherwise better educated than Xiaoshan ones, for example, twice as many Chunan mothers had high school or tertiary education (7% vs 3.4%).

Figure 4.5 Education of father by area: Sample 1

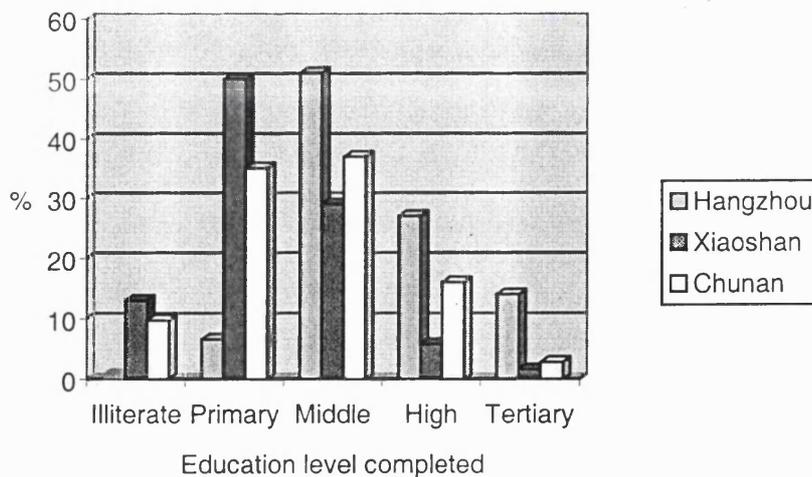
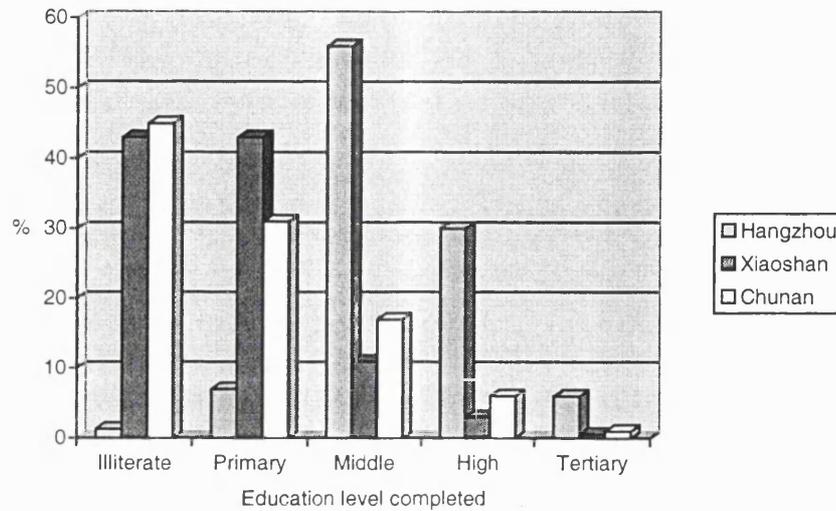


Figure 4.6 Education of mother by area: Sample 1



Breakdown of parental occupation is given according to the Chinese census classification.¹²⁸ Table 4.1 shows occupation of parents by area.

More fathers hold professional or managerial posts (21%), but mothers are still well represented in these kinds of jobs (9.2%). Women are more likely to take up traditional roles such as in service occupations. In Hangzhou service accounts for 19% of all the female employment. Equal numbers of men and women are self-employed. There is a large number (15% overall) of “unclassifieds”, a group which consists partly of unemployed. There is no separate classification of unemployed since until recently unemployment was virtually non-existent. In Chunan occupations are still traditionally rural with 70% of the mothers and 61% of the fathers described as farmers. In Xiaoshan more people work in factories (25%) than on the land (22%) reflecting the way in which rural manufacturing enterprises have come to dominate the Xiaoshan economy, replacing traditional agricultural activities.

4.2.4 Household composition

A very high proportion (92%) live with both natural parents, including 15% who live also with other family members, most commonly grandparents. The number who are affected by parental divorce is low at 2.4%. However, nearly all (92) of the divorces are in Hangzhou, with 10 in Chunan and only one in Xiaoshan. Almost as many live apart from one or both parents because they are working elsewhere (2.2%) or because of the death of a parent (1.9%).

4.3 SOCIO-DEMOGRAPHIC PROFILE STAGE 2 (Table 4.2)

The second stage was carried-out in 36 classes in six middle schools in Hangzhou and Chunan only. The results are in Table 4.2. Of the total 1595 questionnaires returned 1576 were adequately completed and could be linked to anthropometry and haemoglobin measurements, a response rate of 97% (98% in Hangzhou and 96% in Chunan). The age range was 12 to 17 years with a mean of 13.87(SD 1.12), with no significant difference in the mean between the two areas 13.97(SD 1.29) in Hangzhou and Chunan 13.75(SD1.01) There were slightly more girls, 51.1% girls and 48.9% boys, in contrast to Sample 1.

The socio-economic breakdown differed in some respects from the first sample. Parental education levels were consistently higher in the second survey than the first. For example, 16% of the mothers in the second survey were illiterate compared with 28% in the first, and 30% of Hangzhou fathers had completed tertiary education in the second survey, compared with 14% in the first. This education difference was reflected in occupation: more students in the second sample classified their parents as professional or managerial in both Hangzhou and Chunan.

In the second survey there were more children from one-child families with three times more in Chunan: 8% in Survey 1 and 26% in Survey 2. But the marked gender difference in only children in Chunan noted in the first survey was retained in the second. Of the only children in Chunan 83% are boys compared with 48% in Hangzhou.

The breakdown of household composition was remarkably similar in both surveys, the exception being that in Chunan there were more children with divorced parents who in the second survey, 3.3%, compared to 0.08% in the first.

Table 4. 2. Demographic and socio-economic variables by area: Survey 2

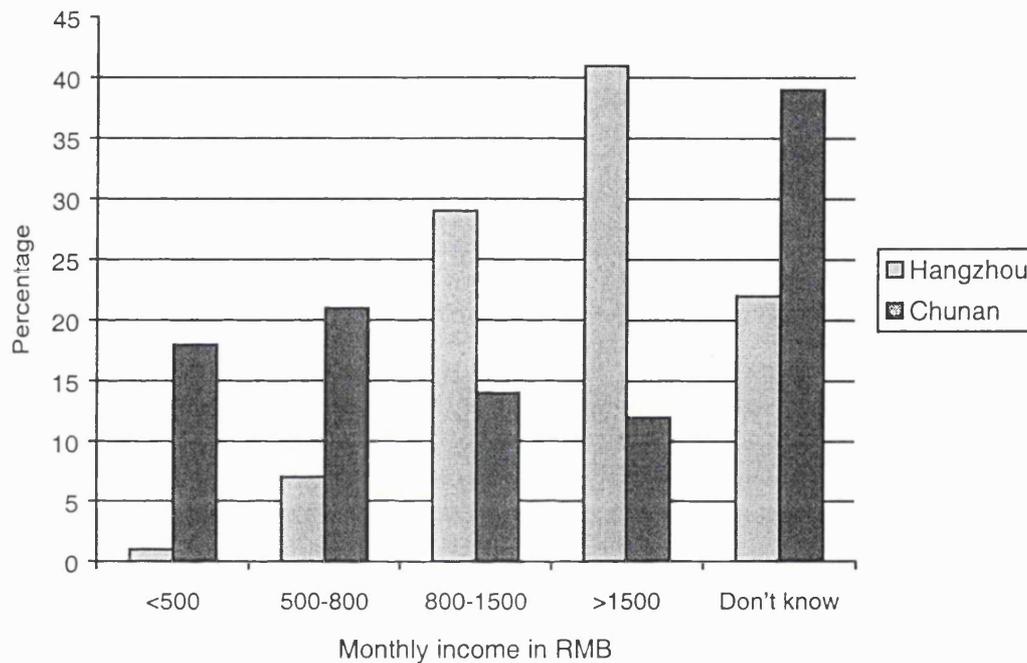
	Total		Hangzhou		Chunan	
n (%)	1577		784(49.7)		792(50.3)	
Male	770(48.8)		369 (47.1)		401(50.6)	
Female	806 (51.1)		415 (52.9)		391(49.3)	
% One child family	60		93		26	
Age breakdown n (%)						
12	27 (1.7)		1 (0.1)		26 (3.3)	
13	407(26)		196 (25)		211 (27)	
14	400(25)		186 (24)		214 (27)	
15	490 (31)		258 (33)		232 (29)	
16	245(15)		143 (18)		102 (13)	
17	7 (0.4)		0		7 (0.8)	
Mean Age (SD)	14.13 (1.39)		14.24 (1.24)		13.94 (1.71)	
Parent's occupation %						
	Father	Mother	Father	Mother	Father	Mother
Professional	13	9.2	17	15	7.8	3.4
Managerial	15	8.2	24	14	7.7	2.3
Office Worker	7.5	7.3	11	13	4.2	1.5
Self-employed	9.0	10	14	15	3.8	5.1
Service	5.5	8.5	8	16	2.8	1.1
Factory worker	6.7	8.5	9.8	14	3.5	2.5
Farmer	31	33	0.4	0.3	61	67
Unclassified	10	12	11	15	9.3	13
Army	0.3	0	0.5	0	0.1	0
Parents' education %						
	Father	Mother	Father	Mother	Father	Mother
Illiterate	4.5	16	1.5	2.2	7.4	30
Primary School	15	16	4.7	5.5	25	27
Middle School	33	29	31	36	34	22
High School	26	22	27	33	24	11
Tertiary education	17	8.8	30	17	3.2	0.4
Household Composition %, child living with:						
Natural parents + siblings only	76		77		75	
Parents and other relatives	10.4		10.3		10.5	
One parent/relatives:parents work away	5.3		3.6		7.1	
One parent/relatives:parents divorced	5.3		7.3		3.3	
One parent/relatives:death of parent(s)	2.3		2.2		2.4	
Household income %						
<500 RMB	9.1		0.9		18	
500-800	14		6.9		21	
800-1500	19		28		14	
>1500	23		41		12	
Don't know	33		22		38	

NB Not all columns add up to 100% because of missing data and "Don't knows"

The second survey included data on household income. One third of the respondents were unable to estimate the household income, 38% in Chunan and 22% in Hangzhou. But the limited data available does show that there are big differences in household income in the two areas, with 18% in Chunan and 0.9% in Hangzhou having household incomes of less than 500 RMB (US\$63) per month and, at the other extreme, 42% of Hangzhouese having incomes of over 1500RMB (\$US188) per month compared with just 12% in Chunan. To put this into perspective the minimum guaranteed per capita income, below

which one is entitled to State Benefit has just been fixed at 215 RMB (US\$27) per month for Hangzhou.⁸⁸ Respondents were also asked who was the major breadwinner in the family: 74% said both parents, 13% said father and 4% mother, with the remainder “don’t knows”.

Figure 4.7 Monthly household income by area



4. 4 DISCUSSION

There are obvious limitations in the accuracy of some of these variables: adolescents may not be certain of their parents’ educational background and the classification of parental occupation into one of the listed categories may be difficult in some cases. Because the demographic variables would be widely used in the analysis it was important to take measures to try to maximise their accuracy. The researchers who administered the questionnaires explained the education and occupation variables in detail. Literacy was clearly defined as being able to read the local newspaper and write a letter to a relative. Writing is far more difficult than reading in Chinese, and so the distinction is important. A large number of queries from the respondents about occupational classification in particular were handled by the researchers in the classroom, but the relatively large number of “unclassifieds” probably reflects the difficulty of fitting unusual occupations into the proscribed categories and the increasing numbers of unemployed. Unlike in many other

countries salaries and income are very openly discussed and members of the leading group felt that most adolescents would know the approximate income of their household, a question which was added to the second questionnaire.

Apart from providing important demographic and socioeconomic indicators for the analysis of the health and lifestyle variables, this data has intrinsic value, in presenting a snapshot of contemporary Chinese society in three distinct areas, during a period of rapid change.

Firstly, there are gender differences in school attendance across the three areas. In Chunan, up to and including the age of 15, there is only a slight preponderance of boys 50.8% compared with 49.2%. But the number of older girls in Chunan is significantly lower, reflecting earlier school leaving by girls in poor rural areas after compulsory schooling officially ends at age sixteen. In Hangzhou there are no differences in gender throughout the age groups suggesting that gender equality in educational opportunity is perhaps the norm now in urban China. In Xiaoshan, where the educational background of parents is lower, the school attendance gender patterns are similar to those in Hangzhou, reflecting the importance that parents in these rapidly developing areas now place on education.⁹³ Such urban/rural differences reflect the picture across China.¹²¹

The gender and geographical differences in educational level illustrate well the improvements in educational attainment, which have taken place between these two generations of parents and their children. For example, the two surveys show overall literacy rates of 60% for rural mothers. The estimated literacy rate for rural Zhejiang women aged 15-30 is now 95% up from an estimated 20% in 1950,⁷⁹ showing huge progress in education in one generation.

Occupational classification shows important differences across the three areas, which reflect their respective economies. Traditional farming predominates in Chunan where nearly two-thirds of the parents are still farmers. However, Xiaoshan, like many rural counties of Eastern China, has become a booming manufacturing area and many farmers have left the land to work in the new manufacturing industries. The new economy has also spawned many small businesses shown by the large number of self-employed or *ge ti hu*, who account for 9% of these parents. Such self-employment was virtually non-existent less

than 20 years ago. Likewise, the large number of women in the service sector in Hangzhou reflects rapid recent change in that city, where the retail and tourism sectors are booming.

The difference in prevalence of one child families in the three areas reflects norms for Zhejiang Province. These children were born at the very height of the One Child Family Policy at the time when it was being implemented most aggressively. The fact that the policy is implemented differently in urban and rural areas, and often at the whim of local officials, is well-illustrated by this data. Although in cities like Hangzhou, the policy is strictly applied, the two child family with a five year gap is the norm in rural areas in eastern China.¹⁰⁸ The 10% of families with more than one child in Hangzhou are mostly families who have migrated from rural areas. There is also a big difference between the proportion of one child families in Chunan between Stage 1 and Stage 2 (8% and 26%) respectively. This could be explained by chance alone, but may also be because the two cohorts are an average of three years apart by chronological age and the Policy in Zhejiang was in fact tightened between the early and mid-1980s to restrict more rural couples to one child only. The practice of only allowing a second child when the first is a girl is clearly demonstrated by the preponderance of only boys in the two rural areas.

Household composition also reflects changing contemporary society. The nuclear family is by far the most prevalent household type (77%) with relatively few extended family households (15%). Married couples are now more likely to be able to afford their own home and the three generation household is becoming less common.⁸⁷ The low number of divorced parents in rural areas demonstrates the persistence of traditional patterns, but the larger number in Hangzhou reflects many societal changes, in terms of expectations of marriage, women's improved status, and individual financial independence.¹⁰⁶ Separation from one or both parents, because they are working away, is more common than divorce in the rural areas, especially in Chunan. These workers, who flock to the eastern boom cities, are part of the huge new migratory workforce, which has grown as restrictions on travel and work permits have gradually been lifted in the last decade.

Data on household income was limited to the second survey and was only available for two-thirds of the respondents. However, the data illustrate the stark contrast between urban and rural incomes and the importance of the incomes of both father and mother to the family, with three-quarters stating that both parents were the "breadwinners".

4.5 ORGANISATION OF SOCIO-DEMOGRAPHIC VARIABLES FOR ANALYSIS

Although composite measures of socio-economic status have been widely-used, current recommendations specify the use of multiple indicators of social class rather than composite indicators.^{145,146} The fluidity of contemporary Chinese society makes socio-economic classification difficult. Peasants who run small businesses may earn several times more than respected professionals and leaders, and they may have similar interests and aspirations, especially in terms of education for their children. Therefore there is no standard socio-economic classification. Rather it is carried-out in a number of ways depending on the context: by area of residence (with urban, divided into large, medium and small cities and rural divided into rich, middle and poor), by occupation or educational level. No method has been developed which combines these elements into one measure as has been attempted elsewhere.¹⁴⁶

In determining how best to organise this data there was an initial attempt to develop an aggregate socio-economic status indicator, derived from parental occupation and education and area of residence. The occupational and educational variables were grouped and weighted to create six socio-economic groupings. It was complicated by the imperative of using both parents' indicators (not just head of household) which led to regression to the mean. This led to very narrow band widths for the different classes developed, with resulting poor validity. To validate the measure formally would have necessitated a separate research project. Furthermore, in using it for this research, comparison with data from other researchers would have been limited.

So for the purposes of analysis the variables were adjusted as follows:

- Age was adjusted both as a continuous variable and a dichotomous variable, where appropriate: aged 14 and younger and aged 15 or older
- Parental education was dichotomised into low (illiterate or completion of primary education) and high (completion of middle school or higher)
- Occupational groupings were developed:
 1. Skilled: professional and managerial
 2. Semi-skilled: office-worker and self-employed
 3. Unskilled: factory workers, service workers, unclassified
 4. Farmers

- Household income was dichotomised into low income <800 RMB/month and middle/high income more than 800 RMB per month

4.6 SUMMARY

The demographic and socio-economic data present a picture of changing society in urban and rural areas of Eastern China. An attempt to develop a measure of socio-economic status for use in analysing this research and for possible replication by others failed.

CHAPTER 5:

HEALTH AND HEALTH CARE SEEKING BEHAVIOUR

5.1 INTRODUCTION

This chapter focuses on patterns of morbidity, health concerns and health care seeking behaviour in the three areas, and examines the relationship between socio-economic status and ill health in this age group. It also presents the preferences of young people for changes in their services and for the health education curriculum.

5.2 BACKGROUND

In the developed world the last two decades have seen an increasing number of studies into the health and health needs of adolescents, as their need for specific services has been recognised.¹⁴⁷ Now there is also a small but growing body of research, which solicits information from the adolescents themselves.¹⁴⁸ This includes some studies on patterns of uptake of care, barriers to service utilisation and preferences for services. Although the overwhelming majority of the research comes from Western countries, particularly North America,¹⁴⁹ it has provided useful pointers for research in developing countries, where the literature in this area remains sparse. This recent literature embraces a number of themes, which can be explored in the Chinese context.

Firstly, there has been a realisation that risk behaviours have had inappropriate prominence in the adolescent health literature. There has been a tendency for researchers in adolescent health to focus on risk behaviours, and their effects on adolescent health, rather than immediate health concerns. This perhaps relates to the fact that the sensational nature of such findings gains an easy readership.¹⁵⁰ In the public (and even professional) perception these risk behaviours have tended to become generalised to all young people.²⁰ But now this balance is starting to be redressed as research on adolescent health is carried-out from a broader perspective. These studies have shown unequivocally that risk behaviours in most societies are practised by a small minority. Most young people don't acquire sexually transmitted diseases, get pregnant, abuse alcohol and illicit drugs or get involved in interpersonal violence.²⁰ While young people are aware of these problems, they are generally far less pressing than the more commonplace issues of relationships with friends and parents, personal appearance and academic stress.⁴⁸

Secondly, although most young people perceive themselves as healthy, most have considerable concerns about their health, and these tend to be underestimated by adults.¹⁵¹ The health problems perceived by young people not surprisingly, differ substantially from what might be expected from mortality and morbidity data in adolescents. The most commonly cited health concerns from a range of studies in school-attending adolescents from North America and Europe included stress, depression, acne and overweight.^{42,43,47} In some of these studies sexual health concerns, for example worries about contraception and sexually transmitted disease, were cited in older adolescents, but were not regarded as a major concern.

Thirdly, health concerns overlap with general concerns in adolescents perhaps more than in any other age group. When young people are asked in the context of a health questionnaire about their worries and concerns a range of responses emerge, from school-related stress to personal relationships, to worries about appearance. The importance of these non-medical causes of ill health has been recognised in two influential American studies. The Child Health and Illness Profile was developed at Johns Hopkins University to assess the health status of US 11-17 year olds for epidemiological surveys.⁴⁹ Apart from acute symptoms it includes items such as school achievement, peer relationships and family relationships. Likewise the US National Longitudinal study on Adolescent Health identified school context and family context as the most important predictors of adolescent health and risk behaviours.¹⁵²

Finally, the evidence for a relationship between poverty and ill-health, which is now unquestioned for most age groups, is equivocal for adolescents within developed country populations.^{153,154} In adults and young children a number of studies have shown that those in higher socio-economic groups not only use disproportionately more health services than lower classes, after accounting for variations in morbidity, but that their health outcomes are better.^{155,156} This is particularly marked in countries operating a fee-for-service system.¹⁵⁷ Two studies which were designed specifically to examine the relationship between socio-economic status and adolescent health and service uptake produced mixed evidence. A US study measured adolescent health by five parameters: rates of depression and obesity showed a gradient from high to low socio-economic status, whereas no relationship with socio-economic status was found for asthma, sexually transmitted

disease, and suicide.¹⁴⁵ A UK study examined the uptake of services by young people according to socio-economic status. It found no evidence that up-take of a range of health services by young people varied according to social class.¹⁵⁸

There is very little published literature in this area for China, and there is virtually nothing on health care seeking behaviour. This component of the research was therefore carried-out as an initial foray into this subject, but with a view to informing service developments. The data collected was also used to explore the relationship between socio-economic status and ill-health in this population. The data for this component was all drawn from the first survey. The socio-demographic breakdown of the 4197 respondents is in Table 4.1.

5.3 HEALTH AND HEALTH CONCERNS

5.3.1 Morbidity

Respondents were asked about conditions that had been suffered in the last year by completing a checklist of conditions and symptoms. *“In the past year have you suffered from any of the following?”* Major and minor conditions were included. Table 5.1 shows the results by gender and area.

Table 5.1:
Morbidity in the past year by sex and area: % affirmative responses for each condition

	All	Male	Female	Hangzhou	Xiaoshan	Chunan
Colds/flu	85	82	88*	85	84	85
Headache	42	36	49*	33	42	54*
Diarrhoea	35	34	36	33	32	40*
Acne	30	35	25*	29	32	29
Abdominal pain	21	17	24*	21	22	19
Toothache	25	22	28*	25	22	27*
Menstrual problems	24	NA	24	22	24	25
Anaemia	20	16	25*	17	21	25*
Tonsillitis	19	18	21	35	14	5.2*
Asthma	5.5	6	4.8	7.6	3.1	5.2
Nocturnal cough	12	12	12	18	11	9*
Insomnia	12	11	13	6.5	12	19*
Hepatitis	2.7	2.9	2.4	2.3	2.7	3.0
Diabetes	0.6	0.4	0.9	0.7	0.5	0.5
Heart disease	1.8	1.8	1.7	1.5	1.9	1.2
Cancer	1.1	1.0	1.2	1.2	1.0	1.5
Epilepsy	0.4	0.2	0.6	0.3	0.1	0.5

*p<0.001

Colds and flu were by far the most commonly reported condition (85%), with no difference across the three areas. (The two conditions are grouped together because the Chinese word *gan mao* doesn't clearly distinguish them.) This was followed by headaches (42%) which were significantly more common in girls and in the rural areas, and then by diarrhoea (35%) which was more common in Chunan. Acne was also a common problem, reported by significantly more boys. Around one fifth reported abdominal pain and a quarter toothache. One quarter of the girls reported menstrual problems, corresponding to 40% of those who had actually started menstruating, though the type of problem was not specified. Anaemia was reported by 20% with significantly more in girls and in the two rural areas. However, it was not clear whether this was based on actual haemoglobin measurements. A surprisingly high proportion reported tonsillitis with seven times more in Hangzhou than Chunan, the most dramatic difference across all the conditions. This is almost certainly the result of overenthusiastic diagnosis of simple sore throats in order to justify antibiotics in a population who can afford it. Hepatitis is relatively common, at 2.7%, though no distinction has been made between acute and chronic. Around 7% of Zhejiang adults are Hepatitis B Surface Antigen positive which is mostly acquired vertically.¹⁵⁹ Asthma was reported significantly more in Hangzhou, as was nocturnal cough, which is often regarded as suggestive of asthma. The chronic conditions, diabetes, heart disease, cancer and epilepsy all had reported rates within the range that would be expected for this age group.

Overall girls note more minor illness than boys, for colds and flu, headache, diarrhoea, toothache and abdominal pain. The only minor condition reported more commonly by boys was acne. In terms of area schoolchildren in Chunan reported the most minor illness, especially headache, diarrhoea, anaemia, skin problems and insomnia.

Cross-tabulations for other demographic and socio-economic variables produced few significant differences for any of the conditions by age, self-reported academic performance or parental education and occupation. Where differences existed confidence intervals for the odds ratios approximated to unity and therefore the effects were very small. For those conditions with significant urban/rural differences (anaemia, headache, tonsillitis and insomnia) logistic regression analysis was carried-out to determine whether the urban/rural differences were confounded by other socio-economic factors. For headache and anaemia rural residence and gender remained the most important predictors after controlling for age, parental education and parental occupation. Headache was nearly

twice as common in girls OR 1.74 (1.53-1.97) and one and a half times as common in rural areas OR 1.56 (1.46-1.7) after adjustment for the other socio-demographic variables. For anaemia female sex was more influential 1.77(1.52-2.07) than rural residence 1.31 (1.19-1.43). The only significant factor for insomnia was rural residence OR 1.47 (1.25-1.71). Tonsillitis remained much more common in Hangzhou than in the rural areas OR 4.2 (3.45-7.76) after controlling for the other variables.

