

The health of children and young people

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Chapter 7

Asthma and allergic diseases

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Introduction

Asthma, eczema and hay fever (allergic rhinitis) are among the commonest chronic diseases of childhood. During the 1970s and 1980s there was considerable expansion of epidemiological research into these disorders, prompted mainly by concern about the upward trends in hospital admissions for childhood asthma in the UK and several other countries,¹ despite the availability of effective anti-asthma medications.

Trends in childhood asthma in Britain from the early 1960s to the early 1990s were comprehensively reviewed in the context of a Department of Health report assessing the possible link between asthma and outdoor air pollution.² This chapter presents more recent trends in national sources of data relating to asthma and allergic disorders in children through the 1990s.

Although many local surveys of the prevalence of asthma have been published in the past decade, there have been few with nationwide coverage. This chapter uses data from a national interview survey conducted in 1991³ and the Health Surveys for England⁴ and Scotland⁵ to describe the spectrum of asthma and allergic diseases across the childhood age range, and the relation of these disorders to socio-economic status.

The International Study of Asthma and Allergies in Childhood (ISAAC)⁶ carried out questionnaire surveys during the mid-1990s of two age groups (6- to 7-year-olds: completed by parents; and 13- to 14-year-olds: self-completed by the children). These data from 56 countries worldwide⁷⁻¹⁰ place British prevalence figures in a global context. This chapter focuses on the ISAAC results for over 27,500 13- to 14-year-olds from a nationally representative sample of 93 British schools.^{11,12} These results also provide an insight into geographical variations in prevalence of asthma, eczema and hay fever within England, Scotland and Wales in 1995.

Asthma

Disease definition

Three measures of wheezing illness have been widely used in epidemiological research.^{13,14} For epidemiological purposes, a pragmatic disease definition is often required in order to make best use of the routinely available data.

Diagnosed asthma

In most sources of data relating to health service use and mortality, this is all that is available. However, many studies have confirmed that there is substantial variation between doctors, areas and over time in the degree to which the term asthma has been applied to wheezing illnesses. These variations can to some extent be taken into account in analyses of routine statistics by seeking data on related diagnostic categories, such as acute or unspecified bronchitis or chronic obstructive airways disease, among which episodes of wheezing might be classified.

Symptoms

This is the approach most widely used in surveys specifically designed to study the occurrence of asthma. A common assumption is that all wheezing is asthma, regardless of diagnostic label. This has two advantages:



- disease ascertainment is not sensitive to variations in doctors' preferences for specific diagnoses; and
- the full range of symptomatology can be explored.

There are also limitations:

- the reporting of symptoms by children or parents is difficult to standardise¹⁵ and spurious variations may arise from translation artefacts, increased awareness of respiratory problems in certain groups or from changes in the perception of symptoms over time; and
- there may be many distinct types of wheezing illness with different epidemiological patterns.

Measures of lung function and bronchial hyper-reactivity

These are too invasive and labour-intensive for most epidemiological purposes and are not discussed in this chapter.

Much of the survey data relating to asthma provides a measure of disease prevalence, that is the proportion of individuals with the condition at a given point in time. Defining the prevalence of an episodic complaint such as asthma presents a problem in that most people with a tendency to wheeze are asymptomatic at any given moment. So it has become customary to refer to *period prevalence*, defined as the proportion of children with one or more episodes of wheezing over a specified prior period, usually the last twelve months.

The prevalence of any chronic disease is proportional to both the rate of occurrence of new cases (*incidence*) and to the *duration* of the illness. Conceptually, therefore, data on asthma prevalence should be interpreted as a function of incidence and prognosis.

Information derived from statistics of health service use is influenced by the *severity* of the condition (particularly the occurrence of intense attacks) and by social, cultural, geographical and financial factors, which may encourage or deter patients from using the health service. The burden of disease in terms of morbidity and mortality are influenced both by the epidemiological determinants of prevalence and severity and the degree to which effective care is offered and accepted. Symptoms related to asthma are therefore simultaneously both inputs and outputs of the health care system. Hence, a change over time in measured symptoms could be due to changes in prevalence, changes in health care, or both.

The burden of disease

Figure 7.1 summarises illustrative figures relating to the morbidity, mortality and service use generated by a population of one thousand children aged 5 to 14 years in Britain in the early 1990s. The prevalence data was derived from a nationwide interview survey of parents.³ The approach cannot be extended to the pre-school age-group as there is no national prevalence data available for children aged under five years.

