The adolescent with respiratory disease

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Background

Much adult lung disease, including asthma and chronic obstructive pulmonary disease (COPD), is likely to have its origin in fetal life and early childhood1, to be modified by genes2,3 and influenced by the establishment of lifestyles, including cigarette smoking, exercise and diet in the transition from childhood to adulthood (Fig 1).

Most adult lifestyles are formed during childhood and adolescence, and therefore present targets for improving respiratory health in the adult population. These targets include improvement in dietary intake, particularly naturally occurring antioxidants, reduction in uptake of smoking and increase in physical exercise4. These factors are also important in the development of cardiovascular disease, obesity, and a range of diseases including hypertension and maturity-onset diabetes which are recognised to be largely preventable or modifiable.

Advances in the medical management of childhood respiratory problems which previously had a high mortality are resulting in a gradual increase in the survival to young adulthood of individuals with problems such as chronic lung disease of prematurity and congenital diaphragmatic hernia, some of which have hitherto been unfamiliar to the adult chest physician (Table 1).

What about the more common diseases of childhood, their prognosis into adulthood and their relation to long-term COPD?

Prognosis

Persistence of asthma into adulthood is strongly associated with atopy5,6, together with an increased rate of decline in lung function in mid-to-late adult life7. Concerns about those who have been termed the ‘asthma generation’ must be that atopic asthma has increased dramatically in a generation8,9, and that their long-term prognosis into adult life is unfavourable10.

For other, less clearly defined, recurrent symptoms, such as cough and wheezing only in the presence of viral infection (previously labelled as bronchitis or wheezy bronchitis), the long-term consequences are becoming clearer11. In the early 1960s, Orie et al12 proposed that asthma and non-specific lung disease (NSLD), including chronic bronchitis and emphysema, were part of the same disease spectrum. The popularly labelled ‘Dutch hypothesis’ postulates that the expression of asthma or NSLD depends in part on the age at which exposure to known and unknown adverse environmental factors occurs.

Although most epidemiological studies have combined what used to be called wheezy bronchitis together with doctor-diagnosed asthma, evidence is emerging that these two conditions have different pathogenic origins. Stevenson et al13 have reported that cell recovery of bronchoalveolar lavage (BAL) in children categorised as wheezy
Table 1. Respiratory disease child/adult.

| Respiratory disease                  | Resolves          | Persists                        |
|--------------------------------------|-------------------|--------------------------------|
| Wheezy bronchitis                    |                   | Atopic asthma                   |
| Isolated cough                       |                   | Cystic fibrosis                 |
| Bronchiolitis (infancy)              |                   | Chronic lung disease of prematurity |
| Transient tachypnoea of newborn      |                   | Congenital anomalies (eg diaphragmatic hernia) |
| Uncomplicated respiratory distress syndrome |               | Intersitial diseases (fibrosing alveolitis, histiocytosis) |
|                                      |                   | Scoliosis                       |

bronchitics has more in common with BAL in adults with stable chronic bronchitis than with asthmatic subjects. There also appear to be different clinical and functional outcomes in the transition from childhood to adult life for these two clinically diagnosed syndromes. The identification of an increasing number of genetic markers and gene candidates associated with asthma wheezing illness and atopy, together with the different wheezing syndromes of childhood and adolescence, invites a reassessment of this unitary hypothesis, although the possibility remains that a number of overlapping genetic and environmental determinants contribute to both asthma and COPD.

For young adults with a history of persistent cough and spurt production, the strongest predictor appears to be active smoking, with a significant but smaller contribution from atopy. However, one of the difficulties in establishing the fate of asthma in the transition to adulthood is the relative paucity of prospective studies and the poor retrospective recall of symptoms.

It remains a possibility that children with viral associated wheeze (previously labelled 'wheezy bronchitics') may present again in late adult life with COPD, although there are as yet no longitudinal studies or linked family studies to confirm this possible association.

Growth

Young people and their parents often become concerned when linear growth appears to be abnormal. In common with any other chronic illness, chronic respiratory illness has the potential to delay the onset of puberty and thereby slow the pace of linear growth. With increasing concerns about long-term use of inhaled corticosteroids and their possible systemic effects, clinicians, carers, parents and young people can become confused about their risks and benefits. There is no evidence that modest doses of up to 400 μg/day of beclomethasone dipropionate (or equivalent) have anything but minor effects on attained adult height. Indeed, it is more likely that any reductions in height velocity in the short to medium term are due to the impact of illness in delaying the onset of puberty rather than to a direct systemic effect.

Gender differences

An interesting, as yet unexplained, phenomenon during the transition from childhood to adulthood is the difference in the prevalence of respiratory disease between the sexes, with boys more likely to lose their symptoms and girls more likely to persist with symptoms or to re-acquire them. Together with the erroneous view of some health care professionals that asthma is more common in adolescent boys, this can lead to under-recognition in girls.

Issues for the young patient

Growing up involves the adolescent in a variety of learning experiences, experimentation, 'testing the boundaries' of rules and accepted social practices. A desire to take part in 'risk taking' which may be detrimental to respiratory health is normal in the transition from childhood to adulthood. The development of various lifestyles has important implications for emerging adult patterns of health behaviour, as evidenced by smoking, drinking, diet and physical activity. Young people with a chronic respiratory disease may be particularly 'at risk' in adolescence by experimenting with activities such as smoking, in order to remain accepted within their peer group, to imitate an admired adult role model or to protest against parental values. The promotion of healthy lifestyles in adolescence is likely to be the best way of improving health in adult life, particularly for those with an established chronic illness.