5.3.2 Disability

There was a separate question on disability. Thirty-three (0.8%) claimed to have a congenital disability and 20(0.5%) an acquired disability. Although asked to do so, only ten respondents actually stated what their disability was. Three had epilepsy, two had congenital heart defects, two were hearing impaired, two had minor limb abnormalities and one had had a cleft lip and palate. This total of 1.3% corresponds with the figures for disabled children in mainstream education (around 1-1.5%) estimated by Zhejiang Education Committee. There were no significant differences across gender or area.

5.3.3 Psychological morbidity

In the first questionnaire just three questions were asked to gain a crude assessment of mental well-being. They are included here to provide some comparison with the other types of morbidity, though this whole area is covered in detail in Chapter 8.

Table 5.2 Psychological morbidity: percentage affirmative responses

	Total	Male	Female	P-value	Hang-zhou	Xiao-shan	Chunan	P-value
Do you frequently get anxious?	64	63	64	0.08	50	66	79	<0.001
Do you frequently get depressed?	50	48	53	<0.001	38	48	68	<0.001
Do you worry a lot about the future?	53	54	53	0.6	41	59	63	<0.001

Psychological morbidity from these questions is high across both sexes and all areas. The rates outstrip all other types of morbidity except common cold. Furthermore rates of all three parameters show a marked gradient across the three areas from urban, rich rural to poor rural. Rates of depression and anxiety were particularly high in Chunan. The only gender significant difference was in depression and the difference here is small.

5.3.4 Worries and concerns

Worries and concerns were elicited through an open question which was coded by the categories below, as listed by sex and area in Table 7.3. Students could record as many concerns as they liked. The top eight responses are shown. All other responses were cited by less than 2% of the total.

Table 5.3 Major worries and concerns by percentage of respondents (n=4180)

	Total	Male	Female	Hangzhou	Xiaoshan	Chunan
School record/ performance	66	68	63	65	64	67
Chronic fatigue	55	52	59	50	57	59
Too much homework	45	45	45	42	43	52
Future employment	23	30	16*	30	21	18*
Family financial problems	15	15	15	5.7	9.7	33*
Unpopularity/peer relationships	13	16	11	13	12	13
Appearance, including weight	11	11	11	11	12	12
Relationships with parents	8	9	7	8.2	6.3	8.8

*P<0.001

The top four worries and concerns reported related to education: school performance, chronic fatigue, too much homework and worries about getting a job in the future. Fatigue is of course a common psychosomatic complaint and may well indicate depression.¹⁶⁰ Traditional adolescent concerns of relationships and appearance were reported by few students. Sexual worries were mentioned by just six students (0.14%). Gender differences were generally small except in relation to worries about future employment, which were stated twice as often by boys as girls. Responses were also markedly consistent across the three areas: the major differences were worries about the family's financial situation, which was far more common in Chunan, and concern about future employment which was most common in Hangzhou.

5.4 HEALTH CARE SEEKING BEHAVIOUR

These questions aimed to explore utilisation of health facilities, and aspects of self-treatment. Throughout this section the n values vary substantially because of large differences in numbers of responses. The timing of the last visit to a health facility or a dentist is given in Table 5.4 and the reason for the visit to the health facility in 5.5

Table 5.4 Last visits to a doctor/health facility or a dentist (%)

	All	Male	Female	Hangzhou	Xiaoshan	Chunan
Last visit to a doctor health facility (n=4190)						
Within past 6 months	22	20	23	30	11	25
6 months to 1 year ago	31	26	36	35	26	30
1-2 years ago	20	24	15	15	27	18
>2 years ago	18	16	19	15	20	19
Don't know	9	12	7	5	16	7
Last visit to a dentist (n=4188)						
Within past 6 months	14	9	18	20	12	9
6 months to 1 year ago	8	7	8	10	6	8
1-2 years ago	9	10	9	18	8	4
> 2 years ago	7	5	10	7	6	7
Never	50	49	51	27	53	70
Don't know	12	20	5	18	16	2

Fifty-three per cent have visited a health facility in the last year, significantly more girls than boys ($P<0.001$) and significantly more in Hangzhou than in Xiaoshan or Chunan ($P<0.001$). Given that levels of morbidity appear to be (albeit crudely) similar across the three areas, crude comparison probably has some validity without weighting for illness severity.

Attendance at a health facility was dichotomised into categories of attendance/non-attendance within the past year. Xiaoshan and Chunan were grouped together as rural. Logistic regression analysis showed that Hangzhouese were more likely to have attended a health facility in the last year, OR 1.41(1.21,1.63) after controlling for parental education and occupation.

In contrast with the high frequency of attendance at health facilities, there is very poor uptake of dental services with half of the respondents saying they had never been to a dentist and only 22% having been in the past year. But there are big differences across areas: 27% have never been to a dentist in Hangzhou, while in Xiaoshan the proportion is nearly double and in Chunan nearly triple. In Xiaoshan and Chunan only 18% and 17% respectively had been to a dentist in the past year.

For further analysis results were dichotomised into never/ever having seen a dentist. After adjusting for parental occupation, and sex, those whose parents had a better education were more likely to have attended a dentist. OR 1.53 (1.26,1.73) for father and OR 1.57 (1.32,1.88) for the mother. But area of residence was still the most important factor with

Hangzhounese students more than twice as likely to have been to a dentist than students from Xiaoshan or Chunan. OR 2.1(1.8,2.4) after controlling for the other socio-demographic variables (parental education, parental occupation and one child family).

Utilisation of health facilities is high even for minor illness. Respondents were asked what was the reason for their last attendance at a health facility. The majority of attendances (61%) were for cold-type symptoms, followed by skin problems with 20%. Accidents accounted for 15%, although the severity of the accidents is not clear, and therefore the appropriateness of the use of health facilities impossible to assess. Of particular note is the small proportion attending for psychological problems, only 0.5% or 15 in total, despite the high psychological morbidity acknowledged by these adolescents.

The types of treatment used for the last illness, the type of health facility used, the source of funding of payment for the care are all shown in Table 5.5.

Table 5.5 Type of treatment for last illness (%)

	Total	Male	Female	P-value	Hang-Zhou	Xiao-Shan	Chun-an	P-value
Type of treatment used for last illness (n=2850)								
Health facility	63	59	66	<0.001	70	64	55	<0.001
Drugs from pharmacy	15	16	13	0.06	18	18	9	<0.001
Drugs in stock at home	13	10	15	0.04	6	10	12	<0.001
Nothing	9	15	6	<0.001	6	8	24	<0.001
Type of health facility used for last illness (n=1960)								
Local/village clinic	30	29	31	0.2	5.7	41	45	<0.001
Township hospital	27	29	26	0.09	3.7	47	32	<0.001
County/city hospital	21	19	23	0.05	46	11	5.1	<0.001
Provincial hospital	14	17	11	0.001	43	0.2	0.02	<0.001
School clinic	7	7	7	0.9	2.8	0.07	19	<0.001
Who paid for the care in the health facility? (n=1890)								
Self/parents	70	69	71	0.2	37	86	91	<0.001
Half self	12	14	10	0.05	6	18	12	<0.001
State	6.6	5.1	7.5	0.3	12	3	4	<0.001
Insurance	4.1	4.4	3.9	0.3	7	4	1	<0.001
Employer re-imburement	3.7	3.7	3.7	0.9	7	2	6	0.02
CMS	1.3	1.8	0.9	0.05	14	1.2	1	<0.001
Time off school for illness in the last year (n=3665)								
No time off school	83	85	81	0.01	86	82	82	0.8
1 day	9	8	10	0.05	7	8	9	0.7
2 days to 1 week	4	3	5	0.08	5	6	2	0.001
1 week to 1 month	1.2	1.4	0.9	0.09	0.5	2	1.2	0.06
1 month to 3 months	1.4	1.6	1.1	0.6	1.8	1.1	1.2	0.6
3 months to 1 year	1.3	1.6	0.9	0.03	1.3	0	1.3	
Over 1 year	0.2	0.3	0		0.3	0	0	

Sixty-three percent attended some kind of health facility for their last illness, significantly more girls and significantly more in Hangzhou than Xiaoshan or Chunan. Self-medication through buying drugs at a pharmacy or using drugs in stock at home was the choice of 28%. Hangzhounese were least likely to use drugs stored at home. Only 9% had done nothing, but over twice as many boys as girls and four times as many from Chunan as from Hangzhou.

A note about the particular relevance of the type of provider used in the Chinese context is necessary here. There is no gatekeeper function incorporated into the Chinese system, so services can be accessed at any level even for trivial conditions. Inappropriate self-referral to provincial level services for minor illness is a particular problem in babies and young children and provincial levels children's hospitals are swamped with out-patients. The purpose of this question in the survey is to determine whether the same is true for adolescents. It seems not to be the case. In this population of young people the majority present at lower level facilities. In Xiaoshan and Chunan the majority attend the village clinic or the township hospital, 84% and 76% respectively, and only a small proportion attend county level or provincial facilities. This implies appropriate utilisation for minor illness. The proportion in Hangzhou going to provincial facilities is higher, because these facilities also serve as primary care providers for the local urban population. It is notable that there is a sharp contrast between the areas in the use of school clinics. They are relatively frequently-used in Chunan (19%), but barely used at all in Xiaoshan (0.08).

Respondents were also asked who accompanied them to the health facility. Eighty-five percent went with a parent, 10% with another relative, 2% with a friend, 2% alone (all of these were 17 and 18-year olds) and 1% with a teacher or school nurse.

The way in which health services are paid-for or reimbursed is shown in Table 5.5. As was explained in Chapter Two pre-payment schemes for children are limited because very few workplace health insurance schemes cover dependents. This is well-illustrated by this data: a high proportion (70%) of these adolescents, pay the full costs of their healthcare out-of-pocket. This proportion increases in the rural areas: 86% in Xiaoshan and 91% in Chunan, where the CMS operates in a just five (out of 245) villages and very few farmers have any health insurance. In Hangzhou a few are covered by some kind of insurance, either through the State Insurance scheme for government employees, through private insurance,

or through work unit insurance. Some schemes pay a proportion of the costs, typically 50%, explaining the “half-self” category in the Table. Respondents were further asked to estimate the cost of the treatment for their last illness (Table 5.6) and whether this was hard to afford.

Table 5.6 Cost of last treatment at a health facility (n=1073)

Cost in RMB	n	%
<50	410	38
51-100	302	28
101-500	292	27
501-1000	25	2.3
1001-5000	31	2.8
>5000	13	1.2

US\$1 = 8RMB

Given that the majority of illnesses are minor and self-limiting, the costs of treatment are high with 27% paying between 100 and 500RMB. This compares with an average monthly per capita disposable income of 700 RMB in Hangzhou, 550 RMB in Xiaoshan and 260 RMB in Chunan. It is therefore not surprising that 42% of the Chunan students said that the treatment was hard to afford, compared with 11% of the Hangzhounese and 13% of those from Xiaoshan.

Despite the readiness to attend health facilities for illness these young people are disinclined to take time off school, and those that do, usually take just one day. (Table 5.5) Only 17% reported having time off school because of illness in the past year with 9% having taken off just one day. Hangzhounese were over twice as likely to have taken time off school because of illness than schoolchildren from either Xiaoshan or Chunan. At the other extreme a relatively high number have long periods (over one month) off school. This is certainly in keeping with the Chinese tradition of long convalescence after moderate or major illness as a precautionary measure even when recovery is complete.

Finally students were asked about the use of drugs on a regular basis (defined as at least once per week) to treat chronic conditions or promote health. The findings (Table 5.7) show that a large number of young people are taking medication on a regular basis.

Table 5.7 Medication taken at least once per week by gender and area (%)

	All	Male	Female	Hangzhou	Xiaoshan	Chunan
Sedatives	2.3	1.8	2.8	2.4	3.3	0.08
Vitamins/ iron /iodine	28	27	29	38	26	18*
Painkillers	25	22	28	21	32	20*
Laxatives	20	19	22	21	21	18
Traditional Chinese Medicine	28	27	29	32	21	30*
Nutritional Supplements	50	51	48	50	55	42

P<0.001

All of these drugs are available without prescription from pharmacies. One quarter take analgesics regularly, presumably treating all that chronic abdominal pain, headache and toothache. Laxatives are taken by 20% with equal use across gender and area. Traditional Chinese Medicine is also widely taken. Half take nutritional supplements or “tonics”, regarded as particularly effective for symptoms of fatigue, which 55% of the respondents had claimed they suffer. (Table 5.3) Fifteen percent of the students were taking three or more supplements on a regular basis. There were no significant gender differences and differences across area were inconsistent: Hangzhounese were the most enthusiastic users of vitamins and mineral supplements such as iron and iodine, while Xiaoshan students took the most analgesics.

5.5 PREFERENCE FOR SERVICES

Respondents were asked about what kind of health services they would like for their age group:

Table 5.8 Preferences for services (n= 3505)

	Yes %	No %	Don't Know %
Special clinics for young people in hospitals	5	21	74
Special clinics for young people outside hospital	6	30	64
School counsellor to help with medical/psychological problems	28	20	52
Telephone help-lines	73	5	32

Two important points emerge. First, most of the respondents were indifferent to how services were delivered, as evinced by the number of don't knows. (The number of don't knows for this question was the highest for the whole questionnaire). Secondly, by far the most desirable service was a telephone helpline, requested by nearly three-quarters of the respondents. Students were invited to make further comments and suggestions for this question. A few students noted that a helpline was convenient and private. Other

explanations for requesting a helpline included that they didn't like "the long waits at hospital" and the fact that the drugs were very expensive.

Finally, students were asked about school health education, specifically what subjects the health education classes in school should cover. Results are in Table 5.9.

Table 5.9
What subjects would you like to learn about in health education classes? (n=3984)

	%
Prevention of common diseases	73
Physiology/development	69
Adolescent psychology	67
Use of medicines	64
Oral health	59
Sexual health	38
Don't want any health education classes	33

The question was answered by nearly all the students, and their responses are enlightening. One third say they don't want any health education classes. Most wanted content to cover disease prevention, physiology, psychology and the use of medicines. The emphasis on psychology and the use of medicines is of particular note given the importance of psychological problems and abuse of medicines shown in other questions. The interest in oral health probably relates to a recent government campaign, widely disseminated in schools, to improve the nation's oral health. The low ranking of sexual health further was explained by the additional comments of a few students that the classroom is an inappropriate setting for sex education and that the teachers would be too embarrassed to teach it.

5.6 DISCUSSION

Despite the superficial approach necessitated by the broad-based questionnaire, there are some important findings which allow for comparison with the international literature and which have relevance for policy.

5.6.1 Morbidity

Clearly except for the major illnesses individual definition of these conditions and memory about them will vary enormously between individuals and interpretation should be cautious. However, the fact that the rates of major illnesses corresponded with the

expected rates for this age group suggests that the quality of reporting is quite high. Disability was openly acknowledged reflecting the acceptance of these more minor disabilities by the school and peers. It is policy for disabled children to be integrated into the mainstream education system, wherever possible. Discussions with teachers suggested that there was no shame felt by these “disabled” children in the mainstream school system. The excess of reported asthma in Hangzhou was not verified by physiological testing and is therefore hard to interpret. It could be real, or because of higher rates of detection or diagnostic preference. However, it confirms the findings of another study in younger children which suggests that the actual prevalence of asthma is higher in some urban environments in China.¹⁶¹ The high rates of headache and abdominal pain may reflect somatisation which is known to be common in Chinese populations,¹¹² and this possibility is explored further in Chapter 9.

Comparison with the international literature, which specifically explores morbidity, is striking in its similarity with the morbidity of these Chinese adolescents. For example, a study of British 14-16 year olds gave sore throat, gastrointestinal complaints and skin problems as their commonest medical problems.⁴⁸ In a suburban American population the commonest medical problems were abdominal pain, headaches, coughing, tiredness and acne.¹⁵⁹ Another American study among 13-18 year olds showed that coughs and colds, hay fever, skin problems and asthma were the most common problems. Acne, depression, dental problems and overweight were the top health concerns across three ethnic groups (Caucasian, Hispanic and Black) of Texan teenagers.⁴⁴ Amongst 12-15 year olds in Harlem the primary physical concern was dental caries.⁴³ Depression was the most cited problem of Australian teenagers,⁴⁵ and in a Swiss study over half the women and 30% of the men said that stress and anxiety were their major health concerns.⁴⁷ This confirms that these Chinese adolescents are not alone in their high rates of psychological morbidity.

Perhaps the most important finding from the morbidity data is that there are few differences in morbidity by socio-economic status, as measured by area of residence, parental occupation and parental education. In fact headache and anaemia were the only conditions to be more common in rural areas after controlling for parental occupation and education. This absence of a relationship with socio-economic status has been noted for this age group in developed countries.^{153,154} The conclusion can be drawn from this study that young people in Chunan are not suffering severe poverty, sufficient to lead to

nutritional deficiency (except mild anaemia) or infectious diseases related to poor hygiene or overcrowding.

The health worries and concerns of these Chinese young people are also strikingly similar to their counterparts elsewhere, suggesting that common adolescent health concerns transcend geography. For these Chinese adolescents school-related issues figure most prominently. School problems also figure prominently in studies from other countries, but personal relationships are also very important.^{45,47} Lower priority is generally given to those problems traditionally associated with adolescence, the risk-behaviours such as sex and drugs. Sex and drugs were mentioned by 4% and 3% respectively of the Swiss high school students in Michaud's study.⁴⁷ In this study sex was mentioned by just six respondents and drugs/alcohol/smoking by none. It is of note that a study carried-out in Nagoya, Japan, most closely parallels the Chinese situation. It identified the major concerns of middle school students as school performance, followed by future health concerns and family concerns.⁴⁶ Neither sex, nor drugs were mentioned by any of the respondents.

5.6.2 Health Care Seeking Behaviour

Young Chinese are eager users of health facilities, even for minor illness. Fifty-three percent had attended a health facility in the last year with significantly more in Hangzhou, after controlling for other socio-economic variables. Sixty-three percent attended a health facility for their last illness, the majority of which were for minor self-limiting illnesses, 61% for cold-type symptoms. Therefore the fact that rural dwellers used services less should perhaps be regarded favourably, suggesting more appropriate use of services rather than limited access. But naturally much of this behaviour is simply a reflection of parental patterns of help-seeking. Many of these young people will not be making their own decisions about health-seeking, but will simply be following parental advice. This is reinforced by the finding that 95% attended health facilities with a parent or other relative. Those who went alone were all 17 or 18 year-olds. To put this into perspective a UK study showed that 26% of 15-year olds made their own appointments to see a GP and had attended alone.¹⁴⁸

This apparently excessive utilisation of health facilities for minor illness is partly because of easy access, partly cultural and partly encouraged by health providers. Geographical

access is easy because of the large number of health facilities in Eastern China. A large study across eight Eastern Chinese provinces found that no-one was more than a half hour walk or bike ride away from a health facility.¹⁶³ Furthermore the consultation fee is very low (though as we have seen the cost of drugs is not). The cultural perspective is that there is an expectation of attendance at a health facility for minor conditions. The use of infusions of glucose for common colds is still the norm in many parts of China, and users often expect to receive such treatment. Most hospitals have an infusion room specifically for this purpose. Overprescription and polypharmacy are recognised as endemic in the Chinese health care system, since profits are made on the mark-up on drugs,⁹⁷ and over 50% of all health care costs are attributable to drugs.⁷⁵ A study carried out in village clinics in rural Zhejiang showed that an average of four drugs (mean cost 65 RMB) was prescribed for uncomplicated upper respiratory tract infections in children.⁹⁸

The cost of care is high given that the majority of cases are minor self-limiting illnesses. This clearly disproportionately affects the poor. For the poor accessing health care can absorb a considerable proportion of disposable income, with 42 % of the Chunan adolescents claiming that meeting the health care costs of their last illness was difficult. It can be thus assumed that in the case of severe, costly illness this could cause real hardship to the family.

While the health system continues to rely on user-fees and the mark-up on drugs as a source of funding, however, there is little incentive to educate people about the disadvantages and dangers of excessive use of drugs. But this is starting to change as providers, in cities particularly, have started to compete for “clients” and the high cost of drugs is now on the political agenda. Reforms are underway in a number of cities which involve bidding processes for drugs ensuring purchase at a lower price, which can be passed onto the consumer.¹⁶⁴

However, utilisation of health services for apparently trivial conditions is not unique to Chinese adolescents. In fact compared with their North American counterparts they are positively reluctant. Eighty percent of the 14,000 Oregon students questioned in the Youth Risk Behaviour Surveillance Survey had seen a doctor or health practitioner in the last year. Only 7% had not seen a doctor in two years.¹⁵² A Canadian study shows 80% of 15-21 year olds had visited a doctor in the last year,⁴² and while the proportion was 73% in

Texas.⁴⁴ Another American study showed that an enormous 93% had consulted a physician in the past year.¹⁶² The breakdown of the reasons for the visits, however, contrasts somewhat with those in China, since while minor illness accounts for over 50% overall of these visits a proportion are for check-ups, which don't figure in the Chinese data at all.

Time taken off school is low compared with elsewhere. A study of Swiss adolescents showed that 63% had taken at least one day off school in the previous year.¹⁶⁵ UK children take on average 4 days off in every school year.¹⁶⁶ However direct comparison is difficult because of the acknowledged problem of truancy in children and adolescents in these countries and the difficulty of establishing what is genuine time-off for illness.

The main exception to the high use of health facilities is the low use for explicit psychological problems. Despite the obviously high psychological morbidity only 0.5% said they attended a health facility for a psychological problem. Since there is almost no other access to psychiatric services, this represents a large area of unmet need.

Although there is high utilization for probably trivial conditions, there is also high utilization of *local* facilities and little inappropriate self-referral to higher level services for trivial conditions. The huge disparity between the utilisation of the school health clinics by place also illustrates that the school health clinic can serve a useful primary care function and this should perhaps be exploited more fully.

Not only is there almost certainly overuse of prescription drugs, but there is also massive use of regular medication and supplements with some children (15%) taking three or more different types. Again this must reflect parental demand as much as personal. Vitamins, minerals and nutritional supplements are heavily promoted as essential to health, growth and often intelligence. In Traditional Chinese Medicine theory there is no sharp distinction between food and medicines,¹⁶⁷ and the widespread use of these supplements needs to be viewed from that perspective. While probably not conferring much real benefit, they probably do little harm. More worrying is the widespread use of painkillers, laxatives and even sedatives. Clearly education is needed, even if only to counter the misleading claims allowed in advertising campaigns and to draw attention to the long term effects of the regular use of such drugs

5.6.3 Preferences for services

The results about preference for services and health education illustrate perhaps better than all the other data the mindset of these adolescents. Understandably, most don't have strong feelings about how services are delivered. The majority of those who responded liked the idea of a helpline to deal with medical or psychological problems, reflecting perhaps a desire for confidentiality and the very favourable publicity given to a helpline (for adults) in Shanghai just before this study was carried-out.¹⁶⁸ Twenty eight percent were in favour of school-based counsellor who could deal with medical and psychological problems, an option which would be taken-up as a specific recommendation by the leading group.

The ranking of subjects that students want to learn about in health education classes is perhaps surprising with disease prevention coming first. Physiology and adolescent development comes second. In Liu's study of Beijing middle school students he emphasises their lack of knowledge of puberty.¹⁶⁹ He found that around one-third of boys and one-quarter of girls were "puzzled" by the physiological changes of puberty. It is perhaps encouraging that so many wanted information about the use of medicines given the widespread inappropriate use of them. It suggests they are aware of this, perhaps more enlightened than their parents, who are perhaps the ones encouraging the overuse of medication. Sexual health is cited by few, probably because school is not regarded as a comfortable setting for sex education, and because it is a source of embarrassment for teachers and students alike. This point also emerged from the early discussion groups held at the beginning of this project.

The results of this component of the study had important policy implications. The recommendations and outcomes which resulted are described in Chapter 9.

5.7 SUMMARY

The most common illnesses were colds and flu, headache, depression, anxiety, fatigue, diarrhoea and acne. Major health concerns related to stress from academic pressure. There is a high utilization of health services and a widespread regular use of nutritional supplements and some forms of medication. In terms of specific services for young people the preference was for telephone help-lines followed by school-based counsellors. Students wanted their health education classes to cover disease prevention, physiology, psychology and appropriate use of medication.

CHAPTER 6: SMOKING

6.1 INTRODUCTION

This component of the study was carried-out to quantify the prevalence of smoking in adolescents in urban and rural Zhejiang, and to explore the relationship between smoking and a range of potential risk factors. The discussion concentrates on the relevance of the findings to the development of a smoking prevention programme for adolescents in Zhejiang Province.