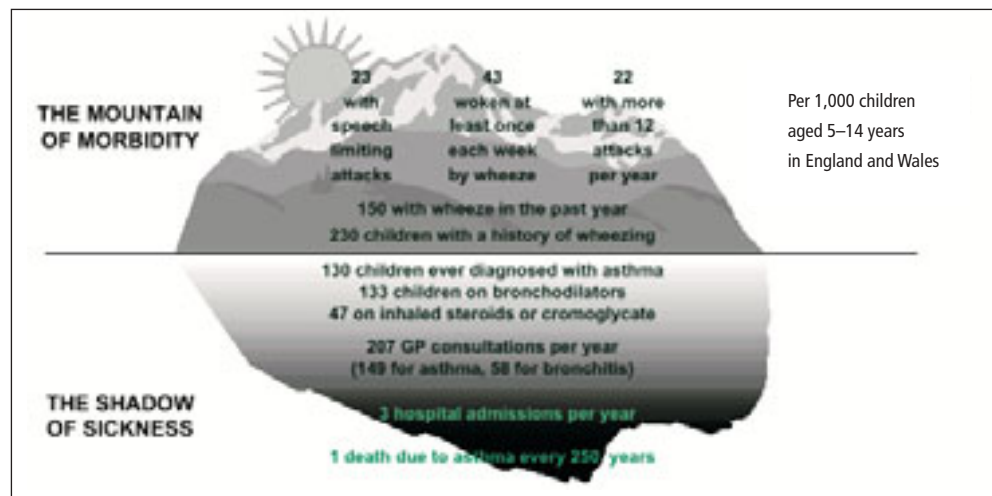
Various indicators of the severity of asthma may be derived from population surveys. In the above study,³ there was only a limited degree of overlap between the three measures presented in Figure 7.1. So children could present with infrequent speech-limiting attacks



Figure 7.1

Burden of asthma among 1,000 children aged 5 to 14 years in 1991

England and Wales



Source: MSGP4, HES, ONS, Strachan et al 1994 (*Arch Dis Child*. 70 174–178)

(speech-limitation being an indicator of clinically significant airway obstruction), or with frequent mild attacks. Children with persistent airflow limitation sufficient to disturb sleep might not be recognised by their parents as having attacks of wheezing.¹⁴

The figure shows that the impact of asthma on health services is borne largely by primary care, and that death from asthma in childhood is a rare occurrence. The ‘mountain of morbidity’ casting a ‘shadow of sickness’ represents the impact of asthma on health services and mortality statistics. Conceptually, the size and shape of the shadow is dependent on the angle of the sun, which can change over time, as attitudes to presentation, referral, diagnosis, treatment and compliance vary with time or from one region to another.

Table 7.1 shows the prevalence of diagnosed asthma, recent wheeze and more severe symptoms (frequent attacks, night-waking and speech-limiting episodes) among children of different ages in the Health Surveys of England (1996) and Scotland (1998). Throughout childhood and early adolescence, boys tended to experience more asthmatic symptoms than girls, although the prevalence was higher among females than males by the mid-teenage years.¹⁶

Socio-economic variations

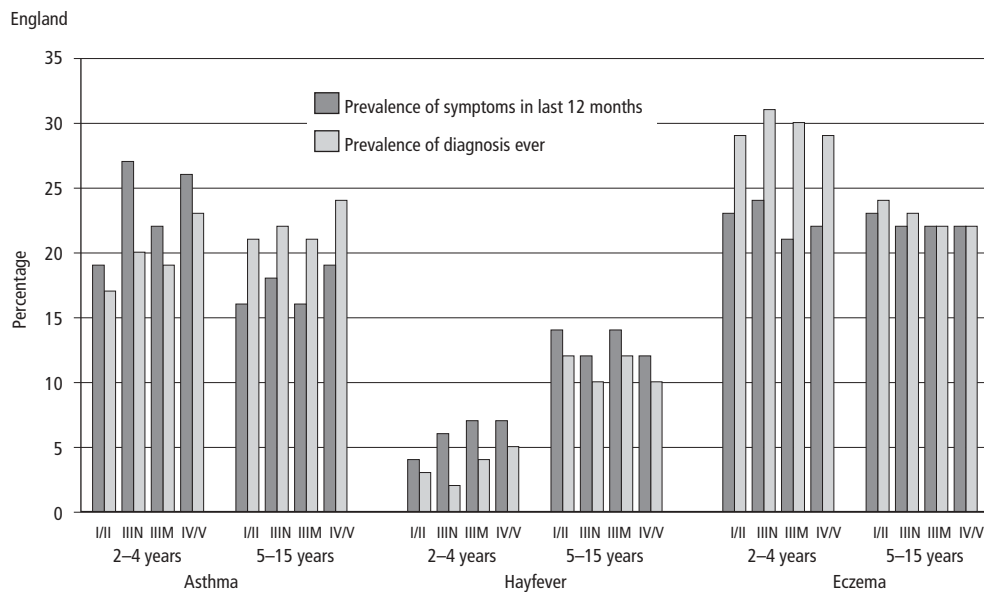
Between 1995 and 1997, the prevalence of asthma symptoms and diagnosis among children aged 5 to 15 years, in England, varied little between the parental social classes (Figure 7.2). However, the prevalence was slightly higher among children of manual workers, and this was more pronounced in the pre-school age group.