In young people with the additional burden of chronic illness, attention needs to be given to their own and their parents'/guardians' coping skills. A recurrent theme is the need to establish independence, while helping parents come to terms with the 'loss' of their dependent sick child for whom they have hitherto taken full responsibility. Compliance (or concordance) with treatment is also a major concern as failure
to maintain regular therapy can have serious immediate and long-term consequences for the health of the affected individual.

All responsible parents invest huge amounts of time and emotional energy into child rearing, but these efforts are redoubled by the presence of chronic disease and illness. Most parents experience feelings of loss at the passing of childhood and the changes in their children as they make the transition to adult life. A common challenge is to achieve a balance between acceptance of the illness by both child and parents and, at the other extreme, denial of the severity of the disease and the resultant harm by failing to comply with the best possible medical treatments.

**Issues for the health care professional**

A pattern of transitional care is commonly adopted for children in their early teens as a first step towards full independence and regular follow-up in an adult oriented service, with full transfer somewhere between 16 and 18 years of age. Parents often find it difficult to separate from their children, particularly when they have hitherto been largely responsible for their medical management. Unless responsibility for day-to-day management is transferred to young people, there is a danger that the medical management itself may become part of the natural testing of boundaries and the need to establish independence.

In a potentially life-threatening illness such as asthma, and with the reduced actuarial life expectancy associated with cystic fibrosis, adherence to therapy can become a source of conflict. Parents are aware of the potential dangers of poor treatment adherence and risk taking such as smoking. However, for many young people, present behaviour is not often linked to long-term consequences. Peer pressure and the need to be accepted are particularly strong in girls and young women17. Establishing trust between health care professionals and young people, and transferring the responsibility for disease management and a healthy lifestyle to young people themselves are prerequisites for long-term future health, not only in the presence of chronic illness but also in those without health problems. Persistent respiratory disease may go unrecognised in young people because of communication problems with medical and health care professionals18. This is also likely to be compounded by the unease that many practitioners experience in dealing with young people – who may themselves also be confused about the appropriate route to gain access to health care19.

**Current trends, future challenges**

At the turn of the millennium a number of questions and challenges face policy makers, health care planners and those delivering the services:

- What are the long-term outcomes of the different wheezing syndromes of childhood, and is there a link between recurrent viral precipitated episodes and the development of COPD in adult life?
- What can be done to reduce the uptake of active smoking and to improve dietary and exercise habits in the population in transition from childhood to adulthood?
- What can be done to reduce or modify the development of chronic lung disease of prematurity and to improve the long-term respiratory outcome for individuals with severe congenital lung anomalies such as congenital diaphragmatic hernia?
- Are the different wheezing conditions distinct or do they have overlapping genetic and environmental contributions?

The questions surrounding the identification, management and prevention of chronic lung disease in the transition from childhood to adulthood are challenging and require close collaboration between paediatricians, the physicians of adulthood, and biomedical scientists. Young people travelling through a challenging and often turbulent period in their lives who carry the additional burden of respiratory illness require knowledgeable and sympathetic medical attendants if they are to be afforded the best chance of lifelong health.

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Nutrition, eating and gastrointestinal conditions in adolescence

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Adolescence is the period in development when puberty occurs and peak growth velocity is achieved (mean: girls 12 years, boys 14 years). Optimal nutrition is therefore particularly important at this time. Certain gastrointestinal (GI) diseases, some affecting nutrition and growth (eg Crohn’s disease), may present during this period.

Attitudes to eating

As teenagers develop greater freedom and independence, they are increasingly likely to take more meals away from home and decide for themselves what they want to eat. School exams, peer pressures, relationship or sexuality issues become part of their life. It is at this stage that meals may start to be missed, especially breakfast. Several studies have shown that breakfast improves the intellectual and physical performance of schoolchildren.

As young people begin to choose their own food, their diet may gradually deteriorate in nutritional quality and consist of more ‘junk food’, high in saturated fat and sugar. Snack and convenience foods are particularly low in iron, calcium, folate and fibre.

Nutritional education is important and is part of health education and the national curriculum. The ‘principles of good eating’ are vital (see Table 1) and have a role in preventing adult disease.

Reduction of obesity is now one of the key targets of The health of the nation. Currently, 13% of men and 16% of women in the UK are obese, the percentages having doubled since 1980. Children, too, are becoming heavier for their height, and the nation as a whole, including children, takes less physical exercise than a decade ago.

On the other hand, there are teenagers who feel they need to lose weight. Sometimes a degree of weight reduction can be recommended and is appropriate, but some individuals diet unnecessarily. Some dieting regimens can be both restrictive and nutritionally deficient. The degree to which the media and the fashion industry portray the ‘ideal body’ and their influence on young people is debatable. In extreme cases, the psychiatric conditions anorexia nervosa and bulimia nervosa can develop. Perfectionism and negative self-evaluation are particularly important risk factors for both eating disorders. Parental obesity, early menarche and parental psychiatric disorder are more associated with bulimia nervosa than anorexia nervosa.

Inflammatory bowel disease

The incidence of Crohn’s disease is increasing. Cosgrove et al found that the incidence of Crohn’s disease in South Glamorgan more than doubled over a 10-year period, although the incidence of ulcerative colitis (UC) remained the same. Recent prospective data from the British Paediatric Surveillance Unit

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Table 1. Principles of good eating.

- Enjoy your food
- Eat a variety of different foods
- Eat the right amount to be a healthy weight
- Eat plenty of foods rich in starch and fibre
- Don’t eat too much fat
- Don’t eat sugary foods too often
- Look after the vitamins and minerals in your food