6.2 BACKGROUND

In much of the developed world smoking rates have fallen steadily since the 1950s. In contrast in China yearly per capita consumption of cigarettes increased more than three fold between 1950 and 1990, from about 500 to 1800.¹⁷⁰ In China there are now 320 million smokers, about the same number as in all developed countries combined.¹⁷¹ Of these 300 million are men, accounting for nearly two-thirds of all Chinese men.

Furthermore rates in Chinese men appear to be still rising. The two national prevalence studies carried-out in 1984 and 1996^{172,173} demonstrated that in men over the age of 15 years there had been an increase in the prevalence of smoking (defined as at least one cigarette per day) from 61% to 63%. By contrast there was a fall in female smoking from 7% to 4%. Analysis of the occupational breakdown of male smokers showed that across this twelve-year period professionals smoked less, down from 58% to 56%, but this reduction was offset by increases in non-skilled workers from 65% to 68%.

Of particular importance is the fact that few Chinese quit smoking. Of the 1996 cohort only 17% said they had made any attempt to give up smoking in the last year.¹⁷² Another large study, carried-out in Shanghai in 1995, showed that only 14% of the male smokers even had any desire to quit.¹⁷⁴ Thus it is recognised that tobacco control strategies must focus on trying to prevent young people from taking-up smoking. This is now regarded as a priority of the Chinese Ministry of Public Health.¹⁷⁵

Evidence for the mortality burden from smoking comes primarily from three large studies: a prospective study of 18,244 Shanghainese men,¹⁷⁶ a nationwide retrospective study of one million deaths¹⁷⁷ and a nationwide prospective study of 224,500 men.¹⁷⁸ These studies estimate that there are nearly a million tobacco-related deaths every year, and that

based on current consumption trends, by 2020 around 2 million annual deaths will be related to smoking. Half the young adults who are now regular persistent smokers will be killed by the habit and around one third of all Chinese men will die prematurely from tobacco-related disease.¹⁷⁸

Smoking also affects large numbers of non-smokers in China. The 1996 survey reported that 40% of non-smokers interviewed were passive smokers, defined as passively inhaling tobacco smoke for more than 15 minutes per day.¹⁷³

Historically smoking prevalence among adolescents in Western countries has followed adult patterns. More boys smoked in the 1960s, but then the number of girl smokers increased until equality was reached in the late 70s.¹⁷⁹ Since then rates in teenagers have changed relatively little, despite declines in adult prevalence.¹⁸⁰ Prevalence of smoking among girls is now higher in many Western countries.¹⁸¹ Explanations include earlier maturation,¹⁸² greater susceptibility to nicotine addiction¹⁸¹ different experiences of adolescence such as different rates of participation in sport,¹⁸³ and the belief that smoking promotes weight loss.¹⁸²

As in many developing countries the patterns of smoking in China are two to three decades behind those in the West.¹⁸⁴ In most developing countries¹⁸⁵ and developed Asian countries such as Japan¹⁸⁶ South Korea,¹⁸⁷ Taiwan¹⁸⁸ and Hong Kong¹⁸⁹ male predominance in smoking still prevails. In China data from the national surveys shows that the prevalence of regular smoking among 15-24 year old women across the whole country was unchanged between 1984 and 1996 at 0.5%.¹⁷²⁻³ In most countries the overwhelming majority of smokers take-up the habit before they are 20. In the UK for example 82% of smokers started as teenagers.¹⁹⁰ This is not the case in China. In the 1996 national survey the median age of starting smoking was 20 years for men and 25 for women.¹⁷³ For men this was two years earlier than for the 1984 cohort. So although onset is relatively late there is a downward trend. A similar trend was also found in a large study in six Shanghai factories, where the age of starting was younger for men and women in successive birth cohorts.¹⁹¹ This relatively late onset is consistent with other studies which ask retrospectively about age of onset of smoking.¹⁹²⁻³ They also show broadly similar ranges of prevalence, with consistently marked gender differences, which are typical of many developing countries.¹⁸⁵

A number of studies have been carried-out recently which explore aspects of smoking in Chinese adolescents.¹⁹⁴⁻²⁰² The studies are summarised in Table 6.1 where they are compared with studies from other countries in East Asia. All these studies were cross-sectional surveys, carried-out in schools, with most carried-out in middle schools (predominant age range 13 to 16 years). All used self-completion questionnaires and all except two of the Chinese studies were carried-out in Beijing or Shanghai. Only two included a rural area. Meaningful comparison between the studies is hampered by the lack of consistency in questions asked, the difficulty in distinguishing between regular smoking and experimentation and definitions of ever-smoking. In some studies ever-smoking is defined as “even one puff”, in other studies smoking a whole cigarette is implied. The range of correlates analysed also varies across the studies making comparison difficult.

Despite these limitations a number of similarities emerge. In all the studies smoking prevalence increased with age with consistently wide gender differences. Ever-smoking amongst boys aged 13-18 years varied between 23% and 39% and amongst girls, 3% to 11%. Three studies included younger children: in Beijing 28% of 12-year old boys and 3% of 12-year old girls were reported by Zhu to have tried cigarettes,¹⁹⁹ but the other two studies showed lower rates: 12% and 1% of 10-11 year old boys and girls respectively had experimented with cigarettes in Fang’s study of Beijing school-children,¹⁹⁷ and in Shanghai 8% and 0.3% of Chen’s sample of 10-year olds boys and girls.¹⁹⁵ However, the mean age for both boys and girls smoking their first cigarette across all these studies is between 12 and 15 years. Comparison with the studies from Japan, South Korea, Taiwan and Hong Kong shows marked similarities in gender differential and age of onset.¹⁸⁶⁻⁹

But these studies contrast with the situation in Western countries: studies from North America and Western Europe, show that first experimentation with cigarettes occurs at 8 to 12 years, with regular smoking starting at 12 to 15 years.²⁰³⁻⁴ In the US and UK up to 70% of children have experimented with smoking by the age of 16, and in the UK 10% of 11-15 year olds are regular smokers (at least one cigarette per week).¹⁹⁰

The challenge for any intervention aimed at reducing smoking in young people is to address the factors that are associated with the onset of smoking. Studies in Western countries, including the WHO Cross National survey, carried out among adolescents in

fourteen Western countries,²⁰⁴ have identified factors associated with the onset of smoking and a number of consistent associations emerge.

Firstly, knowledge of the health risks has been shown *not* to influence the uptake of smoking.²⁰⁵ The early school-based smoking prevention programmes carried-out in the mid-1970s in the US and Europe failed, because they were based on the premise that improving knowledge of the health dangers of smoking would reduce uptake, an assumption which has since been proved to be erroneous.²⁰⁶

Environmental factors affecting uptake of smoking include: availability of cigarettes, parental, peer and sibling attitudes and the perception that tobacco use is the norm.²⁰⁷ However, recently it has been shown that the influence of parental smoking is equivocal. Of the published prospective studies reviewed by Reid only about half show a clear predictive relation between teenage and parental smoking.²⁰³

Socio-demographic predictors include low parental socio-economic status and personal finance.²⁰⁶ However, the relationship with low socio-economic status seems to be more strongly associated with adult smoking than teenage smoking in some countries.²⁰⁸ For example, in the UK no relation was found between socio-economic status and smoking prevalence in a Health Education Authority survey of 9 to 15 year olds.²⁰⁹ It is the increased quitting by higher income smokers that leads to a differential in socio-economic status by age 30.²⁰³ Having more personal disposable income is positively associated with uptake of smoking in some Western studies.²¹⁰ Behavioural and personal predictors include low self-esteem, low academic achievement²¹¹ rebelliousness and alienation from school,²¹² and the belief that smoking confers advantages in social life.²⁰⁶

The correlates reported from the Chinese and East Asian studies show broadly similar predictors as those in the Western studies. The most frequent and strongest correlate is friends smoking (peer pressure), parental smoking or influences and poor academic record (Table 6.1). There are marked similarities between the correlates in mainland China and East Asia. Of particular note is the study from Hong Kong which found being born in mainland China to be a major risk factor.¹⁸⁹

Table 6.1 Smoking in adolescents: recent studies from China and East Asia

Author, year Country/ area	Sample size	Age Range	Smoking ever/occasional*		Major correlates
			Boys	Girls	
Zhu (1992) Beijing ¹⁹⁴	8437	13-16	34%*	3.9%*	Peer pressure
Chen (1992) Shanghai ¹⁹⁵	411	8-17	24%	6%	Less educated fathers
Mei (1993) Jiangxi Province & Japan ¹⁹⁶	1600	13-16	Jiangxi: 30% Japan 31%	Jiangxi 5% Japan 3%	Friends and parents smoking behaviour
Fang (1994) Beijing ¹⁹⁷	828	10-18	28%	4%	Peer pressure
Li (1996) Beijing ¹⁹⁸	1041	12-16	29%	11%	Poor academic performance, other problem behaviours
Zhu (1996) Beijing ¹⁹⁹	16,966	10-12	28%	3%	Having close friends who smoke
Sun (1997) Shanghai ²⁰⁰	1116	13-16	39%	5%	Parents smoking
Li (1999) Beijing ²⁰¹	323	13-16	23%	5.5%	Other problem behaviours, poor academic performance
Osaki Y (1999) Jiangxi Province & Japan ²⁰²	57,566 Japanese 11836 Jiangxi	12-16	Jiangxi 28% Japan 31%	Jiangxi 5% Japan 3%	Friends smoking
Minagawa (1992) Japan ¹⁸⁶	15,000	12-16	34%	4%	Friends smoking, academic pressure, parents smoking
Wang (1996) Taiwan ¹⁸⁸	1372	13-16	11.5 *	0.4*	Family influence, peer pressure.
Lam (1998) Hong Kong ¹⁸⁹	6304	12-15	42%	15%	Family members smoking, having been born in Mainland China
Juon (1995) Korea ¹⁸⁷	9764	13 and 16	15.4%*	1.3%*	Peer use, academic stress

* denotes occasional/weekly smoking. All other figures are for ever-smoking

The purpose of this component of the study was to determine patterns of smoking behaviour, knowledge and attitudes among adolescents in Zhejiang Province, to inform a school-based smoking prevention programme in this population. Results for prevalence are drawn from both surveys with a total sample size of 5773. The data on knowledge and attitudes comes from Survey 1 only, with a sample size of 4197. These questions were not repeated in the second questionnaire. Characteristics of the two sample populations are shown in Tables 4.1 and 4.2.

6.3 SMOKING PREVALENCE

Overall 15.8% of the sample (26% boys and 5.2% girls,) had smoked at some time (were ever-smokers). There were significant differences between urban Hangzhou (11%) and the two rural areas 18% in Xiaoshan and 19% in Chunan. ($P < 0.001$) for urban compared with rural). However, the vast majority had only tried smoking and a tiny number (18 in total or 0.3%) classed themselves as regular smokers (Table 6.2).

Table 6.2 Smoking behaviour by sex and area n(%)

	Total n=5773	Male n=2982	Female n=2791	Hangzhou n=2361	Xiaoshan n=1388	Chunan n=2024
I have never smoked at all	4849 (84)	2209 (74)	2640 (95)	2078 (88)	1136 (82)	1635 (81)
I have smoked a few/several times	889 (15)	748 (25)	141 (5.1)	266 (11.3)	240 (17)	383 (19)
Occasionally less than once per week	17 (0.3)	13 (0.4)	4 (0.1)	7 (0.3)	6 (0.4)	4 (0.2)
I smoke 1-10 per week	11 (0.2)	11 (0.4)	0	6 (0.2)	3 (0.2)	2 (0.1)
I smoke >10 per week	7 (0.1)	7 (0.2)	0	3 (0.1)	3 (0.2)	0

Ever-smoking prevalence by age is shown in Figure 6.1 showing a clear gradient with age. The fact that 7% are classed as ever-smokers by age 12 is borne out by the results shown in Table 6.3 which shows clearly that very early exposure to smoking is not uncommon. In Hangzhou first smoking experience increased with age, whereas in the two rural areas the distribution was bimodal with peaks in the five-to-ten and over-fourteen age groups. Overall 7.4% of ever smokers had smoked before the age of five and 41% before the age of ten. This young “smoking” was more common in the two rural areas: in Xiaoshan 49% and in Chunan 44% of the ever-smokers had experience by age ten compared with 31% in Hangzhou. Proportionately more girls were exposed to smoking very early: 23% of girl ever-smokers had smoked before age five and 57% before age ten.

Figure 6.1 Proportion of ever smokers by age (n=924)

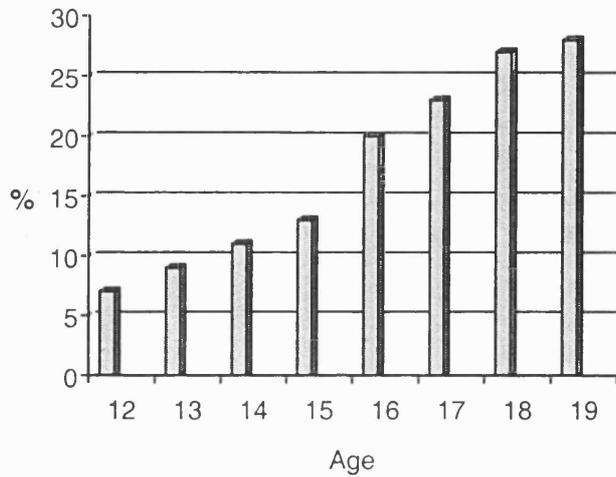


Table 6.3 Ever-smokers: age of first cigarette by sex and area n(%)

Age	All n=924	Male n=779	Female n=145	Hangzhou n=283	Xiaoshan n=252	Chunan n=389
<5yrs	72(7.4)	38(4.9)	34(23)	15(5.3)	24(9.7)	31(7.1)
5-10	315(34)	267(34)	48(34)	73(26)	98(39)	144(37)
11-13	195(21)	167(21)	28(17)	84(31)	51(20)	60(16)
>14	342(37)	307(39)	35(26)	106(37)	79(31)	157(40)

6.4 SOURCE OF CIGARETTES

Over three-quarters (76%) of the ever-smokers said they got cigarettes mainly from home (from parents or relatives), 4% from friends, and just 10% said they had bought them themselves.

6.5 PREDICTORS OF SMOKING

For the following analysis smoking behaviour was dichotomised to ever or never smoking. Odds ratios for relationships between ever smoking and selected characteristics are in Table 6.4.

Table 6.4 : Smoking Associations: unadjusted odds ratios

Characteristic	Unadjusted OR (95% CI)	P-value
Male sex	6.6 (5.2-8.3)	<0.001
Rural residence	1.9 (1.7-2.1)	<0.001
Father's education: low	0.6(0.5-0.7)	<0.001
Mother's education: low	0.6 (0.5-0.7)	<0.001
Father's occupation: non skilled	1.0(0.9-1.2)	0.78
Mother's occupation: non-skilled	1.0 (0.8-1.4)	0.51
Self-reported academic record	1.2(1.0-1.4)	0.03
Only child	0.9(0.7-1.1)	0.18
Father smokes	2.4(2.2-2.7)	<0.001
Mother smokes	3.3(2.3-5.6)	<0.001
Most friends smoke	8.2(6.7-9.9)	<0.001
Have drunk alcohol	4.0(3.4-6.5)	<0.001
Have been drunk	5.4(4.3-6.5)	<0.001

Strongest associations were with male sex, friends smoking, parental smoking (maternal greater than paternal), experience of drinking alcohol and alcohol abuse. The parental perspective is that 69% of the respondents reported that their father was a smoker compared with 2.6% for their mother. Experience of drinking alcohol was reported by 41% of the boys and 21% of the girls (P<0.001). Having been drunk was admitted by 16% of the boys and 7% of the girls (P<0.001). Significant but less strong were self-reported academic record and parents education. Parents' occupation and being an only child were not significant. Highly significant values were modelled by forward stepwise logistic regression. The adjusted odds ratios are shown in Table 6.5.

Table 6.5 Smoking Associations: adjusted odds ratios

Characteristic	Adjusted odds ratio (95% CI)	P-value
Male sex	5.1(4.0, 6.2)	<0.001
Rural residence	1.3 (0.9,1.5)	0.06
Father smokes	2.4(2.3,2.7)	<0.001
Mother smokes	3.8(2.6,5.8)	<0.001
Most friends smoke	4.5(3.7,5.6)	<0.001
Have drunk alcohol	2.1(1.7, 2.6)	<0.001
Have been drunk	3.0(2.3,3.8)	<0.001

Male sex, father and mother smoking, friends smoking, experience of alcohol use and abuse are all highly significant after logistic regression analysis with strongest associations with male sex, friends' smoking and maternal smoking.

6.6 ATTITUDES TO SMOKING

These are shown by smoking status in table 6.5. Most students gave the “correct” or more enlightened answers, irrespective of smoking status. Few overall thought smoking made young people look tough (5.3%) glamorous (8.5%) or fashionable (11%). But conversely not many perceived smoking as weak or stupid (14% and 31% respectively). Smoking was also not perceived as conferring any social advantages. Fewer than 10% thought smoking put you in a better mood, helped you make friends, act more confidently, or made you more popular. Although there were significant differences between smokers and non-smokers on some of these measures the actual differences were small. The smokers are clearly well aware of the risks: 86% of them said smoking harmed health with almost the same proportion (79%) agreeing it was a form of ‘chronic suicide’. Only 6.5% agreed that smoking helped one to lose weight, a belief which is thought to contribute to the large number of young girls smoking in many Western countries.¹⁸²

Table 6.6 Attitudes to smoking by smoking status: % affirmative responses

	Total	Ever-smokers	Never-smokers	P-value
Question: If you see someone of your age smoking, what do you think of them?				
Tough	5.3	7.2	4.9	0.01
Glamorous	8.5	15.3	7.2	<0.001
Stupid	31	27	32	0.01
Weak	14	10	14	0.02
Fashionable	11	16	10	<0.001
Rebellious	9.4	13	8.6	<0.001
Question: What do you think of smoking? Mark those you agree with.				
It's a waste of money	74	77	74	0.02
It helps you lose weight	6.5	7.5	6.2	0.03
It harms your health	83	86	82	0.01
It is like chronic suicide	79	80	78	0.2
Helps you make friends	10	19	8.2	<0.001
Helps you act more confidently	8.2	15	6.9	<0.001
It puts you in a better mood	9.1	14	8.3	<0.001
People like you more if you smoke	3.2	5.5	2.8	<0.001

6.7 DISCUSSION

The prevalence of ever smoking in our sample is low (15.8%) even in boys (25%) with regular smoking extremely low (0.3%). These rates are consistent with the lower end of the range of the other published studies, but these studies were mostly carried-out in Beijing and Shanghai and in middle schools only, so direct comparison may be inappropriate.¹⁹²⁻²⁰⁰ In addition, the exact questions asked (where this was clear) often differed from those on our study. But the wide gender difference and increase during the middle school period with age observed in our study is consistent with all the other studies. The finding that the increase in prevalence levels after age 16 is not observed elsewhere, since only two studies included this older age group and both had a relatively small sample size.^{193,195} The possible explanation for this decrease after the end of middle school is that those who stay at school are a selected group who are less likely to take-up smoking than those who leave school after compulsory education is over.

Although regular smoking is very rare, early exposure to smoking is not, with 7.3% of ever-smokers claiming to have smoked before the age of five and 41% before the age of ten. Not only do children obtain cigarettes from home (in this study 76% of ever-smokers) but some parents clearly give cigarettes to their young children. In China there is much anecdotal evidence about the use of cigarettes to pacify young children and even babies especially in rural areas.²¹³ This study has helped to quantify the phenomenon. The volunteering of this information by as many as 84 respondents is surprising, since many can't have clear memories of their early years. It is possible therefore that the figure of 84 is an underestimate. Although overall the proportion exposed in this way is small (around 1.2% overall), and the relationship between this early smoking and later long term smoking is unclear, it indicates a worrying prevailing subculture of parental indifference to the dangers of smoking.

Evidence for the importance of parental influence is supported by the high odds ratios for parental smoking on adolescent smoking behaviour. Maternal smoking (OR 3.3 95% CI 2.3,5.6) appears more influential than paternal smoking, OR 2.4 (2.2,2.7) although the low percentage of mothers who smoke probably influences this. The fact that smoking in mothers may be more influential has been noted elsewhere and a number of mechanisms proposed.^{214,215} The especially strong association with friends smoking and alcohol abuse points to the possible existence of a subculture of risk-takers. Other Chinese studies have

been selective in their reporting of predictors. However, parental smoking and peer pressure have been shown to be particularly important influences, while there is mixed evidence for the importance of poor academic performance, low socio-economic class and other problem behaviours such as alcohol consumption.¹⁹⁴⁻²⁰²

The fact that the majority gave enlightened answers to the attitude and knowledge questions and were well-informed generally about smoking confirms that lack of knowledge is not a major problem. The overwhelming majority are well aware of the health dangers and don't regard smoking as glamorous or fashionable. Even the potential social advantages of smoking are eschewed by the vast majority.

All the findings have implications for the proposed tobacco control programme. A variety of interventions and activities have been attempted with the view to reducing the uptake of smoking in young people.²⁰³ They can be divided into health promotion interventions and health policy interventions and the major ones are listed in Table 6.8.

Table 6.7 Interventions for reducing uptake of smoking in young people

Health promotion interventions
* school-based health education interventions
* restrictions of smoking on school premises
* mass media campaigns
Health policy interventions
* fiscal measures, increasing tax in cigarettes
* restricting advertising/sponsorship by tobacco companies
* legislation and action to restrict sales to minors

Because of the complex range of individual, social and environmental factors influencing decisions to smoke, it is generally believed that a comprehensive strategy, including health promotion and health policy options, is essential to bring about reductions in smoking in young people. The resulting synergism, particularly if implemented at community level, probably affords the best chance of success.²⁰⁶ Here each of these measures is considered, and its potential for use in the Chinese context is discussed, in view of the findings of this study and others.

School based health education programmes: In this study we found rates of smoking to be very low in school, and yet given present trends nearly two-thirds of boys will go on to be regular smokers before they are 25 years old.¹⁷³ This of course implies that the vast majority take-up smoking after leaving school. This has important implications for school-based prevention programmes. School-based programmes have been the most widely used approach in for preventing the uptake of smoking.²⁰³ But the evidence to date for their effectiveness for preventing the uptake of smoking in young people is very limited. The low rates of success of school-based programmes in Western countries have been partly blamed on the fact that patterns of regular smoking, and probably nicotine addiction, are already established even in early secondary school, and it has been proposed that much younger age groups such as four to eight year olds should be targeted.²⁰⁶ The very low prevalence of regular smoking in these Chinese adolescents implies, however, that there may be potential for school-based prevention programmes even as late as at high school level in China.

But the types of programme which have met with greatest success would be difficult to implement in the more rigid, didactic educational paradigm in China. These programmes are based on psychosocial theory, especially social learning theory and self-efficacy,²¹⁶ and focus on improving self-esteem, reducing alienation and the development of skills to resist the pressure to use cigarettes.²¹⁷ Although impressive short-term reductions in uptake of smoking have been demonstrated through such programmes,^{218,219} the effects of these intensive programmes have been shown not to last into adulthood.²²⁰⁻¹ However, it has been argued that delay in recruitment is a useful end in itself, because people who start smoking early are more likely to become regular heavy smokers.²²² Apart from being intensive and expensive such programmes involve the recruitment of especially-trained instructors. It has been shown that the use of classroom teachers is relatively ineffective²²³ making such programmes more difficult to implement in a Chinese setting.

Smoking restrictions in school: It has been recently recognised that schools themselves can play an important complementary role through creating a healthy supportive environment for students and staff. The importance of the school setting is acknowledged by WHO through its Health Promoting Schools Initiative.²²⁴ There is some evidence that the effects of school programmes can be enhanced by restrictions on smoking by teachers.

Smoking is already forbidden in Chinese schools, although enforcement is highly variable, and there may be a case for tougher enforcement.

Mass media campaigns: The mass media, television, radio, newspapers and magazines, have become an increasingly popular vehicle for campaigns aimed at reducing smoking in young people in a number of countries. In England and the US major teenage programmes have been carried-out since 1980. These have included paid advertising and the creation of publicity in the teenage media.²²⁵ But there is little evidence that they have been effective. In fact, there was no change in the uptake of smoking by 11-16 year olds in the UK between 1982 and 1992 despite a fall in adult prevalence.¹⁹⁰ The two controlled trials which did demonstrate an effect were long, intensive and expensive.²²⁶ There have been no programmes of this type targeting young people in China. With very little of the media (magazines or television programmes) specifically catering for this age group to find a suitable vehicle would be a considerable challenge and chances of success probably minimal.

Banning of advertising and sponsorship: Cigarette advertising and sponsorship is thought to influence teenage attitudes to smoking, helping to convey an impression of smoking as a normal and socially acceptable activity.²²⁷ However, banning advertising in other countries has been shown to have only a small effect on the uptake of smoking by young people.²²⁸ In China the effects of advertising and sponsorship on children's uptake of smoking have not been evaluated. The foreign tobacco corporations who came to China in the late 1980s introduced Western advertising and promotional strategies, including sponsorship of sports and cultural events, which were aimed especially at young people. But a 1994 law banned tobacco advertising in the electronic and print media and in 1997 there was a total ban on cigarette advertising. However, the enforcement of the ban is patchy with many provinces, including parts of Zhejiang, adopting a laissez-faire approach.

Sponsorship is used by tobacco companies to increase brand awareness. Since sponsorship is frequently used for events, such as sporting events which have particular appeal for young people such sponsorship may be particularly influential on their smoking behaviour. Brand recall has been shown to be heightened among children following the viewing of sponsored sport.²²⁹ A UK study showed that boys who cited the tobacco-company

sponsored motor racing as their favourite sport were twice as likely to become regular smokers.²³⁰ In China a range of sporting and cultural events are sponsored by tobacco companies. The dependence of these events on this generous source of funding makes it unlikely to cease in the foreseeable future.²³¹

Fiscal measures: Having larger amounts of money to spend is positively associated with uptake of smoking in young people in Western settings. So the price of cigarettes could be expected to influence consumption. The price elasticity of cigarettes in many industrial countries is typically about -0.5%,²³² that is, for every 1% increase in real price, per capita consumption falls by 0.5%. The situation in China is particularly complicated. Cigarettes in China are relatively cheap. Even legally imported foreign cigarettes sell for about US\$1 per packet, and many local cigarettes are much cheaper. In China as yet there is no strategy for gradual price increases. This is partly because of the powerful tobacco lobby in China and partly because of concerns that raising tobacco tax would lead to reduced government revenue (through lower consumption and possibly more smuggling) and bring hardship to poor smokers.²³³ But the effects in young people are doubtful, given that most young Chinese smokers obtain their cigarettes from home. The real effects of fiscal policy on young smokers would probably be very small.

Restriction of sale of cigarettes to minors: Controlling access to cigarettes is a well-established strategy in preventing young people from becoming addicted to tobacco and in many countries the sale of cigarettes to children under the age of 16 or 18 is illegal. Experience has shown that enactment of laws to restrict the sale of cigarettes to minors must be accompanied by vigorous enforcement if it is to have any effect.²⁰³ In China there are no legal restrictions on tobacco sales to children. Since many young smokers get their cigarettes from home the effect of any legislation could be small and enforcement would be virtually impossible.

Other measures: The issue of tobacco control is complicated by China's economic dependence on tobacco production. China is by far the world's largest producer of tobacco, creating employment for ten million farmers, over half a million industrial workers and 3 million retailers. Tobacco is the largest industrial tax source raising \$US10 billion in 1996.²³⁴ Despite this dependence China has taken considerable measures with respect to tobacco control and has been called a leader among developing countries in this respect.¹⁷¹

These measures include: health warning labels on cigarette packets since 1990, from May 1997 a ban on smoking in railway carriages, taxis, buses, and train stations and on domestic flights and, from October 1997, a ban on smoking in public places in 300 cities. These measures are regarded as particularly important in not only reducing opportunities to smoke, but in starting to create a climate where smoking will eventually become less socially acceptable.

The evidence summarised here shows clearly that there is no simple way to prevent young people from taking-up smoking. The issue in China is complicated by the fact that smoking remains the norm, almost an expectation in male society, a factor which makes attempts at prevention particularly fraught. But the results of this study together with the evidence for effectiveness of interventions does provide some information on which to base recommendations. These are outlined in Chapter 9.

6.8 SUMMARY

Rates of smoking experimentation are low in adolescents in Zhejiang Province and rates of regular smoking are very low, but with wide gender differences. A large proportion (41%) of ever-smokers had experience before the age of ten years old. The major influences are friends smoking, parents smoking, and use and abuse of alcohol. Most acquired their cigarettes from home. The majority of young people are well aware of the dangers and disadvantages of smoking. The late onset of smoking means that a school-based prevention programme, focusing on resisting pressures may be effective.

CHAPTER 7: THE NUTRITIONAL PROFILE

7.1 INTRODUCTION

In this chapter the nutritional findings are presented. This component of the study was carried-out to examine the relationship between a range of nutritional status indicators, and to determine whether there are differences in the nutritional status and dietary habits of adolescents in urban and rural areas of Eastern China.

7.2 BACKGROUND

7.2.1 Body Mass Index, diet and exercise

A nutrition transition has been an integral part of the epidemiological transition currently underway in China.²³⁵ Many parts of China have moved from a situation of food scarcity to wide choice in diet over a period of just two-three decades.¹⁰³ Although the average dietary pattern in China still consists mainly of a plant-food-based diet, the last two decades have seen a marked increase in animal product and fat/oil consumption. Between 1982 and 1992, in the decade following the introduction of a market economy, the national consumption of meat, eggs, and fat/oil increased by 38%, 60% and 61% respectively, while cereal and tuber consumption decreased by 12% and 47%. The contribution of fat to the total energy intake reached 26% in 1992, with proportions of over 30% in the big eastern cities, including Beijing, Shanghai and Hangzhou.²³⁶

These changes in diet have contributed to marked changes in body composition.²³⁷ Obesity was very rare in China before the mid 1980s.²³⁸ In urban Chinese the rate of adult obesity (body mass index of >25) increased from 5% to 14% between 1982 and 1991 reaching 14.0%. This increase has been described as among the most rapid ever documented.²³⁹ However, these increases have been largely confined to urban residents and those in middle and high income groups with obesity still rare in rural areas. For underweight (BMI<18.5) rates fell by 1% to 14% and 11% for rural and urban areas respectively.²³⁸

Concerns about the increase in prevalence of overweight have led to interest in the previously neglected topic of adolescent nutritional status in China. It is now recognised that body composition, dietary behaviours, and lifestyle choices acquired during adolescence are likely to continue into adulthood.²⁴⁰ These in turn are likely to determine

patterns of adult mortality and morbidity.²⁴¹⁻² In addition, body composition in adolescence has an influence on sexual maturation and onset of menarche.²⁴³

There have been a number of studies on childhood and adolescent nutrition from China in the last decade, consisting mainly of reports from local and national surveys. In general they show that Chinese children have been getting steadily heavier and taller over the past fifty years.²⁴⁴⁻⁶ But there is evidence that this improvement has not been equitable with urban-rural differences emerging: one study drawing from five cross-sectional studies of pre-school children showed an increasing gap in height between rural and urban children over the past twenty years.²⁴⁵ Another study has shown that overweight (BMI>85th centile) is emerging as a problem of Chinese children and adolescents for the first time with an overall rate of around 4%. But this study also showed that undernutrition (BMI<5th centile) is still common among Chinese adolescents, the overall prevalence being 12-13% with more in lower income groups.²⁴⁶

Studies from industrialised countries show that adolescents have unique dietary habits. Dieting and skipping meals are common practice among adolescents in many Western countries.^{247,248} In China thinness or slimness is culturally more acceptable and desirable than fatness, and dieting to control weight is well-recognised, but little is known about the prevalence of dieting behaviour, especially in adolescents.²⁴⁹

The question of the relative contributions of diet and exercise to changes in body composition have been studied in other populations. In the UK, for example, weight gain has been attributed as much to decreasing levels of physical activity as increased calorific intake.²⁵⁰ In China the picture is unclear. Although there is some data on secular trends in energy intake at a population level,^{237, 246} there is almost nothing on exercise. Wang found that urban adolescents had slightly higher energy intakes than their rural counterparts and this corresponded to small differences in BMI. The major difference found between these urban and rural diets was the proportion of energy derived from fat: 20-23% for rural adolescents, compared with 26-29% for urban adolescents²⁴⁶ (the recommended level is 30%). But this study did not report on exercise.

7.2.2 Age of menarche

There have been also been no studies linking these secular changes in body composition to age of menarche in China. There have been studies of the age of menarche in a number of different Chinese populations, but the lack of comparability in investigative and statistical methods hampers useful comparison.²⁵¹⁻³ However, the median menarcheal age determined by Probit analysis for a cohort of Beijing girls from 1962 was 14.16, compared with 12.77 years for a 1985 cohort of Beijing girls,²⁵³ a difference of 1.54 years or a decline of 8 months per decade. A decline in age of menarche has been documented in many developed and developing countries.²⁵⁴ The relatively steep decline in China compared with the 2.5-3 years over the past century reported for Northern European countries,²⁴³ probably relates to the rapid change in nutritional status in China over recent decades,²⁵³ but how secular changes in BMI impact on age of menarche in China today remains unclear.

7.2.3 Anaemia

There are few published papers on levels of anaemia in Chinese adolescents, studies focusing mainly on pre-school children, pregnancy and specific occupation groups.²⁵⁵⁻⁶ Anaemia is known to be common in younger children: a large national cohort of 7-year olds studied in 1997 showed rates of anaemia (Hb<110gm/L) to be around 40% with only small differences between urban and rural areas.²⁵⁶ Studies of adult women have shown prevalences of anaemia of 30-35% using a cut-off point of Hb<120gm/L.²⁵⁵ But little is known about anaemia among adolescents.

7.2.4 The adolescent nutritional profile

No studies have linked different types of information on nutritional status together to draw-up a picture of adolescent nutritional status for comparison in urban and rural settings. In this study nutritional status indicators examined were mean body mass index, overweight, underweight and obesity, mean haemoglobin and anaemia, age of menarche and levels of exercise. The relationship between these indicators and socio-demographic variables was explored.

Figure 7.1 Nutritional Content of the Two Questionnaires

Stage 1 Questionnaire

- Self reported heights and weights
- Body image
- Dieting
- Nutritional supplements
- Exercise
- Age of menarche

Stage 2 Questionnaire

- Anthropometry
- Haemoglobin
- Nutritional Supplements
- Exercise
- Age of menarche
- Food frequency
- Body image
- Dieting

7.3 BODY MASS INDEX (BMI)

Mean BMIs by sex and area are shown in Table 7.1. There were significant differences in the mean BMIs in urban and rural areas in both sexes.

Table 7.1 Mean BMI (Kg/m²) by sex, residence: totals and by age

	n	Mean BMI (SD)	Mean BMI(SD) 13-yr olds	Mean BMI (SD) 14-yr olds	Mean BMI(SD) 15-yr olds	Mean BMI(SD) 16-yr olds
Urban boys	369	19.2 (3.4)	17.8(3.4)	18.9(2.8)	19.4(2.3)	20.2 (3.6)
Rural boys	402	17.7 (2.0)*	16.9 (2.2)	17.0 (1.9)	17.6 (2.4)	17.5 (2.3)
Urban girls	415	18.6 (2.8)	18.2 (2.3)	17.8 (3.1)	18.9 (2.8)	18.9 (2.5)
Rural girls	391	17.6 (2.4)*	16.6 (2.8)	16.9 (2.9)	17.3 (2.5)	17.9 (2.2)

*P <0.001

The differences in underweight, overweight and obesity by gender, area and income group are in Table 7.2. Overweight and obesity were defined using Cole’s recommended international standards for adolescents.²⁵⁷ These were developed by using six “large nationally representative studies” including from Singapore and Hong Kong and drawing centile curves which at age 18 passed through the cut-off points of 25 and 30kg/m² recognised as defining overweight and obesity in adults. Underweight is defined using WHO standards for adolescents³³ which are based on a similar principle of extrapolating from an adult definition of a BMI of <18.5. Both methods thus have an intrinsic adjustment for age and gender.

Table 7.2 Prevalence of underweight, overweight and obesity by % n=1577

	Under-weight	Over-weight	Obese
All Male	21	4.7	1.0
All Female	16.5*	2.5*	0.5
Urban Male	22	8.4	1.3
Rural Male	21	1.3*	0.5
Urban Female	14.4	4.5	0.9
Rural Female	18.6	0.7*	0
Age ≤ 14 years	17.9	3.4	0.5
Age ≥ 15 years	19.6	3.9	1.0
Income low	23	1.1	
Income middle-high	16*	5.3*	

P<0.001

Note: definitions of underweight, overweight and obesity in the text

Underweight was far more prevalent than overweight across all groups. Underweight was more common in boys, but the prevalence was the similar in rural and urban areas for boys P=0.08. Rural girls had a higher prevalence of underweight than urban girls P=0.01.

Boys have nearly twice the rate of overweight as girls (4.7% vs 2.5%, P<0.001). Urban males emerge as the most overweight with a rate of 8.4%. Both overweight and obesity were rare in the rural area and there was no obesity in rural girls. Overweight and obesity were combined for further analysis. After adjustment for household income and one child family odds ratios for predictors of overweight were male sex OR 2.1(1.1, 3.4) and urban residence OR 9.1 (3.7, 23), the latter clearly being very strong. Male sex was also a predictor of underweight. After adjustment for age, family size, urban/rural residence and parental education, predictors of underweight (adjusted odds ratios) were male sex OR 1.51 (1.1, 2.0) and low household income OR 1.2 (1.05-1.45), though associations were weak with confidence intervals approaching unity in both cases.

7.4 ANAEMIA

The mean haemoglobin level was significantly different in the two areas: Hangzhou, 127g/L and Chunan 124g/L (95% CI for difference in the mean 1.4-3.7, p<0.001). Taking cut-off points for anaemia at 100, 110,120g/L for boys and girls, and 125g/L for boys only, the differences in the two areas are shown in Table 8.3: 36% of the total had Hb

levels below 120g/L, 10.3% below 110g/L and 2.2% below 100g/L. In Chunan 55% of the girls had Hb levels below 120g/L.

Table 7.3 Low haemoglobin by sex and area by percentage

	Hb<100g/L	Hb<110g/L	Hb<120g/L	Hb<125g/L
All	2.2	10.2	36	
Boys	1.0	5.3	21	38
Girls	3.2*	15*	51*	
Urban	1.3	8.1	34	
Rural	3.1	12.4*	38	
Urban Boys	0.8	4.8	20	37
Rural Boys	1.2	4.8	21	
Urban girls	1.6	11	47	39
Rural girls	4.8*	19*	55*	

*P<0.001

Defining anaemia by WHO standards of 120g/L, adjusted odds ratios for anaemia (after controlling for urban/rural residence, household income and parental education levels) were female sex, OR 3.8(3.1-4.76), and being in a two or more child family OR 1.22 (1.03-1.41). There was no difference in haemoglobin levels by menarcheal status and there were no significant differences across the age range.

7.5 EXERCISE

Levels of exercise in these young people were generally high. Over half (51%) walked to school, 45% biked. Only 3.8% took a bus, 0.1% went by car and 0.2% used a rickshaw. The median distance to school was 1 kilometre (km) with a mean of 1.9 km (SD 1.8). This means that over half of the day-pupils walk or cycle an average of over 2 km to and from school everyday.

Students participated in a mean of 3.1 hours (SD 1.1) of sport every week. Boys averaged 3.4 hours compared to the girls 2.6 hours (P<0.001). Students in Chunan did considerably more sport, 3.7 hours per week on average compared with those in Hangzhou who did 1.9 hours (P<0.001). A small number (twelve boys and two girls) exercised a lot, around 30 hours per week. Thirty-five percent claimed to have done some form of sport after school the day before. Of these 16% were boarders. However, it seems that much of this sport is of the relatively gentle variety. The mean number of times in the previous week that students had undergone vigorous exercise, that is, exercised until they were breathless and

tachycardic, was 1.6 (median 1.0, SD 1.23) but consistent with previous findings, boys and rural residents indulged in more vigorous exercise: in Chunan an average of 1.8 times compared with 1.4 in Hangzhou ($p<0.001$); boys 1.8 times compared with 1.3 times in girls ($p<0.001$). However, none of these measures of exercise were significantly associated with underweight or overweight.

7.6 MENARCHE

7.6.1 Age of menarche

The number and percentage of menstruating girls in each age group is in Table 7.4. A small number of girls started menstruating before the age of 12 years: 2 (0.1%) at age 9 completed years, 8 (0.4%) at age 10 and 53 (2.6%) at age 11. Of these 47 or 75% were from Hangzhou.

Table 7.4 Number and percentage of menstruating girls by urban and rural (Average age for each age band is $x+0.5$ years)

	All n= 1986			Urban n=1171			Rural n= 815		
	n	Menstruating		n	Menstruating		n	Menstruating	
		n	%		n	%		n	%
12+	63	15	23.8	40	11	27.5	23	4	17.4
13+	428	285	66.5	281	196	69.7	147	89	60.5
14+	644	504	78.2	402	341	84.8	242	163	67.3
15+	591	486	82.2	301	261	86.7	290	225	77.6
16+	247	232	93.9	139	136	97.8	108	96	88.9
17*	13	12	93	8	8	100	5	4	80

*This age group is included for completeness. The one pre-menarcheal girl in this small group skews the %-menstruating results for the rural area and the total.

Calculating from the data in Table 7.4 the median menarcheal age by Probit analysis is 12.8 (SD 0.91) for urban Hangzhou and 13.2(SD 1.04) for rural Chunan ($p<0.001$).

7.6.2 Comparison of menstruating and non-menstruating girls

The relationship of height, weight and BMI to menarcheal age was available for 993 girls who underwent anthropometry. Table 7.5 compares the anthropometric status according to menarcheal status.

Table 7.5 Growth status of menstruating and non-menstruating girls (n=993)

Age	n		Height (cm)		Weight(kg)		BMI(kg/m ²)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
12	24	7	149 ± 6	152 ± 4	35.4 ± 3.8	39.3 ± 5.2	15.1 ± 0.7	16.7 ± 1.4
13	72	142	152 ± 6	153 ± 5	37.5 ± 5.7	42.3 ± 7.2*	15.9 ± 1.9	18.1 ± 3.0*
14	70	252	152 ± 6	158 ± 4*	39.4 ± 4.7	47.1 ± 6.8*	16.1 ± 1.4	18.8 ± 2.6*
15	52	243	154 ± 5	157 ± 4*	38.0 ± 3.3	46.7 ± 4.5*	16.2 ± 1.9	18.9 ± 2.0*
16	18	106	157 ± 6	162 ± 6*	39.5 ± 2.7	52.1 ± 8.9*	16.9 ± 1.7	19.8 ± 3.2*
17	1	6	158	166 ± 7	37.5	53.0 ± 6.7	15.8	19.1 ± 1.3
	237	756						

* P<0.001

The mean weight and BMI were significantly higher for menstruating girls in nearly all age groups, while there were significant differences in height for ages 14-16 only.

Analysis of the predictors on onset of menarche (Table 7.6) showed not surprisingly that older age (OR 3.6) and higher BMI (OR 3.7) were most strongly associated with having reached menarche. But urban residence was also highly predictive (OR 2.5) as was household income(OR 2.4). However, after adjusting these variables for relevant covariates through forward stepwise logistic regression adjusted odds ratios showed urban girls were still start menstruating significantly earlier than girls in rural areas OR 2.1 (1.8, 2.3).

Table 7.6 Correlates of menarcheal status

	Unadjusted ORs (95% CI)	Adjusted ORs* (95% CI)
Older age	3.6 (2.6,5.0)	2.2(1.4,3.5)
Higher BMI	3.7(2.6,5.1)	3.3 (2.1,5.2)
Urban residence	2.5(2.1,2.8)	2.1 (1.8, 2.3)
Household income: high	2.4(1.6,3.6)	NS p=0.7
Mother's education: high	1.4(1.0,2.0)	Not in model
Father's education: high	1.2(0.8,1.7)	Not in model
One Child family	2.5(1.8,3.5)	NS (p=0.08)

*All variables excluding parental education in logistic regression model
Age and BMI adjusted as continuous variables

7.7 DIET

7.7.1 Food frequency

The results of the food frequency questionnaire by urban or rural residence are summarized in Table 7.7. The data has been simplified by dichotomising into more often 2-3 times per week or more in Table 7.8.

Table 7.7 Food frequency data: % of urban and rural respondents (n=1568)

Food item eaten:	Rarely/never		Once/week or less		2-3 times per week		Most days	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Red meat	4	25	3	18	63	40	30	17
Chicken	9.6	39	37	36	42	19	10	4.9
Fish	13	74	58	22	27	4.1	2.2	0.3
Eggs	8.7	52	18	25	36	16	38	8
Tofu	17	20	28	24	32	40	23	16
Milk	12	88	8.2	6.1	19	4.9	61	1.3
Yogurt	66	95	15	2.3	11	1.0	7.7	1.5
Rice	2.3	1.3	0.8	2.4	1.5	2.1	96	98
Bread	10	19	32	41	20	15	38	25
Fruit	2.2	27	4.3	25	24	28	69	17
Green vegetables	1.3	14	2.7	14	13	28	83	44
Peas/beans	6	34	14	24	35	26	45	16
Nuts	30	72	30	18	30	7.7	9.8	2.4
Pickles	32	53	43	20	20	19	5	9
Potatoes	26	63	43	21	24	10	7	5
Sweet carbonated	12	58	27	21	38	17	24	5.5
Crisps	26	66	35.3	18	29	13	10	2.4
Cake/biscuits	9.6	51	21	23	42	19	27	6.9
Chocolate sweets	16	55	28	20	35	20	21	4.5
Dried fruit snacks	39	87	28	8.2	24	4.2	8.9	0.8
Tea	42	37	18	13	21	13	19	38

Table 7.8: Consumption of food item at least two-three times per week: % of urban and rural respondents

Food item	Urban	Rural
Red meat	93	57*
Chicken	51	24*
Fish	35	5.2*
Eggs	77	27*
Tofu	55	56 (P=0.9)
Milk	78	6.7*
Yogurt	21	3*
Rice	96	98 (P=0.4)
Bread	58	40*
Fruit	94	45*
Green vegetables	83	84 (P=0.9)
Peas/beans	80	42*
Nuts	40	10*
Pickles	25	28 (P=0.23)
Potatoes	31	16*
Sweet drinks/coke etc	61	23
Crisps	39	16*
Cake/biscuits	70	26*
Chocolate sweets	56	24*
Dried fruit snacks	33	5*
Tea	40	51*

* P<0.001

All food items were eaten more frequently in the urban area than the rural with the exception of rice, pickles, green vegetables and tea. The diet of the urban group is varied: meat, chicken, eggs, milk and tofu being consumed regularly and fruit and vegetables frequently, whereas rural children appear to have a far less varied diet with many food items eaten rarely, never or less than once per week. However, the urban adolescents are also consuming significantly more convenience food and snacks, such as crisps and biscuits, and are drinking more carbonated, sweet drinks. (There are still no low sugar alternatives of these drinks available in Zhejiang.)

Higher consumption of sweet drinks and cake was associated with overweight OR 2.04 (1.2,3.5) and OR1.9 (1.1,3.3) respectively, suggesting that the few fat children did indeed consume more “junk food”, but no other foods had significant associations. There were no significant (biologically plausible) associations between food items and undernutrition or anaemia.

7.7.2 Nutritional supplements

Students were asked about nutritional supplements taken at least once per week.

Table 7.9 Regular food supplements by gender and area by %

	Vitamins	Iron	Nutritional supplements
All	18	3.0	31
Boys	18	3.9	32
Girls	19	2.2	30
Urban	29	2.8	41
Rural	6.8*	3.2	20*

* P<0.001

Nutritional supplements consist mainly of herbal concoctions reputed to enhance health, increase energy and improve cognitive function. Overall a high proportion were taking some form of supplement. Urban adolescents take more supplements and vitamins than rural ones, though there is no difference in the consumption of iron and no difference in the proportions of girls and boys for all three. None of those taking iron supplements were anaemic!

7.7.3 Dieting and body image

Results are shown in Table 7.10

**Table 7.10 Dieting and body image by gender and area:
% agreement with statement**

	Total	Boys	Girls	Urban	Rural
I'm too fat: want to lose weight	25	11	39*	33	17*
I'm happy with the shape I am	36	32	40*	37	34
I'm too thin: want to put on weight	39	57	22*	30	49*
I have dieted in the last year to lose weight	5.8	3.9	7.7	7.5	4.2
I have dieted in the last year to gain weight	9.5	14	5.8*	4.6	15*

* P<0.001

Consistent with the anthropometric findings, perceptions of underweight are more common than those of overweight in this population. Over half the boys (57%) want to gain weight, while 22% of the girls also felt underweight. Rural residents were also more likely to regard themselves as underweight than urban ones: 49% compared with 30% (P<0.001). Perceptions of being too fat and wanting to lose weight were more common in girls and urban residents. Despite this very few had made changes to their diet in the last year to either gain or lose weight, suggesting that the highly pervasive dieting culture of the West is not yet prevalent in China. In addition, a fairly consistent number across gender and area, around one third throughout, were happy with their body shape.

Comparison of perception of body weight and dieting behaviour with actual body weight is possible for the second stage respondents (n=1577). Of the 56 overweight students 47 (84%) wanted to lose weight, but of those only 14 (29%) had actually been on a weight losing diet in the past year. A further 347, who were classified as normal weight also wanted to lose weight, and 76 (22%) of them had actually dieted to lose weight in the past year. Two of those classified as underweight had been on a diet in the past year to lose weight. Of the 297 who were underweight 199 (67%) say they want to be heavier and 52 (17.5%) had altered their diet in the last year to specifically to gain weight.

7. 8 DISCUSSION

7.8.1 Overweight and underweight

Despite concerns about the growing problem of overweight and obesity in the Chinese,²³⁹ the findings of this study suggest that undernutrition is still a greater problem, even in the wealthier areas, but with little difference between the sexes or between urban and rural

residence. The number of underweight boys is almost three times that of overweight ones, even in urban Hangzhou, where boys have the overall highest rates of overweight at 8.4%. The rates of underweight we found were similar to those found by Wang et al in their younger adolescent age group of age 10-13 year olds.²⁴⁶ However, underweight in Chinese adolescents is not as prevalent as in other developing countries in Asia: in Nepal 47%, 55% in the Philippines and 32% in India.^{258,259}

The small difference between girls and boys in this population is in sharp contrast to other Asian countries. Studies from India, Nepal, Indonesia, Bangladesh and the Philippines showed that girls were more likely to have undernutrition.²⁶⁰ In China the fact that girls are at lower risk is probably partly explained by the One Child Family Policy which encourages parents to treat their daughters more equitably.^{108,246}

But the health consequences of this underweight and overweight are not clear. Identifying health-based cutoffs for categorising obesity and underweight in children and adolescents has proved to be a problem in many populations.²⁶¹ In adults these definitions are based on known risk ratios for different levels of body mass index. Extrapolating back from these for adolescents and children, as in the WHO and the Cole standards seems a logical approach. But when applied in different countries and ethnic groups the picture is more complicated. Cole's standards use data from six countries across three continents in an attempt to address this issue. But it is still possible that the high rates of underweight in this and other Asian studies may be an artefact of the cut-off points used: they may be too sensitive for Asian populations.²⁴⁶ Urban Chinese have gained more proportionately in height than weight over the past few decades, (1.7cm and 0.9kg /decade for boys, and 2cm and 0.9kg/decade for girls) leading to a taller, leaner population²⁴⁴ but the health consequences, if any, of this are unknown.

There is an additional question in adolescence: whether the underweight or obesity does persist into adulthood. Although evidence from Western countries suggest this is the case,²⁴¹ in China the phenomenon of childhood obesity is very recent and longitudinal studies are needed to answer this question. As has been observed in previous studies, overweight and obesity are mainly confined to male urbanites.^{237,239} Although rates of overweight and obesity are low overall in comparison with developed and middle income countries, it is of concern if these trends continue. Some local studies have highlighted

these trends, for example, a study in the northern province of Heilongjiang found that 5% of urban school students were overweight in 1991, and this had risen to 15% by 1993.²⁶² Some other nonrepresentative surveys suggest that the prevalence of overweight might have reached 6-9% in northern coastal provinces by the mid 1990s.^{249,263,264} However, these studies all used different indicators to define overweight, thus hampering useful comparison. The gender differences in overweight, with boys greatly outnumbering girls, are similar to those found in Hong Kong and Singapore.²⁵⁷

7.8.2 Anaemia

Anaemia, when defined as a haemoglobin of <120g/L was common, affecting over one third of all children and half the girls in Chunan. Female sex was the only significant association to emerge after logistic regression analysis. Interestingly, the examination of gender differences in other developing countries has suggested that adolescent boys are more prone to anaemia. In 32 studies among adolescents reviewed by De Maayer, the prevalence of anaemia was significantly higher in adolescent males in Africa, Latin America and the Caribbean and was similar in the two sexes in Oceania and Asia.²⁶⁵ An explanation for this is the fact that boys are developing muscle mass more rapidly than girls during the adolescent growth spurt, which has more effect on haemoglobin levels than menstrual loss in girls.^{260,265}

But the majority of those classified anaemic in this Zhejiang population had haemoglobins between 110 and 120g/L: 26% compared with only 10% below 110g/L. Whether this marginal anaemia is of clinical importance is controversial, in terms of cognitive function^{266,267} and physical performance.²⁶⁸ Therefore interventions beyond simple dietary advice, such as iron supplementation, are probably questionable. These rates of anaemia are moreover low compared with other Asian countries. Rates of anaemia in adolescent girls in India, Nepal, Indonesia and the Philippines in studies carried-out in the early 1990s varied between 35% and 85%.²⁵⁸

7.8.3 Age of menarche

The median menarcheal age in this population (12.8 years for urban Hangzhou and 13.2 years for rural Chunan) is lower than the age found in urban and rural Zhejiang by Lin in the early 1980s.²⁵³ He reported a median menarcheal age by Probit analysis of 13.3 and 13.6 years in urban and rural Zhejiang respectively. Our data suggest that the age of

menarche may be continuing to decline. It also demonstrates a marked skewed distribution with a relatively high proportion (18%) of 15-year olds still premenarcheal, although 66% of 13-year olds have reached menarche. This is more marked in the rural areas and may be explained by a subgroup of underweight girls who reach menarche late, or may simply be an artefact of small sample size.

But this data does support the importance of BMI as a predictor of the onset of menstruation. The relationship between nutritional status and menarche remains a matter of debate. A UK study concluded that in well-nourished populations the age of menarche is regulated mostly by genetic factors and that nutrition is less important.²⁶⁹ Other studies, notably in rural Bangladesh, where undernutrition is highly prevalent, have shown that girls who reach menarche are significantly heavier and taller and have a higher BMI than those of the same age who are pre-menarche.²⁷⁰ Our study draws similar conclusions. However, the major difference is that the weights and heights in our population of girls were consistently higher, but resulted in very similar pre- and post menarche BMIs by age, as in the Bangladeshi study. This concurs with the theory that BMI is a key factor in the onset of menarche.²⁵⁵ It can be concluded from this that it is likely that secular changes in body weight are having an impact on the declining age of menarche in China.

However, the data from this study suggests this is not the whole story. There were differences in the rural and urban areas in age of menarche, after adjustment for BMI and for other possible confounders, such as household income and parental education. This supports the view that some other unmeasured environmental variable is also influencing the onset of menstruation, a position between the two extremes of Bangladesh and the UK, which represent under-nourished and well-nourished populations respectively. Although in his large study in six Chinese provinces Lin didn't examine BMI specifically he did suggest that what he called "hereditary factors" were important in the onset of menarche, explaining the urban-rural and ethnic group differences which he observed.²⁵³

7.8.4 Exercise

The data on exercise indicates that these Chinese students are relatively active physically, and that for many exercise is part of daily activity, getting to school and in school. In Chinese schools there is compulsory daily morning exercise (consisting of fairly gentle bending and stretching to music) plus three-four 45 minute periods of sport every week,

probably explaining the relatively high levels of exercise. High levels of exercise in adult Chinese was noted by Popkin adult Chinese as well as in adolescents.^{238,239} The fact that exercise is part of daily routine also partly explains the lack of any association with overweight and underweight: everyone does it, irrespective of body weight. But naturally exercise is valuable for its own sake: sedentary children are likely to become sedentary adults²⁷¹ and the positive link between exercise and health is well-established.²⁷² Concerns about the low levels of exercise in British school children (71% of 14 year-olds doing less than 2 hours physical education per week)¹³³ led to the Government's recent call for all schools to enforce a policy of a minimum 2 hours of physical education per week. Perhaps the UK could learn something from Chinese approaches in this respect.

7.8.5 Diet and supplements

The dietary data is crude, with all the usual limitations of food frequency data.^{273, 274} More detailed approaches to dietary surveys (eg diaries, weighing of food items, 24-hour recalls) are all hampered in China by the custom of sharing communal dishes at meal-times, without individual plates of food. So accurate reporting of this type especially in young people would be very difficult to achieve. Our more crude approach does at least provide some insight into differences in urban and rural diet and the way in which the nutrition transition has influenced the urban diet.

In the last few years large increases in disposable income, together with improved food variety, and access to convenience food, have all had an impact on dietary habits, particularly in urban areas, and this is clearly reflected here in this food frequency data. However, traditional dietary habits persist. Rice and green vegetables are still the most commonly eaten foods. All these children were having at least one meal everyday in school and the Provincial Education authorities have drawn-up strict regulations about the composition of the school diet, with at least rice, a vegetable and meat/fish/chicken/ tofu to be offered at every meal. The fact that 36% are anaemic despite this, is perhaps something for the education authorities to examine.

The high proportion (78%) of urban adolescents drinking milk, which has only become widely available in the last three to four years, is also probably partly explained by the fact that it is offered at some schools. The apparently low consumption of fruit in the rural area (only 45% eating it more than two to three times per week) perhaps reflects the fact

that this study was carried-out in the winter, when availability of fruit is limited in the countryside. In urban areas fruit (imported from abroad or from southern China) is available, at a price, all the year round. It is of note that rice, pickles and green vegetables are the only foods eaten as often in the rural area. These are the traditional food of the poor, being the cheapest food available. A study carried-out amongst adults in an urban and rural area of Sichuan province in central China reported similar differences in variety in the urban and rural area, with more than half the urban respondents reporting eating a wide variety of food, while rural respondents reported eating only rice and green vegetables on a daily basis.²⁷⁵

Real or assumed deficiencies in diet are being made up for with nutritional supplements by some. Vitamins are widely taken by both boys and girls, particularly in the Hangzhou area. These nutritional supplements, which are mostly a form of Traditional Chinese Medicine, are believed to confer a wide range of health benefits and are taken regularly by nearly one third of all respondents. The cognitive benefits of many of these drugs are widely believed (and very heavily advertised, especially on television), explaining the high consumption by these young people under pressure to achieve academically.

Finally, it is clear that dieting to lose weight, which occurs in up to 25% of teenage girls in Western countries,²⁷⁶ is much less common in this population. Only 5.8% of these young people (3.9% of the boys and 7.8% of girls) had been on a diet to lose weight in the past year. Indeed there was more concern to gain weight: 14% of the boys and 5.8% of the girls had altered their diet to gain weight in the past year. However, the finding that 25% of those who were normal weight wanted to be thinner, and that 22% of those had dieted to lose weight, suggests that eating disorders such as anorexia nervosa, which are currently largely unrecognised in China, may emerge as a problem in this population in the future.

7.9 SUMMARY

This data shows clear differences between urban and rural lifestyles and diet, which are accompanied by differences in anthropometry and haemoglobin status. Rural adolescent boys have a lower mean BMI, are less overweight, have the same rate of underweight, the same mean haemoglobin and they exercise more than their urban counterparts. Rural girls have a lower mean BMI, more underweight, almost no overweight, are more likely to be anaemic and will reach menarche later than city girls. In the rural area diet was less varied,

but there was also less convenience and snack food consumed. Most of the differences found though were small and it is unclear how they contribute to any differences in child development, such as cognition, school achievement or resistance to infection.

CHAPTER 8: PSYCHOLOGICAL MORBIDITY

8.1 INTRODUCTION

This subject was covered in detail in the second questionnaire. It's further exploration was deemed necessary by the leading group because of the high rate of apparent psychological morbidity revealed in the first survey, and because of an incipient professional and public awareness of anxiety and depression in adolescents.

8.2 BACKGROUND

Evidence for the massive global burden of disease from mental illness has recently been documented and pushed mental illness up the health policy agenda in many countries.²⁷⁷ In developed countries mental ill health is known to be common: one in twelve men and one in six women will have a clinically diagnosed mental illness during their lifetime.²⁷⁸

Mental ill health is also known to be particularly common in young people. Adolescents are particularly vulnerable to stress and emotional lability, leading frequently to depression and anxiety.²⁷⁹ This predisposition has been intensified by the rapid changes taking place in many societies at present. Weakening family structures, rapid urbanisation, severe competition for education and employment, the changes resulting from new technologies and exposure to drugs and alcohol all have a disproportionate influence on the mental stability of young people.¹³ Early detection of mental illness in the young is of great importance, because major mental illness, particularly depression and schizophrenia, commonly starts during adolescence. More than 50% of those who ever develop depressive illness will have had their first symptoms by the age of 25 years.²⁷⁹

Epidemiological studies in Western countries have reported high levels of psychological morbidity in young people. For example, in a UK study of 14-16 year olds 8% reported that they were fed-up or depressed everyday, and 28% at least once per week. Only 3% of the girls and 8% of the boys had never felt depressed.⁴⁸ The rate of clinical depression in the 11-18 year-olds studied in the US National Longitudinal Study of Adolescent Health was 9.3% with no significant difference between girls and boys.¹⁵²

But the mental health of young people has been neglected in many developing countries²⁷ with the result that the prevalence of psychiatric illness in adolescents is often unknown.

China is no exception. Routine data, where it is available, is unhelpful, because of low coverage of services, especially in rural areas, because of differing conceptualisation of illness (a strong tendency to somatise mental health problems) and because patterns of help-seeking mean that many ill people are not identified by the health system.¹¹³ The overwhelming majority of research on the psychology of the Chinese people has been carried-out in Taiwan and Hong Kong and amongst overseas Chinese.¹¹² Only since the mid-1980s has the discipline of child psychology attained any prominence in Mainland China. This new interest has been driven by a number of factors.

First, the introduction of the One Child Family Policy has attracted the attention of psychologists. It was widely expected that it would have detrimental effects on the mental well-being of Chinese children and adolescents. The Chinese traditionally value the qualities of good behaviour, sociability and malleability in their children. These have been perceived as threatened by the One Child Family Policy, since only children elsewhere have been depicted as more egocentric, less co-operative, and more maladjusted than children with siblings.²⁸⁰ However, results from early studies on the psychological development of younger only children were mixed. In fact, the weight of evidence was that the mental health of only children was as sound if not better than that of children with siblings.²⁸¹⁻³ Because the One Child Family Policy was only actively enforced in 1982 the first cohort of “compulsory” only children are only now in late adolescence and there have been few studies to date of this age group.

Second, interest has been generated by massive societal change in the last two decades. There have been huge changes in many aspects of traditional society with threats to the previously clearly demarcated social hierarchy with its inherent emphasis on respect, filial piety and family stability. In the rapid transition to a market economy, the previous system of job allocation and “jobs for life” has been replaced by huge competition for jobs, and unemployment. Increased disposable income and access to new technologies have improved standards of living for the vast majority. But there has also been a great increase in choice and corresponding aspirations. Such rapid change and instability are known to be particularly stressful for young people.¹⁴

Thirdly, and of particular interest to Western researchers, has been the effects of Chinese child rearing and educational practices on the psychological well-being of adolescents.

Chinese parents tend to be highly lenient, even indulgent, towards the infant and young child. The older child in contrast is usually subjected to strict discipline. The change in disciplinary demands characteristically occurs quite abruptly, often at entry to primary school at age six.²⁸⁴ In general Chinese parents place great emphasis on achievement, obedience, impulse control, good moral character, sociability and controlled temperament. These are valued over creativity and all round personal development. Based on Western theories such emphases would be expected to nurture the development of psychological problems, such as anxiety and depression.²⁸⁵

At school these qualities are equally valued. Education and success in exams are regarded as the primary path of upward mobility in contemporary Chinese society. At school children and adolescents are taught that hard work, study and high educational achievement are important forms of self-improvement. Moreover they are taught that their level of achievement reflects on their family, their school and the country. It has been suggested that this pressure to achieve may have its greatest (and potentially most debilitating) effect on the middle school age group, since exams taken at the end of middle school determine entry to high school and entry to a good high school is widely regarded as the passport to a much-prized university place. In Taiwan and Hong Kong where competition is just as intense for limited places in higher education these pressures have been shown to be a major cause of psychosomatic and neurotic disorders. Specifically, fear of failure at exams has been shown to lead to anxiety, depression and psychosomatic symptoms.¹¹³

Finally, the whole issue of psychological well being in adolescence has been brought into sharp focus by the recognition of the high suicide rate in young people in China. As in most other countries the stigma attached to suicide means that a diagnosis is usually only made in cases of certainty. Official data for China gives an overall suicide rate of 15/100,000 in men and 20/100,000 in women, a male:female ratio of 0.77 and an urban:rural ratio of 0.5.³⁷ The rate for rural women is particularly high in the 15-24 year old age group (a rate of 38/100,000), ten times the US figure for this age group.²⁸⁶ Rates in young women aged 15-24 are only exceeded by the over-55 age group. This is in contrast to the usual situation in the West where urban men have the highest suicide rates and where parasuicide (attempted suicide) is more common in young women.²⁸⁷ There are no official figures for parasuicide in Mainland China. In other countries with majority

ethnic Chinese populations like Hong Kong and Singapore male suicide predominates.¹¹² But it seems that this male predominance is not directly related to increased depression or distress in men. It is largely linked to the mode of lethality: most males choose more aggressive and hence successful methods.²⁸⁸

The mode of lethality has been speculated as the reason for the high rate of suicide in Chinese women. In rural areas women favour the ingestion of highly lethal toxins, such as weed-killer.²⁸⁹ But the picture is more complicated than that. There may be an element of under-reporting of male suicide: the stigma surrounding suicide appears to be strong, with more loss of face for men than women, and thus more reluctance to record male death as suicide. It is also possible that the lower social status and self-esteem which is assumed to be more marked in women in rural areas is a contributory factor. Further in rural areas psychiatric services are almost non-existent. The high rates are certainly multicausal and it is impossible to draw a direct causal link between depression and suicide in these women. To determine whether rates of depression and suicide ideation were higher in rural girls was one of the aims of the study.

A bewildering array of methodologies, scales and definitions has been used to assess psychological well-being for epidemiological purposes in Chinese populations. Comparisons are therefore difficult and the findings are usually suggestive rather than definitive. But data for mainland China and more particularly for adolescents in mainland China is very limited and few studies look beyond a handful of socio-economic or demographic variables. In the international literature a number of factors have been identified as associated with psychological morbidity in this age group. School-related stress and relationships are the two most consistent areas.¹²⁹ A further area which remains largely unexplored for China is the effects of bullying. Bullying is known to be a phenomenon in schools worldwide²²⁴ and victims of frequent bullying experience a range of psychological, psychosomatic and behavioural problems, including depression and anxiety, headaches and abdominal pain.^{290,291}

Such somatisation is very common in Chinese society and has been cited as one of the reasons for the low rates of diagnosis of mental illness.¹⁶⁰ Thus many with underlying psychological problems will present with a physical complaint to a medical doctor and the underlying problem is undiagnosed. However, studies in Hong Kong and Taiwan have

shown that, although the presentation is with a physical complaint, individuals do recognise and admit symptoms of anxiety and depression if asked.¹¹² But professional help is in any case rarely sought, and in a country with very few trained psychotherapists or counsellors, family and friends provide the major support for individuals with emotional and psychological problems. Even in Hong Kong students generally do not seek help for their emotional problems and when they do they go to a medical practitioner.²⁹² The fact that medical care is sought for psychological problems highlights the lack of psychotherapeutic services and the fact that the Chinese tend to somatise their emotional problems.

The overall aim of this component was to inform service developments in this area. Therefore the purpose was to quantify the amount and severity of depression and anxiety in these young people, identify their determinants, including the effects of the one child family, and to examine patterns of help-seeking.

The socio-demographic characteristics of the sample are shown in Table 4.2

8.3 ANXIETY

Results from questions about anxiety are tabulated in Table 8.1.

Table 8.1 Anxiety: affirmative responses by sex and area n (%)

	All n=1577	Male n=770	Female N=806	P- value	OR (95%CI)	Urban n=784	Rural n=792	P- value	OR 95% CI
I worry a lot	1104(70)	524(68)	580(72)	0.12	1.1 (0.9,1.1)	542(69)	562(71)	0.8	1.0 (0.9,2.1)
Worry interferes with my enjoyment of life	757(48)	346(45)	411(51)	0.03	1.2 (1.0,1.6)	342(44)	415(53)	0.003	1.3 (1.1,1.7)
Worry makes it hard for me to relax	631(40)	289(38)	342(43)	0.03	1.3 (1.0,1.6)	263(34)	368(47)	0.000	1.7 (1.4,2.1)
Worry interferes with my sleep	426(27)	188(25)	238(30)	0.03	1.3 (1.0,1.6)	153(20)	273(35)	0.000	2.1 (1.7,2.7)

Seventy percent of all these young people say they worry a lot, with nearly half saying it interfered with their enjoyment of life, 40% saying it made them feel tense and unable to relax and over a quarter saying it interfered with sleep. There are only small gender differences in all these measures of worry, but rural students were significantly more likely to be severe worriers than urban ones.

Cross-tabulations by the other socio-economic and demographic variable revealed very few significant differences, for age, parental education or occupation, and household income, suggesting that worry is a universal problem which transcends socio-economic and demographic groups. There were only two consistently significant associations for the more severe levels of stress, after adjustment for the other variables: rural-living and having one or more siblings. Rural dwellers were more likely to worry to the point it interfered with life OR 1.5 (1.2,1.7) prevented relaxation OR 1.6 (1.3,1.9) or interfered with sleep OR 1.9 (1.5,2.4). For those with siblings the respective adjusted odds ratios are 1.4 (1.1-1.7), 1.6 (1.3-2.0), 2.0 (1.6-2.6).

Major sources of worry are shown in Table 8.2. This was presented as a closed question in the second survey with categories based on those given in the open question in the first questionnaire.

Table 8.2
Percentages giving affirmative responses to the question
“Do you worry a lot about any of the following?”

	Total	Male	Female	P-Value	Urban	Rural	P-value
School performance/grades	68	65	72	0.005	63	75	<0.001
Getting a job after leaving school	51	51	52	0.5	50	54	0.12
Homework	44	43	44	0.6	44	43	0.7
Family economic situation	24	24	23	0.6	8.5	40	<0.001
Appearance	15	14	15	0.6	12	16	0.004
Family quarrels	14	14	14	0.9	12	15	0.05
Unpopularity	13	15	12	0.05	11	16	0.005
Parents separate/divorce	4.4	4.5	4.3	0.8	5.0	3.8	0.25

School-related issues were the most important sources of worry. Over two-thirds cited school performance with significantly more rural dwellers ($P < 0.001$). Nearly one half worry a lot about homework, with no urban/rural or gender differences. Half of these young people were worried about getting a job after leaving school, again with no urban/rural or gender difference. Furthermore there were no significant differences here in terms of age ($P = 0.21$). This is of note given many of these young people are several years away from the time of seeking employment, so worries on this score start early.

More traditional concerns of adolescents seem of less importance, only 15% were concerned about appearance, family quarrels just 14% and the break-up of the family just 4.4%. Nearly one quarter (24%) are worried about family finances with nearly five times as many in rural Chunan (40% vs 8.5% $P<0.001$).

Since homework figured prominently in both questionnaires as a source of worry students were specifically asked about their volume of homework. The mean time spent on homework every evening was 2.9 hours with no significant difference by age, sex or urban/rural residence.

8.4 DEPRESSION AND SELF-HARM

Questions on depression and suicide were ordered by severity. Responses are in Table 8.3

Table 8.3 Depression and suicide: affirmative responses by sex and area n (%)

	All n=1577	Male n=770	Female n=806	P-value	OR (95% CI)	Urban n=784	Rural n=792	P-value	OR (95% CI)
Are you often sad and tearful?	536(34)	191(25)	345(43)	<0.001	2.3 (1.9-2.9)	196(25)	340(43)	<0.001	2.2 (1.7-2.7)
Have you been sad/tearful in the past week	568(36)	202(26)	366(45)	<0.001	2.4 (1.9-2.9)	263(33)	305(38)	0.02	1.3 (1.0-1.6)
Sad to point of having no desire to do things?	520(33)	231(30)	289(36)	0.009	1.4 (1.1-1.7)	211(27)	309(39)	<0.001	1.7 (1.4-2.2)
Have you ever felt life doesn't seem worth living	252(16)	104(13)	148(18)	0.006	1.5 (1.1-2.0)	147(19)	95(12)	0.001	0.6 (0.4-0.9)
Have you ever tried to end your life?	142(9)	54(7)	88(11)	0.004	1.5 (1.1-2.0)	90(12)	52(7)	0.001	0.6 (0.5-0.8)

Around one third of all respondents said they were often sad and tearful, significantly more girls ($P<0.001$) and rural inhabitants ($P<0.001$). Throughout the questions related to depression girls and rural dwellers were significantly more at risk. The exception is that thoughts of self-harm and actual self-harm were less common in the rural area.

Analysis by household income and parental education and occupation gave inconsistent results, suggesting overall that these are not important risk factors for depression.

There was also a strong relationship between worry and depression. Those who are depressed are five times as likely to say they worry a lot (OR 5.18, 3.74-7.18).

8.5 MOOD

Two questions explored other aspects of mental well-being: temper and concentration. Results are shown in Table 8.4.

Table 8.4 Mood: affirmative responses by sex and area n %

	All n=1577	Male n=770	Female n=806	P-value	OR (95%CI)	Urban n=784	Rural n=792	P-value	OR (95%CI)
Do you get angry and lose your temper easily?	820 (52)	349 (45)	471 (58)	<0.001	1.6 (1.3,2)	349 (44)	471 (59)	<0.001	1.8 (1.5,2.2)
Do you often have difficulty concentrating?	867 (55)	448 (58)	419 (52)	0.009	1.8 (1.5,2.2)	349 (44)	518 (65)	<0.001	2.4 (1.9,2.9)

Fifty-two percent admitted that they got angry easily and often lost their temper. Girls were significantly more likely to admit to losing their temper easily, as were those from rural Chunan. Fifty-five percent said they were easily distracted and found it difficult to concentrate, with boys and rural children much more prone. Both of these mood variables were strongly associated with depression and worry. Those who worried a lot were over twice as likely to admit to frequent loss of temper (OR 2.1, 1.6-2.7) and over three times as likely to have problems with concentration (3.5,2.7-4.5). Likewise those who admitted to depression were over twice as likely to have a bad temper OR 2.5,1.9-3.2 or to have poor concentration OR 3.0 (2.3-3.9).

8.6 SOMATISATION

Respondents were asked whether they get “a lot of headaches, stomach aches and sickness” in an attempt to determine levels of somatisation. Overall 34% percent admitted to these symptoms, significantly more girls (39% vs 28% $P>0.001$), but with no significant difference between urban and rural: 36% vs 34% $P=0.2$. As a marker of somatisation a key question is whether these symptoms occur more often in those who admit to worry and depression. They are over twice as common in those who admit to depression (OR 2.4 1.9-3.0) and in those who have attempted suicide (OR 2.3,1.7-3.1) and nearly twice as common in those who worry a lot (OR 1.9, 1.5-2.4).

8.7 BULLYING

Responses to questions on bullying are in Table 8.5. The word for bullying used in the second question relates explicitly to physical abuse. In the original question students were asked if the mocking or bullying occurred “often, sometimes or not at all”. For analysis purposes often and sometimes have been combined. The percentages that stated often were very low throughout at less than 4.5%.

Table 8.5

Bullying: percentages giving affirmative responses to the questions by sex and area

	All	Male	Female	P-value	OR (95%CI)	Urban	Rural	P-value	OR (95% CI)
Do you get laughed at (mocked) by school mates?	46	51	41	0.000	0.7 (0.5-0.8)	40	52	0.000	1.7 (1.4-2.0)
Do other children bully you?	35	39	30	0.000	0.7 (0.6-0.8)	25	44	0.000	2.3 (1.0-2.9)

Mocking and bullying are clearly experienced by many children, mocking by nearly half and bullying by over one third. Bullying is experienced more by boys, although the difference between the genders is not great. Children are over twice as likely to experience bullying in rural areas (OR 2.31, 1.89-2.92). There were no differences for either mocking or bullying across age groups.

Although the degree of distress, if any, experienced by the victims of mocking and bullying is impossible to assess from this data, mocking and bullying are associated with psychological morbidity in this population. Those who are bullied are over twice as likely to worry a lot (OR 2.55, 2.01-3.21) and twice as likely to get depressed (OR 2.03, 1.62-2.55). Those who are mocked are nearly twice as likely to say they worry a lot (OR 1.83, 1.41-2.37) or be prone to depression (OR 1.76, 1.39-2.24).

8.8 FRIENDSHIP

Only 3.4% said they had no friends, though more of these were boys (5.2% vs 1.6%). The overwhelming majority (80%) had three or more friends with insignificant gender and urban rural differences. The responses related to friendship are shown in Table 8.6

Table 8. 6
Friendship: percentages giving affirmative responses to the questions
by sex and area

	All	Male	Female	P-value	OR 95% CI	Urban	Rural	P- value	OR 95% CI
Do other children of your age generally like you?	73	72	73	0.5	1.0 (0.8,1.3)	75	72	0.14	0.8 (0.7,1.0)
Can you confide in your friends?	75	67	82	<0.001	2.3 (1.8,2.8)	73	77	0.1	1.2 (0.9,1.5)
If you have problems can you tell your friends?	72	64	80	<0.001	2.2 (1.7,2.7)	75	70	0.05	0.8 (0.6,1.0)

The majority of these children had friendships in which they could share problems, though girls found this slightly easier than boys. Cross-tabulations between these parameters of friendship and responses to worry and depression shows no significant relationship between friendships and the tendency to get depressed or to worry a lot. The one exception was that being able to share problems with friends did have a significant protective effect against worrying a lot (OR 0.5, 0.4-0.6).

8.9 HELP-SEEKING

Respondents were asked who they actually had sought help from if they felt depressed or worried about something. They were also asked who they would like to receive help from if they had a problem. Responses are in Table 8.7.

Table 8.7 Help seeking behaviour for psychological problems (n=1070)

	Who did you ask for help?	Who would you like to receive help from
Friend(s)	40	35
Parents	26	20
Teacher	2.2	9
Other relative	1.1	1.2
Doctor	0.2	0.7
School nurse/doctor	0.1	3.3
Psychotherapist/counsellor	0.1	4.9
Telephone helpline	0.3	14
No-one	30	12

Most striking are the findings that nearly a third go to no-one for help and that only a tiny minority seek help beyond their social network of family and friends. Friends are the most important source of support, followed by parents. All other sources are rarely cited. In contrast preferences for help-seeking show that many more would like to use professionals, including counsellors and school-based professionals, suggesting the existence of

considerable unmet need. As in the first survey the telephone helpline features as a potential source of help. (At the time of this survey the only telephone helplines in Zhejiang were provided by local radio stations in the form of phone-ins.)

8.10 THE ONE CHILD FAMILY

Analysis of all the variables was carried-out comparing adolescents in the one child family with those in families with siblings. Table 8.8 shows the unadjusted odds ratios and the adjusted odds ratios, where variables are significant, adjusted for sex and urban/rural residence. Note that in Hangzhou 94% are only children with equal numbers of girls and boys. In Chunan 30% are only children and of these 82% are boys (see Chapter 4).

Table 8.8. Summary of psychological morbidity parameters by family size %

	One-child	Two+ Child	Unadjusted OR (95% CI)	P-value	Adjusted* OR (95% CI)	P-Value
Worry a lot	59	60	1.0(0.8,1.3)	0.6	1.0 (0.7,1.3)	0.7
Worry interferes with life	37	45	1.4 (1.1,1.7)	0.002	1.1(0.8-1.7)	0.4
Worry makes it hard to relax	29	40	1.6(1.3,2.0)	<0.001	1.6(1.1,2.3)	0.09
Worry interferes with sleep	19	32	2.0(1.6,2.3)	<0.001	1.5(1.1,2.0)	0.02
Often sad and tearful	24	39	2.0(1.6-2.5)	<0.001	1.0(0.8,1.5)	0.65
Sad and tearful in past week	30	36	1.3(1.1-1.6)	0.01	0.9(0.7,1.2)	0.5
Sad to point of no interest n life	25	35	1.6(1.3-2.0)	<0.001	1.2(0.9,1.6)	0.3
Life has felt not worth living	14	14	1.0(0.8-1.4)	0.89	1.0(0.8,1.2)	0.9
Have tried to end life	13	11	0.9(0.6,1.2)	0.39	1.2(0.8,1.9)	0.31
Easily angry	46	60	1.7(1.4,2.2)	<0.001	1.1(0.4,1.5)	0.43
Difficulty concentrating	50	63	1.7(1.4,2.1)	<0.001	1.0(0.7,1.4)	0.77
Lots of headaches etc	30	31	1.0(0.8,1.3)	0.76	1.0(0.7,1.4)	0.58
Generally liked	75	70	0.8(0.6-0.9)	0.03	0.8(0.5,1.0)	0.09
Confide problems in friends	70	62	0.5(0.4-0.6)	<0.001	0.6(0.4,1.1)	0.12
Mocked	42	52	1.5(1.2-1.8)	<0.001	1.4(1.01,1.8)	0.04
Bullied	29	44	2.0(1.6-2.4)	<0.001	1.5(1.1,2.0)	0.006

* Adjusted for sex and urban/rural residence

Unadjusted odds ratios suggest that being an only child is protective against many of these parameters of psychological morbidity. But after adjustment for residence and sex only one parameter approaches significance: children with siblings are more likely to have been bullied.

8.11 DISCUSSION

8.11.1 Limitations

There are clearly major limitations in using a few questions to describe the complexity of the psychological mechanisms and coping processes which these adolescents are adopting. But this is the first time that children in Zhejiang Province have been involved in a survey of this kind and these questions are clearly of a sensitive nature. Therefore it is encouraging that the responses appear to be fairly candid. If anything the rates found are likely to be underestimates of the real situation. Because of the way the questionnaire was designed and the necessity to adapt it to the Chinese setting we have not established a threshold for case definition. Nor can we make direct comparisons with other studies among Chinese populations. But the purpose was to gather information on these adolescents to inform local service developments and not just to make epidemiological comparisons. However, some comparisons can be made with other studies, especially in terms of demographic and socio-economic risk factors.

8.11.2 Anxiety and depression

Overall levels of anxiety and depression are high in this sample of adolescents, and they are high across the age range. It is possible to make some comparison with the UK survey of mental health in children and adolescents which was the source for some of these questions. This showed that anxiety leading to lack of sleep was reported for 12% of boys and 15% of girls in the 13-18 age group.¹³⁵ This compares with 25% and 30% respectively in this study. Likewise in response to the question "Have you ever felt life is not worth living?" 6% of UK 13-18 year old boys and 5% of the girls answered in the affirmative compared with 13% and 18% respectively in this study.

The absence of significant differences across age is surprising given that it might be expected that as the important entrance exams for high school approach, the stress levels will increase along with levels of worry and depression. This suggests that pressures are high with frequent exams and assessments throughout the middle school years. While age is not a factor rural residence is consistently associated with worry, depression, tendency to anger and poor concentration, after controlling for potential confounders (parental education, occupation and household income).

Girls report higher rates of depression than boys, but similar rates of worry. Some comparison can be made with elsewhere. Liu found no gender differences in levels of depression in a sample of students aged 13-22 years old in Shandong Province, though levels of depression dropped dramatically after the age of 18.²⁹³ Hu found higher rates of anxiety, depression and suicide ideation in girls in his study of high school students in Beijing.²⁹⁴ A study in Hong Kong Chinese middle school students showed that boys scored lower for depression indices than girls.²⁹⁵ Taiwanese 15-16 year old girls reported higher rates of depression and sleeping disorders than boys.¹¹⁴ In this same study comparison was made with American students. Overall the Taiwanese students reported more depression but less anxiety and stress than American counterparts. Given that the assumption was that the Taiwanese would suffer more stress because of pressures to achieve academically, the authors proposed that the Americans were simply more willing to admit to stress, though there was no evidence for this.

There have been a number of explanations put forward for the differences in psychological morbidity by gender. The gender differences have been explained by the fact that females have lower self-esteem and that they may be more expressive and willing to acknowledge personal difficulties.²⁹⁶

This study also reports higher levels of anxiety and depression in rural areas. These have been attributed to lower status and self-esteem (particularly for women), a lower general satisfaction and comfort in everyday life, and the virtual non-existence of psychiatric services. This however needs to be balanced against the hypothesis that urbanisation and high density living are a major cause of psychological morbidity.²⁹⁶ It is of note then that amongst Mainland Chinese in Hong Kong it has been shown that there is a high tolerance of overcrowding and that interpersonal conflict rather than space itself is the major sources of stress in situations of high density living.²⁹⁷ Young people who have known no different may be more impervious to the stresses of cramped housing.

Depression and anxiety have been shown to be interrelated dimensions in children in the UK and US.³⁰¹ We found not only this association, but also that anxiety and depression were related to anger and poor concentration. In other words all of these parameters are interrelated. This shows that a minority of these young people are suffering from a range of psychological difficulties which would benefit from professional help.

8.11.3 Suicide ideation

Contemplation of suicide and actual attempts are also very high in our study. Sixteen percent had felt life wasn't worth living and over half of these claim to have actually attempted suicide, a finding which is alarming given the age range of these students. The rates were higher amongst girls and in urban areas. The urban predominance is of note because overall levels of morbidity are lower in urban areas. This is also contrary to expectations, given the evidence from mortality studies which shows that suicide is more common in the rural areas. But the actual differences are small against the background of an overall high rate of young people who have attempted and contemplated suicide. In western countries parasuicide is more common in girls while successful suicide attempts are more common in boys. For example, the US National Longitudinal Study on Adolescent Health of 11-18 year olds reported 10.2% of girls and 7.5% of boys had considered suicide, while 5.1% of girls and 2.1% of boys reported actual suicide attempts.¹⁵²

The evidence about parasuicide in this population suggests that there is a large number of highly vulnerable young people who would benefit from targeted services (as discussed in Chapter 9).

8.11.4 Sources of worry

The major sources of worry in this study were related to school stress and match closely the findings about health concerns reported from the first survey (Chapter 5). The fact that in the rural area more students are worried about their school performance and an equal number worry about homework and getting a job after school illustrates well that these rural adolescents are not assuming they will be spending their lives as farmers like the majority of their parents. Other Chinese studies show the emphasis on academic achievement, but none include rural populations: the major worries in Dong's study of 11-14 year olds was failing a test and getting poor grades.²⁹⁹ Chinese college students (15-21 years old) stated the major causes of anxiety and depression were test pressure, lack of leisure time, peer competition and failure in a test.³⁰⁰ In Taiwan Huang found academic failure and interpersonal problems were the major sources of anxiety and worry for middle school students.¹¹⁴

8.11.5 Bullying

Only four mentioned bullying in the “other” category for causes of worry, although when specifically asked over one third admitted to being bullied sometimes or often. Being bullied was also strongly associated with worry and depression. There is little in the Chinese literature on the subject of bullying. But a recent study carried-out in Shanghai and Yanji showed that 43% of 10-12 year olds had been bullied by their peers.³⁰¹ Given the emphasis on impulse control and conformity perhaps there is a reluctance by school authorities to confront a problem which is probably widespread, but culturally unacceptable. Again comparisons with studies from other countries are hampered by different definitions used. But overall estimates for Europe estimate that around 10% of school children are bullied weekly at school.¹²⁹

8.11.6 Help-seeking

Studies in other Chinese populations have identified factors which protect against psychological difficulties. They emphasise the importance of good social networks, family and friends.^{113, 294, 295} Our findings agreed with this: being able to share problems with friends was a significant protective factor and the majority of students go to friends and parents when they have with problems.

But there is reluctance to seek help, with thirty per cent saying they didn't share their problems with anyone and with less than 1% having sought professional help. This is in contrast to the higher numbers who say they would like to receive some form of professional help, from a telephone helpline (14%) or from a counsellor (5%). There are a number of reasons for this reluctance to seek help for psychological problems. They include habit and tradition, the lack of quality psychotherapeutic services and the tendency to somatise in Chinese populations. Where psychiatric services exist medication is the main form of treatment. In Boey's study of college students in urban China there was a great reluctance to use mental health services, but the main reason given was lack of confidence in the professionals rather than any stigma of mental illness.³⁰² Boys were more likely to rely on themselves for solving personal problems while girls were more likely to go to their parents for help. Our study showed a similar gender pattern. The degree of somatisation is impossible to assess except to conclude that common somatic complaints occur more frequently in those who admit psychological problems. There is clearly scope for training physicians in the recognition of psychosomatic symptoms.

8.11.7 Effects of the One Child Family

After adjusting for confounding variables our findings suggest that family size has little influence on mental well-being. If anything the one-child family may have a marginal protective effect, so that only children may be less prone to depression and anxiety. The one exception is that children with siblings report being bullied significantly more after controlling for other factors. Yang has suggested a possible explanation for this.³⁰³ He explains the higher levels of anxiety and depression in children with siblings in his study by the fact that children from larger families are viewed with disapproval, when there is saturation propaganda about having only one child, a factor which could explain bullying as well. But Yang's study was carried-out in an urban area, and this disapproval may indeed affect children in urban areas. But in rural Chunan where most of the families have two children it seems unlikely that this type of disapproval would explain bullying behaviour in schools.

The effects of the one child family and the one child society in urban China are still unclear. Many studies have not adjusted for important confounders, including gender of the children, residence of the family and socio-economic status of the family.²⁸³ Other possible factors include the preference, if any, of the parents for the gender of the child, position of the child in two child families and proximity of extended family.

8.12 SUMMARY

Despite its limitations this component of the study has illuminated some areas: the high rates of psychological morbidity across all demographic groups, the ubiquity of school-related pressure, the minimal influence of the one child family and the very low levels of professional help-seeking. Preferences for help-seeking suggest there is scope for more professional involvement.

CHAPTER 9:

PROFILE OF ZHEJIANG ADOLESCENTS: RECOMMENDATIONS AND OUTCOMES

9.1 INTRODUCTION

Each chapter of results has had its own discussion section, which focused on specific themes, and which attempted to place the findings of each chapter in a national and international context. The purpose of this final chapter is to draw the threads of all sections together to develop a picture of adolescence in urban and rural Zhejiang Province, to describe how the findings of the study were used to draw-up recommendations, and to explain how these recommendations were converted into policy and action.

9.2 LIMITATIONS

But first acknowledgement must be made about the study's limitations. As the first study of its kind in Zhejiang Province, it is clearly very limited: broad-ranging but inevitably superficial. The major limitations come from the constraints on the approaches used and on the content of the questionnaire. From an epidemiological point of view, the sampling constraints (just three areas and twelve schools) raises the question of the representativeness of this data for the whole of Zhejiang Province. However, because of the way in which "typical" areas were chosen, members of the leading group were convinced that the data was representative enough for policy purposes. Indeed, some members of the group felt that the data was actually representative of the other more developed provinces of eastern China, such as Fujian, Jiangsu, Guangdong and Shandong, as well.

In adolescent health research in Western settings triangulation is now regarded as highly desirable to increase the validity and reliability of results.⁵⁸ The qualitative component of this study was limited to early exploratory discussion groups to inform the content of the questionnaires and feedback sessions (see below) to verify some of the findings. It was impossible to collect the type of qualitative data which would come from focus groups or semi-structured interviews, both because of financial constraints, and because some members of the leading group were strongly opposed to the use of such methods.

For reasons outlined in the Methods' chapter there are many omissions. We have no data on sexual activity or attitudes (except masturbation), and the only other question relating to sex was about knowledge of HIV transmission. Results of this question are shown in Table 9.1. The knowledge of these middle school students about HIV was actually better than some members of the leading group! Other risk-taking behaviours, apart from smoking and drinking alcohol were not explored, since the general consensus is that other forms of drug abuse, though a growing problem in China, start in young adulthood and not adolescence.⁸⁷

The other area that was only touched upon was violence. Recent work has revealed high levels of violence at home and at school, perpetrated by teachers.³⁰¹ We were aware that this was very sensitive territory, especially when the co-operation of teachers was needed to administer the questionnaires. However, it is interesting that in the early exploratory discussions with students about content of the questionnaire, the issue of violence was not raised. This could be explained in a number of ways: violence is rare and not a problem, the subject of violence is taboo, so students are afraid to raise it, or that violence at home and school are an expectation and therefore not an issue for discussion. Further research in this area is clearly necessary.

Table 9. 1

Knowledge of HIV transmission in 13-16 year olds by percentage (n=1560)

How can you catch HIV/AIDS?	Yes	No	Don't know
Kissing an infected person	34	42	24
Shaking hands with an infected person	15	61	23
Blood transfusions	67	13	19
Sexual intercourse	61	16	23
Mosquito bites	49	25	25
Chopsticks which have been used by an infected person	36	38	26
Toilets which have been used by an infected person	30	35	35

9.3 ADOLESCENCE IN URBAN AND RURAL ZHEJIANG

Overall these adolescents are physically healthy, studious and risk-averse, but they feel pressurised to achieve academically. There are numerous significant differences between urban and rural, but even where the differences are significant at the $P < 0.001$ level the actual differences are probably not of great importance in terms of policy. They represent part of a continuum. The inclusion of Xiaoshan in the first survey tends to confirm this. Many of the results from Xiaoshan fall between the two extremes of Hangzhou and Chunan.

The **mortality** rate of these adolescents is low overall, but is higher in rural areas. Of the known causes of death the majority are from accidents. Nearly half of these accidental deaths are from road traffic accidents, followed by drowning and suicide. Infectious disease ranks second with pneumonia topping the list. There are only small urban/rural differences, except in the predominance in infectious diseases in the rural area.

There is a sharp contrast between the three areas in terms of the **demographic and socio-economic** profile. The overwhelming majority (90%) of Hangzhou adolescents are only children, compared to around half in Xiaoshan and 10% in Chunan. In Xiaoshan and Chunan most of the only children are boys, showing clearly the impact of the policy of allowing another child if the first child is a girl. In terms of socio-economic background Hangzhou adolescents have better educated parents who are more likely to have professional or managerial jobs. The parents of Xiaoshan adolescents have the least educated parents, despite their relative wealth. The proportion of Xiaoshan parents working in factories now exceeds the proportion working on the land reflecting a dramatic transition over the past two decades from a predominantly agriculturally-based economy to one based on manufacturing. In Chunan the majority of parents are farmers. The average monthly household income in Hangzhou is twice that in Chunan.

Most of these young people live with both their parents in nuclear family settings. Only a small proportion, around 15% overall, live in extended family units. Divorce rates are low, although in Hangzhou they are twice the rate of both Xiaoshan and Chunan. Separation from parents, because they are working elsewhere, is as common as divorce. There are also marked gender differences in parental education, with four times as many mothers as fathers being illiterate, 28% compared with 7.4% and over twice as many fathers having

completed a tertiary education. These contrast with the educational picture for these adolescents. National statistics show literacy rates of 95-97% for urban 18-year olds today,⁷² illustrating the dramatic change in educational aspirations and opportunities in one generation.

The major causes of **morbidity** are common conditions: upper respiratory tract infections, headaches, abdominal pain and diarrhoea. Utilisation of health facilities is high for minor illness across all areas. Most health care was paid for out-of-pocket, especially in Xiaoshan where 86% and 91% respectively of all healthcare in this population was paid for entirely by users. This causes disproportionate financial difficulty for poor households. Although they appear to have a low threshold for **seeking medical help**, these adolescents are reluctant to take time off school, with over 80% having taken no time off school for illness in the past year. Many take regular medication, with half taking nutritional supplements and over one quarter Traditional Chinese Medicine. Even in Chunan the use of such medication was frequent. The **preferred source of help** for health problems was a telephone helpline, followed by a school counsellor. In contrast to the high utilisation of health facilities for illness very few adolescents go to the dentist, with fewest in Chunan. In terms of **health education** they want to learn about disease prevention, physiology and psychology, with sex education ranking low in the list of preferences.

The prevalence of **risk behaviours** is low. Rates of regular smoking are extremely low, though experimentation is considerably more common. Smoking is more common in boys and is twice as common in both the rural areas as in Hangzhou. Of those who had smoked 7% claim to have smoked before the age of five and 41% before the age of ten. Most obtain their cigarettes from home, where 68% of the fathers, but only 3% of the mothers are smokers, reflecting national averages. Parental smoking, friends smoking and use of alcohol were all important predictors of smoking. Knowledge about the dangers and disadvantages of smoking is high among smokers and non-smokers. Alcohol use was relatively low, with only one third having imbibed alcohol at some time, twice as many boys as girls, but with similar rates across the three areas. Of those who had used alcohol one third had been drunk, again with boys predominating, but with no difference across areas.

Differences between urban and rural were shown by the data on **nutritional status**. The mean body mass index is significantly higher in Hangzhou for both boys and girls with a characteristic gradient across the age range. Boys are more likely to be overweight *and* underweight. There were no urban/rural differences for underweight, but overweight was much more common in urban areas and in higher income families. Obesity was rare with none in rural females. In terms of perception of body size more students felt they were underweight than overweight, with significantly more in boys and rural areas. But few had been on a diet, and of those who had, more had changed their diet to gain weight. The mean haemoglobin was significantly lower in rural areas. But there were no differences in anaemia (Hb<120g/L) across urban and rural after adjustment for confounders. Anaemia was more common in girls, especially rural girls. Urban girls attain menarche significantly earlier than rural girls, after controlling for co-variates. The diet of urban students was more varied than that of rural ones, but it also contained more snack and junk food. Levels of exercise were high with students walking or cycling an average of two kilometres to and from school everyday, and doing an average of 3.1 hours of sport every week. Exercise was incorporated into the everyday school routine.

The data on **psychological morbidity** was notable for the high rates of anxiety and depression reported. Rural students are more prone to severe worry and depression than their urban counterparts, though the urban dwellers were more likely to have had suicidal thoughts and acted upon them. Most worry centred around school-related issues: pressures in exams, homework and worries about getting a job after school. They spend an average of nearly three hours every evening on homework. Bullying is common especially in rural schools. Nearly a third sought no help for problems, but when they did most turned to parents and friends, with very few seeking professional help. However, many would like to receive help for psychological problems with teachers, professional counsellors and a helpline all cited as preferences. Overall being an only child appears to be protective against the major forms of psychological morbidity studied.

In conclusion, on the **positive** side these students are generally hard-working and conscientious. Very few of them smoke regularly or abuse alcohol. Generally they have a healthy diet and exercise routinely. On the **negative** side they overutilise health services for minor illness, experimentation with smoking is relatively common, overweight is an emerging problem of urban males, and girls have high rates of anaemia. But the most

striking feature is the high level of anxiety and depression and stress which seem to be related to pressures to achieve at school and the competition for good jobs.

Although for many variables **urban-rural differences** were small and clinically unimportant, there were some important exceptions. In urban Hangzhou most of the respondents were only children. In Xiaoshan and Chunan most had siblings and most of the only children were boys. Smoking was more common in the two rural areas, overweight and obesity were more common in Hangzhou. Anaemia was more common in rural girls and diet was more varied in Hangzhou. Overall levels of anxiety and depression were higher in Chunan than Hangzhou with the important exception of actual suicide attempts which showed no differences. Worries about academic achievement and future employment were similarly high in Chunan and Hangzhou, suggesting that individual aspirations and parental expectations for their children are high even in traditional farming communities.

9.4 INITIAL OUTCOMES

9.4.1 Feedback to the students

After initial analysis the results were feedback to the leading group. In view of the some of the more surprising findings (low levels of regular smoking, high rates of suicidal ideation and suicide attempts) it was decided to carry-out a feedback session with some of the students who had been involved to verify the validity of some of these findings. Feedback sessions were organised in Chunan and Hangzhou (at one school in each area) to discuss these issues with groups of students. They were not asked for the way that *they* had responded, but how they felt that *others* would have responded. It was as if we had finally succeeded in carrying-out focus groups when initially there had been strong resistance to using qualitative methods! After these meetings we felt that, in general, the questionnaire accurately reflected the behaviour and views of these students.

9.4.2 Feedback to the leading group and teachers

The results were feedback at a large meeting, which included all members of the leading group and some of the teachers and head teachers who had been involved. The views of all attending were solicited. Since the purpose of the survey was to inform a new health education programme much of the discussion centred around how this should be carried forward. Considerable attention was paid to the students' own stated preferences for

education, particularly their desire to learn about disease prevention, physiology and psychology.

9.4.3 Convening of the Implementation Group

At the feedback meeting a new group was convened which consisted of some members of the leading group, four teachers and two middle school students. The inclusion of the students it should be noted was a highly radical move. It was to be their responsibility to draw-up recommendations. At the first meeting of the new group the major findings were outlined, and there was considerable discussion about what the response should comprise. The jurisdiction of the implementation group was limited to the modification of the school-based health education programme and possibly other school-based interventions in the light of the findings of the research. Other measures could be in the form of recommendations only. The remit precluded policy measures such as food fortification which need to be implemented at Ministerial level and in collaboration with representatives of the Food Industry.

9.4.4 The evidence base for school-based health education

Evidence for effectiveness is non-existent or weak in many areas of health education. But even in the present climate of evidence-based practice this does not stop vast resources being devoted to the subject worldwide. School-based health education is no exception. This is at least in part because of the paucity of randomised controlled trials for school-based health care interventions. A review of 270 sexual health education interventions conducted in developed countries, mostly North America, only eleven had been carried-out in the context of a randomised controlled trial and only two were able to demonstrate any change in behaviour, particularly in the area of the adoption of safe sexual practices.⁷⁰ However, sexual behaviour is arguably one of the most difficult areas to influence, especially in a school setting.

A brief discussion of the evidence in the four main areas which were to be targeted by the health education programme follows together with the recommendations made. But there is an important caveat: in China the concept of evidence-based practice is not yet widely accepted. The concern of the authorities is mainly to be seen to be “doing something”. In this instance the major objective was to improve on the existing health education programme, even where the evidence base for these types of interventions is weak.

a. Smoking

Smoking prevention and cessation programmes have probably been the most systematically evaluated school-based health interventions and the major conclusions which can be drawn were outlined in Chapter Six. In brief the evidence for their effectiveness in preventing the uptake of smoking is very limited.²⁰³ The programmes which have demonstrated some success have been intensive and expensive, have involved especially-trained instructors and usually include community-based components such as media campaigns.²¹⁶⁻²¹⁹ But the low overall success rates of school-based smoking prevention programmes in Western countries have been blamed at least partly on the fact that they are offered too late, in secondary school, when regular smoking behaviour and probably nicotine addiction is already established.²⁰⁶ In the adolescents in this study the very low rate of regular smoking suggests that there may be potential for a school-based intervention. The high levels of knowledge of the dangers and disadvantages of smoking further suggest that a programme focusing on improving confidence and self-esteem and on developing the skills to resist the pressures to smoke should be attempted. It is programmes of this sort, based on social learning theory²¹⁷ which have met with most success elsewhere.

There is also evidence that smoking bans on school premises have an important complementary role, and are in fact essential if a smoking prevention education programme is in place.²²⁴ In China such a ban is in place, but it is patchily enforced with many male teachers, in particular, smoking very openly on school premises. Active and perhaps even punitive enforcement was recommended.

b. Nutrition

In comparison with smoking there have been few trials of school-based nutrition education programmes on which to base policy, and there have been no such trials in China. Some success in education programmes focusing on improving dietary quality has been reported from trials in North America.³⁰⁴ The Child and Adolescent Trial of Cardiovascular Health (CATCH) for example, demonstrated significant differences in fat intake and self-reported vigorous exercise in intervention groups compared with controls three years after the intervention, which consisted mainly of classroom education. However there were no differences in BMI, blood pressure or serum lipid levels.³⁰⁵ But dietary habits developed in adolescence are known to influence those throughout adulthood with probable long

term health benefits, so the authors concluded that differences in the physiological parameters would be likely to emerge over time. Niklas was able to demonstrate significantly higher consumption of fruit and vegetables in the intervention group following an intensive programme consisting of classroom teaching, school meal and snack modification and a media campaign.³⁰⁶ In terms of specifically addressing the problem of anaemia, the Integrated Child Development Services scheme from India presented evidence of marginal improvements in haemoglobin levels in non-anaemic participants through education about dietary measures alone.³⁰⁷

All these studies acknowledge the importance of school meals as a source of quality diet and the leading group agreed that in view of the fact that all these students were having at least one meal per day in school, to assess the quality of the meals provided was necessary. Although guidelines about the composition of school meals existed monitoring was haphazard. The composition of the programme to be developed was drawn from guidelines developed by the Centre for Disease Control in the US.³⁰⁴ Evidence collated by CDC shows that school health programmes can be highly instrumental in helping adolescents “attain full educational potential and good health by providing them with the skills, social support, and environmental reinforcement they need to adopt long-term, healthy eating behaviors.” Their report summarizes strategies most likely to be effective in promoting healthy eating among school children and provides nutrition education guidelines for a comprehensive school health programme. The guidelines include recommendations on: school policy on nutrition, a sequential, coordinated curriculum, appropriate instruction for students and integration of the school food service and nutrition education. These guidelines formed the basis of the programme which was to be used in Zhejiang.

Health care seeking behaviour

Studies of health care seeking behaviour in this age group concentrate on improving access to care and not the reverse.³⁰⁸ In fact no research was found which attempted to *reduce* the utilisation of health services or use of medication in this age group. This is clearly a complex area for three main reasons: firstly, it is not clear how much of the apparent overutilisation of health services for minor illness simply reflects parental demands. Secondly, utilisation of health care services for minor conditions is encouraged by the authorities and the providers themselves, because of the large profits to be made, and thirdly, the pharmaceutical companies market ruthlessly to this age group and their parents.

Nevertheless, it was agreed that information should be provided as part of the health education programme about the management of minor ailments, the dangers of over-medication and (most controversially from the Chinese point of view) the fact that the evidence for effectiveness for many of the medications which are commonly used is doubtful.

Psychological Morbidity

There have been a few trials in the US of school-based programmes aimed at reducing levels of psychological morbidity in adolescents. The Resourceful Adolescent Programme, a classroom-based psychological support programme demonstrated significantly reduced levels of depression in the intervention group compared with controls at 10-month follow-up.³⁰⁹ Randell showed that a “coping and support training” programme improved problem-solving, reduced depression and enhanced self-esteem, but there was no difference in suicide risk behaviours.³¹⁰ In Australia Hains carried-out a programme which focused on stress reduction and showed significant improvements in anxiety and anger at three months in those who received the programme compared with controls.³¹¹ The Lifeskills Approach claims significant benefits using school-based sessions on stress management, self-esteem and empowerment.²¹⁷

It is of note that though a number of programmes claim to be able to improve levels of psychological morbidity, few are able to affect suicide or parasuicide rates, suggesting that there is a minority who need intensive help. It was this realisation which led to the recommendation for counselling services in schools and telephone hotlines, although there is little evidence to support the effectiveness of either of these measures.³¹² However, these decisions need to be seen in the Chinese context of the total absence of services of such kind and the need to “do something” about what is recognised as a major problem. Just because an intervention is not effective elsewhere is not enough, probably quite rightly, to convince the Chinese authorities that it is not worth trying.

However, the active management of parasuicide (psychiatric assessment, and treatment if necessary) has been shown to reduce the frequency of subsequent suicide attempts and it was agreed that some attempt should be made to introduce appropriate guidelines for clinicians. However, the reluctance of the victim and the clinician often to acknowledge parasuicide would make the widespread adoption of guidelines very difficult.

Outcome indicators

In order to monitor the health of adolescents in Zhejiang and to evaluate the progress of the planned new programme a series of outcome measures was drawn-up. These indicators were adapted to the local setting from indicators recommended by the WHO Adolescent Health Programme.¹³

It was recommended that an adolescent health survey be carried out every five years in Zhejiang Province with the aim of gathering data relevant to these indicators. In this way secular trends in adolescent health can be monitored.

The key relevant findings, the major recommendations and the corresponding indicators which will be used for monitoring of secular trends are shown in Table 9.2

9.4.5 General recommendations for the school-based health education programme

- The programme should be carried-out across the three years of middle school with annual consistent re-inforcement of key messages
- The same basic curriculum should be used across the province for urban and rural schools. The emphasis could be altered as necessary by individual teachers according to need, for example avoidance of junk food would be of great importance in urban areas, but less important in poor rural areas.
- The programme should be completed in time for incorporation into the standard curriculum across the Province by September 2001, the first year of the Millennium (by Chinese reckoning).
- The Provincial Education Commission should be asked for funds to support the development of the new curriculum. This would involve hiring national experts to develop the curriculum and adapt from appropriate foreign sources.
- Two educationalists, who would take the lead on curriculum development, would go to the US to see health education programmes in action, especially those using the Life Skills approach, the CDC recommended models for nutrition and the Resourceful Adolescent Programme. In fact, a long-standing invitation was taken-up and the pair were able to go immediately after these recommendations were made.

Table 9.2

Summary of key research findings, recommendations and proposed indicators

RELEVANT RESEARCH FINDINGS	RECOMMENDED ACTION MEASURES	INDICATORS FOR MONITORING
SMOKING		
Low levels of regular smoking	A Life skills education approach to smoking prevention	% of young people who have ever smoked by age and sex
High levels of knowledge of smoking		
Smoking at a very young age in a minority	Opportunistic education of parents	% of young people who are regular smokers by age and sex
HEALTH AND HEALTH CARE SEEKING BEHAVIOUR		
High utilisation of health care facilities for minor self-limiting illness	School-based education about management of simple illness	% attending a health facility in the past year by residence
High levels of self-medication	Education about dangers/wastage of self-medication	
Low utilisation of dental health services	Education about oral health	
NUTRITION		
In urban areas overweight starting	Education about healthy diet according to CDC Guidelines	% anaemic by sex % underweight, overweight and obese by sex, age and residence % undertaking vigorous exercise at least once per week by sex
Urban diet containing junk food	Improvement and monitoring of school meals	
Anaemia common especially in rural girls	Consideration given to supplementation of those with Hb<110g/L	
PSYCHOLOGICAL MORBIDITY		
High levels of anxiety and depression	Education about stress alleviation, coping mechanisms	% attempted suicide in the past year by gender/residence % answering in affirmative: worry interfering with life/sleep and suicide contemplation/attempts
High levels of school-related stress	Reduction in frequency of exams	
Help-seeking limited	Establishment of a helpline manned by trained counsellors. School counselling service to be established	
Requests for helpline		
Requests for counselling service		

- A separate textbook using a modular approach would be produced for each course and these would be standardised across the Province.
- A standard teacher's manual would also be produced.
- A teacher in each school should be appointed as Director of Health Education and should take responsibility for the dissemination of the programme. S/he should receive training and would be expected to provide support to colleagues as they teach the programme. (The Group was made aware that the quality of the instructors and the mode of implementation of health education programmes in schools has been shown to be critical to effectiveness,²⁰⁶ so measures must be taken to ensure high quality delivery).
- Ideally the programme should be carried-out as a controlled trial with specific knowledge, attitude and behavioural outcome measures. It was acknowledged that the dearth of information about the effectiveness of health education measures in the Chinese setting makes carrying-out a controlled trial particularly desirable. However, the additional funding necessary for such a trial to be carried-out with sufficient rigour makes it somewhat unrealistic at present.

9.4.5 Specific recommendations for the content of the new curriculum

- The anatomy and physiology components of the programme should be reduced to 20 hours from the current 32 hours.
- A new course called "Health for Life" should be introduced and 20 hours of curriculum time be allocated to it.
- The Health for Life course would mainly focus on risk factors for disease while emphasising the immediate benefits of adopting a healthy lifestyle. From the data obtained from the research and from the literature on effectiveness the specific approaches to be included were as follows:

Smoking: this component would emphasise the immediate effects including smoking being unattractive, impairing performance at sports, discolouring and damaging the teeth etc. The smoking component would also adopt a Life Skills²¹⁷ approach, which includes improving self-esteem, empowerment and learning the skills to resist the pressures to smoke. Special focus would be placed on the vulnerable transition time between school and college or entering the workplace.

Nutrition: Ideas and specific parts of the CDC Guidelines³⁰⁴ and specific parts of programme for the Child and Adolescent Trial for Cardiovascular Health³⁰⁵ would be utilised for much of the nutrition component with attention focused on eating fresh foods, teaching the nutritional value of foods, especially with regard to iron and promoting the idea that a “healthier diet” promotes a sense of physical well-being and helps maintain a good figure. Education on exercise would focus on the benefits for mental well-being, building of muscle bulk, and creating a healthier, more attractive appearance.

Psychological morbidity: The whole area of recognition and management of psychological morbidity would be given particular prominence. This would be the first time that this has been attempted in schools in Zhejiang, and it was thought that teachers would feel ill-equipped to deal with this component and so specific training might need to be given. Models already found to be effective, albeit in Western settings, such as the Resourceful Adolescent Programme³⁰⁹ and the Coping and Support Training³¹⁰ would be adapted to local need.

Health care seeking behaviour: The appropriate use of medications and health facilities was a component which was clearly very specific to the Chinese setting. A Chinese paediatric colleague and myself have since been invited to write this section. As well as providing factual information about the management of minor illness and appropriate use of medications, we designed role play exercises for use in the classroom.

Accident prevention: A final section was thought to be particularly important, given the high mortality from road traffic accidents and drowning. This would cover aspects of road safety, traffic awareness, safe cycling and water safety. Although helmets for cycling and reflective clothing are not readily available (and bikes don't have lights!) students would be taught the importance of conspicuousness, for example, wearing at least brightly coloured clothing when cycling or walking on dark streets. Although not possible for most schools, because there are few swimming pools, the idea of introducing swimming lessons would be suggested.

9.4.6 Other recommendations

- Publicity should be given to the need to reduce the number of exams students are required to take. Weekly exams should be abandoned and replaced with exams taking place at most once per month.
- Sources of help for psychological problems must be increased and improved. This should start with training of school health staff in the recognition and referral of serious psychological problems.
- A school-based counselling service specialising in the needs of young people should be established.
- A telephone helpline manned by professional counsellors with experience of young people should be established.
- A system should be introduced along the lines of the one operational in the UK which ensures that those attempting suicide who attend a health facility receive psychiatric or psychotherapeutic help in the immediate aftermath with follow-up, if necessary.
- Because there was little demand for specific in-patient hospital services for adolescents (probably because few used such services), a formal needs assessment would be carried-out to determine whether specific wards or parts of wards should be allocated for adolescents. This however was relevant for a small number of major provincial referral centres in Hangzhou. This is where the majority of chronic serious illness in this age group is treated for the whole Province
- Smoking restrictions in schools should be actively enforced.
- Consideration should be given to improving health education in the mass media, antenatal and child health clinics to educate current and future parents about the dangers of encouraging young children to smoke.
- Consideration should be given to approaching a manufacturer to produce cycle helmets and reflective clothing.

9.5 FINAL OUTCOMES

Recommendations of committees worldwide gather dust on shelves and get forgotten. By early 2000 it seemed this would be the fate of the recommendations of the implementation group of this study. The major barrier to implementation of the above proposals was funding. Since many of the recommendations cut across the health and education disciplines, neither authority was willing to fund a component alone, and there was stalemate. A moratorium was called on the one component which it had been agreed would be funded, the development of the health education component, because cost-recovery would operate through sale of the textbooks. This was because of the retirement of the senior education official on the leading group and the prime mover behind this component. The newly appointed official was not an enthusiast for change. By January 2000 all that had happened was the visit of two educationalists to the US to observe Life Skills education in action. But a tragic event became the catalyst for a re-appraisal of the whole area of adolescent health in Zhejiang.

The event occurred in Jinhua, a city equidistant from Hangzhou and Chunan, and it sparked a national debate about the health and well-being of young people. On January 17, 2000 a 16-year old middle school student murdered his mother by bludgeoning her with a hammer. The reason given in the press at the time was the stress of the boy's "heavy homework load". As the case unfolded in court it transpired that the mother had expected her son to spend all his spare time studying, not allowing him to associate with peers, and beating him if he came "lower than tenth in the class". The mother's behaviour struck a chord with many parents and the ensuing national debate focused on the faults in the system, which place such huge pressures on students and their parents.

The calls for action were led by President Jiang Zemin, who (very unusually and as a direct result of this tragedy) made a specific speech on the subject of teenage education. The suggestions made echoed the recommendations made by the implementation group six months earlier, but now the Education Commission couldn't ignore them. So the following measures have now been taken:

- From September 2000 year all schools were asked to reduce the number of exams which students are required to take. Weekly exams in most subjects have been reduced to monthly and even less in some cases.

- In July 2000 the provincial Education Commission announced the establishment of “psychological counselling centres” for all middle schools in Zhejiang Province by the Year 2005. Teachers professionals would undergo formal certificated training in psychological counselling. A number of pilot centres would be established in the first stage. This move was regarded as sufficiently innovative to warrant an article in the national English language newspaper, the China Daily.³¹³ Shen Minguang, the Director of Zhejiang Education Department is quoted as saying that he hoped the centres would “improve the mental well-being of students” and that “families should communicate with schools for the sake of students’ psychological health”. However, apart from the pilot schools which would receive dedicated funding for this, it will be difficult to raise the resources for such an ambitious scheme. Given the virtual absence of counselling services there is also the question of who is going to provide the training and indeed whether teachers make suitable counsellors. Furthermore there is no space to build new centres on already cramped school premises, and it is likely the existing health clinic would serve as the counselling centre as well. So it is unlikely that such a target can be met. But this clearly represents a positive step in the acknowledgement of the problems of young people.
- A helpline manned by professional counsellors with experience of young people is still planned and has now been funded by the Education Commission and a private company. The present barrier is finding sufficient trained counsellors to provide a 24-hour service which is thought essential.
- There has been no progress on the recommendation about providing psychiatric or psychotherapeutic help following parasuicide.
- The revision of the health education programme is now back on the agenda with a target starting date of September 2002.

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Questionnaire 1

THE ZHEJIANG STUDENTS SURVEY

We are carrying-out research into the health and the health concerns of adolescents. Please fill in the following questionnaire. Answer as honestly as you can, but don't be afraid to write "don't know" when you're not sure and we are here to answer any queries you may have. Feel free to add any comments which you think are important. Everything you write will be completely confidential and anonymous. Thank you very much for your help.

A. First we want to know a little bit about you and your family.

A1. Where is your school . Circle the correct one Hangzhou Xiaoshan Chunan

A2. Sex M/F

A3. What is your date of birth?

A4. Where do your parents live? In a city In a county In a township/village

A5. How many children are there in your family?

A6. We want to know who you live with in your household, that is, who you share your evening meal with on a daily basis.

Is it your natural parents only

Natural parents and grandparents?

Natural parents and other relatives?

Living with your father because mother is living away because of work or study

Living with mother because father is living away because of work or study

Living with others because mother and/or father are living away because of work or study

With father because of divorce of parents

With mother because of divorce

With others because of divorce

With father because of death of mother

With mother because of death of father

With others because of death of parents

None of the above

A7/A8. What level of education have your parents completed?

A7 Your Father

Illiterate

Primary school

Middle

Senior

College/University

Don't know

A8. Your Mother

Illiterate

Primary school

Middle

Senior

College/University

Don't know

A9/A10. What jobs do your parents do for a living?

A9. Your Father

- Professional/technical
- Manager/director/cadre
- Office worker
- Shop worker
- Service occupations
- Farmer/fishing/forestry
- Factories/transport
- Army
- Unclassified
- Unemployed

A10. Your Mother

- Professional/technical
- Manager/director/cadre
- Office worker
- Shop worker
- Service occupations
- Farmer/fishing/forestry
- Factories/transport
- Army
- Unclassified
- Unemployed

A11. Do the people you live with take an interest in you and talk to you about your life and studies.
No/seldom/often

A12. Do you have your own room at home? Y/N

A13. How would you say your family income compares with your fellow students?

- Better
- Similar
- Worse
- Don't know

A14. Which grade of study do you think you will complete?

- Middle school
- High school
- Senior
- College
- Postgraduate
- As high as possible
- Don't know

A15. What is your academic record like?

- Excellent
- Good
- Average
- Poor

B. Now we are going to ask you a few questions about your general health. If you don't know the answer please mark "don't know" rather than guess.

B1. What is your height? Cm Don't know

B2. What is your weight? Kg Don't know

B3. Which statement best describes your height?

- I would like to be taller
- I am happy with my height as it is

B4. Which statement best describes your weight?

- I would like to lose weight
- I am happy with my weight as it is
- I would like to put-on weight

B5. Do you have any disability Y/N

If you have said, yes were you born with it? Y/N

Was it acquired? Y/N

Describe the disability, if you can.

B6. Have you had any of the following physical problems in the last year? Mark any that you have had.

asthma/bronchitis
toothache
acne
flu
insomnia
headache
abdominal pains
diarrhoea
constipation
tonsillitis
skin problems
anaemia
hepatitis
asthma
menstrual problems
diabetes
epilepsy
heart disease/what type
cancer/what type

B7. When was the last time you visited a doctor ?

- In the past month
- Six months to one year ago
- One to two years ago
- Over two years ago
- Don't know

B8. What were the problems/symptoms that you visited the doctor for?

B9. The last time you went to see a doctor for an illness where did you see that doctor?

- Neighbourhood committee/village clinic
- Township clinic
- County
- City hospital
- Provincial hospital
- School clinic

B10. When you last saw the doctor how much did the total treatment cost? Include drugs, operations, blood tests, other tests and stay in hospital where appropriate).

Write the amount in RMB

B11. Was there difficulty with payment? Y/N/DK

B12. How was the treatment paid for?

- All self/parents
- Part self/parents, part other
- State
- Parents work unit
- Insurance
- Co-operative medical system
- Don't know

B13. In the last year how many days have you spent in bed because of illness?

B14. In the last year how many days have stayed off school because of illness?

B15. Have you treated yourself for any illness in the last year? Y/N

B16. If you did where did you get the medicine from?

- Pharmacy
- Family/home
- Given by others
- Don't know

B17 Do you regularly take any of the following medicines? Tick those that you do.

- Sedatives
- Vitamins
- Painkillers
- Laxatives
- TCM
- Nutritional supplements

B18. Do you have tooth decay? Y/N/DK

B19. How many teeth are decayed?

B20. When did you last go to the dentist?

- In the past month
- In the past six months
- Six months to one year ago
- One year to two years
- Never
- Don't know

B21. What is your visual acuity? Right eye Left eye

B22. Do you wear glasses?

For boys:

B23. Have you started having nocturnal emissions?

B24. How old were you when you started having nocturnal emissions? Years

For girls:

B25. Have you started menstruating

B26. How old were you when you first menstruated? Years Months
If you don't know the age in months just write in years.

B27. Do you masturbate?

- Never
- Seldom
- Sometimes
- Never

B28. Would you say that you get very anxious about things? Y/N/DK

B29. Do you often feel sad or depressed? Y/N/DK

B30. Do you worry a lot about the future? Y/N/DK

C. Now we want to know a little bit about your lifestyle.

C1. What is the distance from your home to school? In km

C2. How do you go to school everyday?

- walk
- bicycle
- bus
- car
- rickshaw
- stay in school/boarding
- other

C3. Did you do any of the following activities after school yesterday?

- homework
- reading
- videogames or computer games
- watching TV or video/listening to music
- private tutor
- sports
- dancing
- karaoke
- housework/cooking

C4. How many hours of homework on average do you do in the evenings after school?

C5. Are any of the following a concern for you?

- Too much homework
- Constantly tired

Family economic problems
Family quarrels
Relationships with friends
Being unpopular
Your appearance
That parents might separate

C6. When you have a problem who do you talk to about it?

No-one
Close friends
Parents
Other relatives
Teacher
Other

C7. Have you changed your eating habits in the past year?

To put on weight
To lose weight
Medical problem
Other reason

C8 Regarding cigarette smoking which statement describes you best? Mark just one.

I have never tried smoking at all, not even one puff
I have tried smoking once or twice
I used to smoke but I don't now
I smoke occasionally (less than 1 cigarette per week)
I smoke between one and ten cigarettes per week
I smoke more than 10 cigarettes per week

C9. How old were you when you had your first cigarette?

C10. Does your father smoke? Y/N

C11. Does your mother smoke? Y/N

C12. Do your friends smoke?

None
Some
Most
All

C13. For those who have smoked where did you get your cigarettes?

From home
From relatives
From friends
Buy yourself

C14. If you see someone of your age with a cigarette in their mouth what do you think of them? Which words would you use to describe them? Mark any you agree with.

Tough
Glamorous
Stupid
Grown-up
Weak
Fashionable
Rebellious
Independent
None of these

C15. Say whether or not you agree with the following statements about smoking

Agree Disagree Don't know

Smoking makes you less fit
Smoking puts you in a better mood
Smoking is a waste of money
Smoking helps you lose weight
Smoking harms your health
Smoking is like "chronic suicide"

Smoking helps you make friends
Smoking helps you act more confidently
It is difficult to say no when people offer you cigarettes
People like you more if you smoke
Quitting smoking is very difficult
Smoking calms your nerves

C16. Do you drink alcohol? Y/N/DK

C17. Have you ever been drunk? Y/N/DK

C18. How old were you when you first drank alcohol?

C19. Where did you first drink alcohol?

Home
A friend or relative's home
Out with friends
Don't know

Do you eat a lot of sweets/chocolate? Y/N/DK

Do you eat a lot of snacks? Y/N/DK

Do you drink a lot of sweet drinks Cola/Sprite? Y/N/DK

Do you frequently miss breakfast? Y/N/DK

Do you often go to bed late? Y/N/DK

Do you do a lot of physical activities/sports? Y/N/DK

Do you like physical activities/sports? Y/N/DK

Do you spit? Y/N/DK

Do you wash your hands before meals? Y/N/DK

Do you wash your hands after using the toilet? Y/N/DK

D. Finally a few questions about your health classes in school.

D1. Do you find the health classes a school to be helpful for your everyday life?

No
A little
Very

D2. List the subjects which you have found most useful.

D3. What kind of subjects do you think these classes should cover?

Do you agree with the following statements?

D4. Some types of cancer are preventable through altering aspects of behaviour. Y/N/DK

D5. Some types of heart disease are preventable through altering aspects of behaviour. Y/N/DK

If there is anything you would like to add about you, your health or anything we haven't asked about on the questionnaire please add it below.

Thank you very much for helping us by filling in this questionnaire!!

Questionnaire 2

THE ZHEJIANG STUDENTS SURVEY

We are carrying-out research into the health and the health concerns of adolescents. Please fill in the following questionnaire. Answer as honestly as you can, but don't be afraid to write "don't know" when you're not sure and we are here to answer any queries you may have. Feel free to add any comments which you think are important. Everything you write will be completely confidential and anonymous. Thank you very much for your help.

Height Cm

Weight Kg

Haemoglobin g/L

A. First we want to know a little bit about you and your family.

A1. Where is your school . Circle the correct one Hangzhou Chunan

A2. Sex M/F

A3. What is your date of birth?

A4. Where do your parents live? In a city In a county In a township/village

A5. How many children are there in your family?

A6. We want to know who you live with in your household, that is, who you share your evening meal with on a daily basis.

- Is it your natural parents only
- Natural parents and grandparents?
- Natural parents and other relatives?
- Living with your father because mother is living away because of work or study
- Living with mother because father is living away because of work or study
- Living with others because mother and father are living away because of work or study
- With father because of divorce of parents
- With mother because of divorce
- With others because of divorce
- With father because of death of mother
- With mother because of death of father
- With others because of death of parents
- None of the above

A7. What level of education has your father completed?

- Illiterate
- Primary school
- Middle
- Senior
- College/University
- Don't know

A8. What is your father's job?
Professional/technical
Manager/director/cadre
Office worker
Shop worker
Service occupations
Farmer/fishing/forestry
Factories/transport
Army
Unclassified
Unemployed

A9. What does your father earn per month?
<500RMB
501-800RMB
801-1500RMB
>1500RMB
Don't know

A10. What level of education has your mother completed?
Illiterate
Primary school
Middle
Senior
College/University
Don't know

A11. What is your mother's job?
Professional/technical
Manager/director/cadre
Office worker
Shop worker
Service occupations
Farmer/fishing/forestry
Factories/transport
Army
Unclassified
Unemployed

A12. What does your mother earn per month?
<500RMB
500-800RMB
800-1500RMB
>1500RMB
Don't know

A13. What is the main source of household income?
Father
Mother
Both combined
Other

A14. What is the total household income?

- <500RMB
- 500-800RMB
- 800-1500RMB
- >1500RMB
- Don't know

B. Now we are going to ask you a few questions about your general health. If you don't know the answer please mark "don't know" rather than guess.

B1. Which statement best describes your height?

- I would like to be taller
- I am happy with my height as it is

B2. Which statement best describes your weight?

- I would like to lose weight
- I am happy with my weight as it is
- I would like to put-on weight

B3. Do you have any disability Y/N

If you have said, yes were you born with it? Y/N

Was it acquired? Y/N

Describe the disability, if you can.

B4. Do you regularly take any of the following medicines? Mark those that you do.

- Sedatives
- Vitamins
- Painkillers
- Laxatives
- TCM
- Nutritional supplements

For boys:

B5. Have you started having nocturnal emissions?

B6. How old were you when you started having nocturnal emissions?

For girls:

B7. Have you started menstruating

B8. How old were you when you first menstruated? Years Months

B9. Do you masturbate?

- Never
- Seldom
- Sometimes

C. Now a few questions about your lifestyle.

C1. What is the distance from your home to school? In km

C2. How do you go to school everyday?

- walk
- bicycle
- bus
- car
- rickshaw
- stay in school/boarding
- other

C3. Did you do any of the following activities after school yesterday?

- homework
- reading
- videogames or computer games
- watching TV or video/listening to music
- private tutor
- sports
- dancing
- karaoke
- housework/cooking

C4. How many hours of homework on average do you do in the evenings after school?

C5. Regarding cigarette smoking which statement describes you best? Mark just one.

- I have never tried smoking at all, not even one puff
- I have tried smoking once or twice
- I used to smoke but I don't now
- I smoke occasionally (less than 1 cigarette per week)
- I smoke between one and ten cigarettes per week
- I smoke more than 10 cigarettes per week

C6. How old were you when you had your first cigarette?

C7. Does your father smoke? Y/N

C8. Does your mother smoke? Y/N

C9. Do your friends smoke?

- None
- Some
- Most
- All

C10. Do you drink alcohol?

C11. Have you ever been drunk?

C12. How old were you when you first drank alcohol?

C21. How many hours of sport in total do you do every week?

C22. How many times in the last week have you exercised so that your heart beats faster and you feel breathless?

D. We are now going to ask you a few questions about the way you feel about things. Many young people feel unhappy or worried from time to time. The following questions will help us to understand how these problems affect you.

D1. Do you worry a lot? Y/N/DK

D2. Over the last six months have you worried so much that it has really upset you or interfered with your life? Y/N/DK

D3. Does worrying make you feel restless, keyed-up, tense or unable to relax.

D4. Does worrying interfere with your sleep?

D5. Do you worry a lot about any of the following? Mark any that are true

School record

Family money problems

Family quarrels

Too much homework

Getting a job after school

That you are unpopular

Your appearance

That your parents might separate or divorce

Other things, feel free to say what.

D6. Would you say that you are often unhappy, down hearted or tearful?

D7. In the past month have there been times when you have been very sad, miserable, unhappy or tearful?

D8. In the past month has there been a time when you lost interest in everything or nearly everything you normally enjoy doing?

D9. Have you ever felt so unhappy that you thought you didn't want to go on living?

D10. Have you ever felt so unhappy that you have asked people for help?

D11. Who did you ask for help?

Parents

Other relatives

Friend

Teacher

Doctor

School nurse

Telephone helpline

D12. If you ever felt so unhappy or worried that you needed to ask for help who would you like to talk to?

Parents
Other relatives
friend
teacher
doctor
school nurse
trained counselor with experience of adolescent problems.
telephone helpline

D13. Over the whole of your lifetime have you ever tried to harm or kill yourself? Y/N/DK

D14. Do you get a lot of headaches, stomach aches or sickness? Y.N/DK

D15. Do you get very angry and often lose your temper Y/N/DK

D16. Are you easily distracted or do you find it difficult to concentrate? Y/N/DK

D17. Do other people of your age generally like you? Y/N/DK

D18. Do you have friends at school? Y/N/DK

D19. How many friends do you have at school? 1. One or two 2. Three or more

D20. Can you confide in any of your friends such as sharing a secret or telling them private things?
Definitely / Sometimes / Not at all

D21. If you have troubles or worries can you tell your friends how you are feeling?
Definitely/ Sometimes/ Not at all

D22. Do you get teased or laughed at by friends
Often/ Sometimes /Not at all

D23. Do other children pick on you and bully you?
Often / Sometimes /Not at all

We now want to know a little bit about what you know about health and what you think about the health classes you receive in school.

E1. Do you agree with the following statements?
Some types of cancer are preventable through altering aspects of behaviour Y/N/DK

E2. Some types of heart disease are preventable through altering aspects of behaviour Y/N/DK

E3. How can you catch HIV/AIDS : Y/N/DK

Kissing an infected person
Shaking hands with an infected person
Blood transfusions
Sexual intercourse
Mosquito bites
Chopsticks which have been used by an infected person
Toilets

F. Now we want to ask you a few questions about your eating habits

F1. What did you have to eat this morning for breakfast

Rice Mantou/bread Pickles Noodles Egg Milk Other

F2. Do you frequently miss breakfast?

F3. Have you changed your eating habits in the last year Y/N

If yes, why? To put-on weight
 To lose weight
 Medical problem
 Other

F4. Look at this list of foods. Decide how often you eat them and circle the number

0= rarely or never

1= about once per week

2= about 2-3 times per week

3= on most or all days

Red meat Lamb, beef , pork	0	1	2	3
Poultry chicken	0	1	2	3
Fish	0	1	2	3
Eggs	0	1	2	3
Tofu	0	1	2	3
Milk	0	1	2	3
Yoghurt	0	1	2	3
Rice	0	1	2	3
Bread of any type	0	1	2	3
Fresh fruit	0	1	2	3
Green Vegetables	0	1	2	3
Peas/beans	0	1	2	3
Nuts	0	1	2	3
Pickles	0	1	2	3
Potatoes (white, yellow)	0	1	2	3
Tea	0	1	2	3
Fizzy drinks (Coke, Sprite)	0	1	2	3
Cakes, biscuits	0	1	2	3
Crisps	0	1	2	3
Sweets, chocolates	0	1	2	3
Dried fruit snacks	0	1	2	3

If there is anything you would like to add about you, your health or anything we haven't asked about on the questionnaire please add it below.

Thank you very much for helping us by filling in this questionnaire!!

青少年健康需求调查表

我们将进行一项有关青少年健康状况及影响因素的研究,请如实填写下表并附上您认为较重要的意见,您的所有情况都是绝对保密的,谢谢您的合作。 编号

身高(厘米) _____ 体重(千克) _____ 血红蛋白(g/l) _____

一、一般情况:

1. 学校所在地:(1)杭州,(2)淳安 A₁
2. 性别:(1)男,(2)女 A₂
3. 出生年月 _____, 周岁 _____ A₃
4. 出生地:(1)市区,(2)镇,(3)农村 A₄
5. 是否独生子女:(1)是,(2)有兄弟姐妹 _____人(包括自己) A₅
6. 就读年级:(1)初一,(2)初二,(3)初三 A₆
7. 目前和谁生活在一起:(如住校生,则指回家时与谁生活在一起) A₇
 - (1)亲生父母;
 - (2)亲生父母及祖父母;
 - (3)亲生父母及其他亲属;
 - (4)父母因工作学习两地分居,随父亲生活;
 - (5)父母因工作学习两地分居,随母亲生活;
 - (6)父母因工作学习在外地,随其它亲属生活;
 - (7)父母离异,随父亲生活;
 - (8)父母离异,随母亲生活;
 - (9)父母离异,随其它亲属生活;
 - (10)丧母,随父亲生活;
 - (11)丧父,随母亲生活;
 - (12)父母双亡,随其它亲属生活;
 - (13)其它(陈述)
8. 你父亲文化程度 _____ A₈
 - (1)文盲半文盲,(2)小学,(3)初中,(4)高中,(5)大专以上,(9)不详
9. 你父亲是否在职 _____ (1)在职,(2)不在职(指最近壹个月内无任何收入) A₉
 如在职,其职业 _____ A₉₁
 - (1)各类专业技术人员;
 - (2)国家机关、党群组织、企事业单位负责人;
 - (3)办事人员和有关人员;
 - (4)商业工作人员;
 - (5)服务性工作人员;
 - (6)农、林、牧、渔劳动者;
 - (7)生产工人、运输工人和有关人员;
 - (8)军人;
 - (9)不便分类的其它劳动人员
- 你父亲平均每月的总收入(包括工资、奖金等) _____ A₁₀
 - (1)500元以下,(2)501~800元,(3)801~1500元,(4)1500元以上,(9)不详
- 你父亲如不在职,其原因 _____ A₁₁
 - (1)因单位原因失业,(2)因工伤生病等原因失业,(3)退休,(4)其它,(9)不详
10. 你母亲文化程度 _____ A₁₂
 - (1)文盲半文盲,(2)小学,(3)初中,(4)高中,(5)大专以上,(9)不详
11. 你母亲是否在职 _____ (1)在职,(2)不在职(指最近壹个月内无任何收入) A₁₃
 如在职,其职业 _____ A₁₃₁
 - (1)各类专业技术人员;
 - (2)国家机关、党群组织、企事业单位负责人;
 - (3)办事人员和有关人员;
 - (4)商业工作人员;
 - (5)服务性工作人员;
 - (6)农、林、牧、渔劳动者;
 - (7)生产工人、运输工人和有关人员;
 - (8)军人;
 - (9)不便分类的其它劳动人员

- 你母亲平均每月的总收入(包括工资、奖金等) _____ A₁₅
 (1)500元以下,(2)501~800元,(3)801~1500元,(4)1500元以上,(9)不详
- 你母亲如不在业,其原因 _____ A₁₇
 (1)因单位原因失业,(2)因工伤生病等原因失业,(3)退休,(4)其它,(9)不详
12. 你家庭生活的主要经济来源 _____ A₁₈
 (1)父亲的收入,(2)母亲的收入,(3)父母的各种收入,(4)政府补助,(5)其它,(9)不详
13. 全家总人数(指住在一起的,共同生活,但不包括暂时住在一起的人) _____ A₁₉
14. 全家平均每月的总收入(包括工资、奖金、礼品等等的总和) _____ A₂₀
 (1)500元以下,(2)501~800元,(3)801~1500元,(4)1500元以上,(9)不详

二、有关您健康的问题:

1. 您希望自己的身高:(1)保持原状,(2)增加一些 B₁
2. 您希望自己的体重:(1)减少一些,(2)保持原状,(3)增加一些 B₂
3. 身体残疾:(0)无,(1)先天,(2)后天,(3)不详 病名 _____ B₃
4. 是否经常服用下列有关的药品或滋补品(每周3次以上)(注:下同)(选择项标记“√”)

	(0)无	(1)有	
(1)安眠药			<input type="checkbox"/> B ₄
(2)维生素类片/丸			<input type="checkbox"/> B ₅
(3)止痛药			<input type="checkbox"/> B ₆
(4)放松药(剂)			<input type="checkbox"/> B ₇
(5)补铁药(剂)			<input type="checkbox"/> B ₈
(6)营养滋补品			<input type="checkbox"/> B ₉
(7)中药			<input type="checkbox"/> B ₁₀

5. 第一次来月经(例假) _____ 周岁/第一次遗精时 _____ 周岁 B₁₁
6. 手淫: (0)无,(1)偶尔,(2)经常 B₁₂
7. 第一次手淫的年龄 _____ B₁₃

三、有关您生活习惯的问题:

1. 您家离学校的距离 _____ 公里 C₁
2. 是否住校:(1)住校,如非住校生,平时上学主要是:(2)步行,(3)骑自行车,
 (4)乘公共汽车,(5)轿车,(6)人力三轮车,(7)其它 C₂
3. 上周一般情况下,放学后你做过以下哪些活动?(注意双休日除外)

项目	(0)无	(1)有	
(1)做作业			<input type="checkbox"/> C ₃
(2)读课外书和杂志、报纸等			<input type="checkbox"/> C ₄
(3)玩电子游戏			<input type="checkbox"/> C ₅
(4)看电视、录像、听音乐			<input type="checkbox"/> C ₆
(5)家庭教师辅导			<input type="checkbox"/> C ₇
(6)体育活动			<input type="checkbox"/> C ₈
(7)跳舞			<input type="checkbox"/> C ₉
(8)卡拉 OK			<input type="checkbox"/> C ₁₀
(9)家务劳动			<input type="checkbox"/> C ₁₁

4. 上周放学后平均每天作家庭作业_____小时(不包括双休日), C₁₁
5. 你吸烟吗? (只选一项)(0)从未吸过烟,(1)曾试过一二次,(2)我过去吸过,现已戒掉 C₁₁
- (3)每周最多一支,(4)1~10支/每周,(5)每周10支以上
6. 你吸第一支烟的年龄_____ (未吸过烟者,填0) C₁₁
7. 您的烟来自? (1)父母,(2)自己买,(3)自己朋友送,(不吸烟填0) C₁₁
8. 您比较好的朋友吸烟吗? (1)都不吸烟,(2)有几个吸烟,(3)大多数吸烟 C₁₁
9. 您父亲吸烟:(0)不,(1)是 C₁₁
10. 您母亲吸烟:(0)不,(1)是 C₁₁
11. 您喝过酒吗? (0)否,(1)是 C₁₁
12. 你喝醉过酒吗? (0)否,(1)是 C₁₁
13. 您第一次饮酒时几岁(包括一小口)_____ C₁₁
14. 一般情况下,每周平均体育锻炼几小时_____ C₁₁
15. 上周里,达到心跳加快、呼吸急促的体育锻炼总共有几次_____ C₁₁

四、目前经常担心或烦恼的事情:

1. 你有很多事情要担心(或烦恼)吗? (如家庭经济、与父母关系、学习成绩、交朋友、工作、健康、婚姻等)? (0)否,(1)是,(9)不知道 D₁₁
2. 最近半年里,这些事情常常干扰(或影响)你的学习、生活吗? (0)否,(1)是,(9)不知道 D₁₁
3. 这些担心使你无法放松,以致常感到紧张、容易激动吗? (0)否,(1)是,(9)不知道 D₁₁
4. 这些担心使你无法入睡(或睡不着觉)吗? (0)否,(1)是,(9)不知道 D₁₁
5. 目前经常担心或烦恼的事情:

项目	(0)否	(1)是	(9)不知道
(1)作业太多	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(2)毕业后就业问题	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(3)家庭经济困难	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(4)家庭不和睦	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(5)在校成绩不好	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(6)喜欢我的人太少	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(7)自己的相貌(如身材矮小、残疾等)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(8)父母离婚或分居	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(9)经常生病	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁
(10)其它	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> D ₁₁

5. 你是否经常不愉快、心事重、甚至想哭? (0)否,(1)是,(9)不知道 D₁₁
7. 在上个月,你是否有时感到非常悲伤、不幸而想哭泣? (0)否,(1)是,(9)不知道 D₁₁
8. 在上个月,你是否有过对任何事情都失去信心,甚至对平时乐意做的事情也不想做? D₁₁
- (0)否,(1)是,(9)不知道
9. 你是否有时觉得太不幸以致不想活了? (0)否,(1)是,(9)不知道 D₁₁
10. 到现在为止,你是否想过伤害自己甚至自杀? (0)否,(1)是,(9)不知道 D₁₁
11. 你是否有过“因感到不幸(或不愉快)而需要他人帮助”的要求(或想法)? D₁₁
- (0)否,(1)是,(9)不知道
12. 当你遇到这些担忧或烦恼的事情时,一般向谁求助? D₁₁
- (1)父母,(2)其它亲戚,(3)朋友,(4)老师,(5)医师,
(6)校医,(7)专业心理辅导老师,(8)热线电话咨询
13. 您最希望得到谁的帮助? (注:选择可以与问题12一样,也可以不同) D₁₁

(1)父母,(2)其它亲戚,(3)朋友,(4)老师,(5)医师,
(6)校医,(7)专业心理辅导老师,(8)热线电话咨询

14. 你是否经常有头痛、胃痛或其它疾病的感觉? (0)无,(1)有,(9)不知道 D₁₄
15. 你感到非常生气时经常发脾气吗? (0)无,(1)有,(9)不知道 D₁₅
15. 你平时容易注意力分散,或精力难以集中吗? (0)无,(1)有,(9)不知道 D₁₅
17. 同龄人喜欢与你相处、玩吗? (0)无,(1)有,(9)不知道 D₁₇
13. 你在学校有朋友吗? (0)无,(1)一二个,(3)三个以上 D₁₃
19. 你对朋友讲述自己的秘密或个人私事吗?
(0)不,(1)有时讲,(2)经常讲,(9)不知道 D₁₉
20. 当你有挫折或烦恼时,是否将你自己的感觉直接告诉朋友?
(0)不,(1)有时告诉,(2)经常告诉,(9)不知道 D₂₀
21. 你是否经常被朋友嘲笑? (0)无,(1)有时,(2)经常 D₂₁
22. 你常被同龄人欺侮或挑剔吗? (0)无,(1)有时,(2)经常 D₂₂

五、健康知识

1. 有些癌症可以通过改变自己的生活行为而加以预防:(1)错,(2)对,(9)不知道 E₁
2. 有些心脏病,可以通过改变自己的生活行为而加以预防:(1)错,(2)对,(9)不知道 E₂
3. 爱滋病的传播途径

项目	(1)否	(2)是	(9)不知道
(1)接吻	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> E ₁
(2)握手	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> E ₂
(3)输血或打针	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> E ₃
(4)性交	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> E ₄
(5)蚊子咬	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> E ₅
(6)一起吃饭,共用筷子	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> E ₆
(7)共用抽水马桶	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> E ₇

六、饮食习惯

1. 今天早饭吃过什么?

项目	(0)没有	(1)有
(1)稀饭	<input type="checkbox"/>	<input type="checkbox"/> F ₁
(2)馒头	<input type="checkbox"/>	<input type="checkbox"/> F ₂
(3)腌制食品(如咸菜等)	<input type="checkbox"/>	<input type="checkbox"/> F ₃
(4)面条	<input type="checkbox"/>	<input type="checkbox"/> F ₄
(3)油条	<input type="checkbox"/>	<input type="checkbox"/> F ₃
(6)鸡蛋	<input type="checkbox"/>	<input type="checkbox"/> F ₆
(7)牛奶	<input type="checkbox"/>	<input type="checkbox"/> F ₇
(8)其他	<input type="checkbox"/>	<input type="checkbox"/> F ₈
(9)没吃	<input type="checkbox"/>	<input type="checkbox"/> F ₉

2. 你经常不吃早饭吗? (0)无,(1)是 F₁₀
3. 近一年来,你的饮食习惯是否改变?(如有改变其原因是)
(0)无,(1)为减轻体重,(2)为增加体重,(3)因医疗原因,(4)其它原因 F₁₁

4. 是否吃过下列食品,请选择相应的编号

项目	(0)很少或不	(1)1周最多一次	(2)一周2-3次	(3)几乎每天吃	
(1)瘦猪肉,猪肉					<input type="checkbox"/> F ₁₂
(2)鸡、鸭					<input type="checkbox"/> F ₁₃
(3)鱼					<input type="checkbox"/> F ₁₄
(4)鸡蛋					<input type="checkbox"/> F ₁₅
(5)牛奶					<input type="checkbox"/> F ₁₆
(6)酸乳酪					<input type="checkbox"/> F ₁₇
(7)米饭(蒸、煮)					<input type="checkbox"/> F ₁₈
(8)油炒饭					<input type="checkbox"/> F ₁₉
(9)面包、馒头					<input type="checkbox"/> F ₂₀
(10)新鲜水果					<input type="checkbox"/> F ₂₁
(11)新鲜蔬菜					<input type="checkbox"/> F ₂₂
(12)豆类蔬菜					<input type="checkbox"/> F ₂₃
(13)坚果类					<input type="checkbox"/> F ₂₄
(14)腌制食品					<input type="checkbox"/> F ₂₅
(15)土豆					<input type="checkbox"/> F ₂₆
(16)茶					<input type="checkbox"/> F ₂₇
(17)甜饮料					<input type="checkbox"/> F ₂₈
(18)饼干、蛋糕					<input type="checkbox"/> F ₂₉
(19)油炸的膨化食品					<input type="checkbox"/> F ₃₀
(20)糖果、巧克力					<input type="checkbox"/> F ₃₁
(21)蜜饯					<input type="checkbox"/> F ₃₂

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谢谢您的合作!!!

有何建议或评论请写在调查表背面,也可直接写信告诉我们