Patient consultation rates (Figure 7.3) showed a similar pattern to that seen in the Health Survey for England, with a social class gradient in the under-fives but relatively little socio-economic variation at ages 5 to 14 years. The number of consultations per patient did not differ systematically by social class in either age group.¹⁸



Figure 7.2

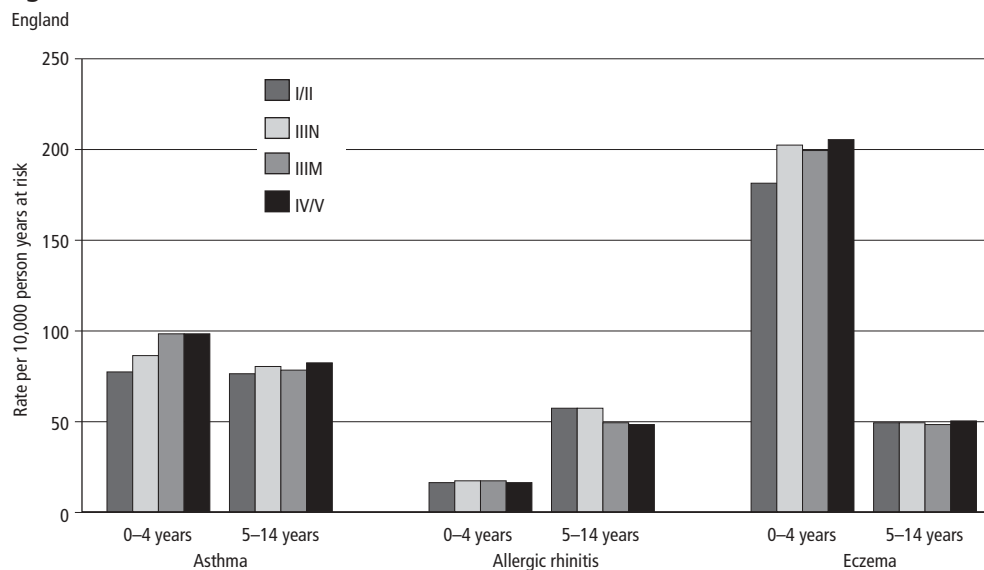
Prevalence of symptoms and diagnosis of asthma, hayfever and eczema, by age and social class of head-of-household, 1995–1997



Source: Health Survey for England 1997

Figure 7.3

Patient consultation rates in children for asthma, allergic rhinitis and eczema, by age and social class, 1991/1992



Source: Fourth National Morbidity Study of General Practice

The 1991 national interview survey,³ carried out at about the same time as MSGP4, found much greater socio-economic variations in the prevalence of severe wheeze (indicated by frequent or speech-limiting attacks, or sleep disturbance) than wheeze in the last year, among 5- to 17-year-olds. Given the similarity in consultation rates across the social classes in MSGP4, there was concern that this represented under-diagnosis and under-treatment of asthma in less privileged families. However, the interview survey showed that higher proportions of children in the less privileged groups were receiving treatment with ‘preventer’ medication (cromoglycate or steroid inhalers), which would be more consistent with appropriate treatment for more severe asthma.³



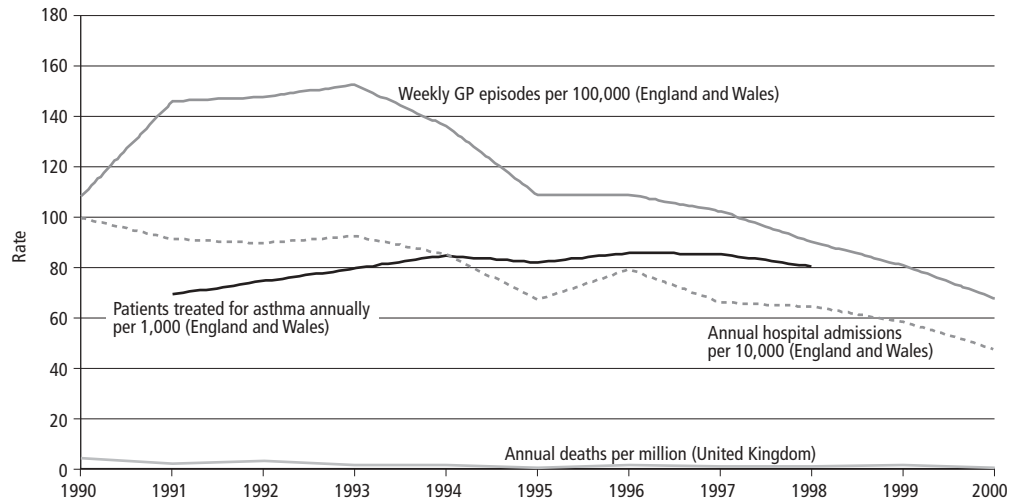
Time trends

Figures 7.4 and 7.5 summarise recent trends in health service utilisation and mortality for asthma among children. These combine information from various sources, and update trends for the period 1962 to 1992, which were tabulated in detail in an earlier review² and have been presented graphically and discussed elsewhere.¹⁹

Figure 7.4

Trends in annual rates of primary care consultations, hospital admissions and mortality for asthma, among children aged under 5 years

England and Wales, United Kingdom

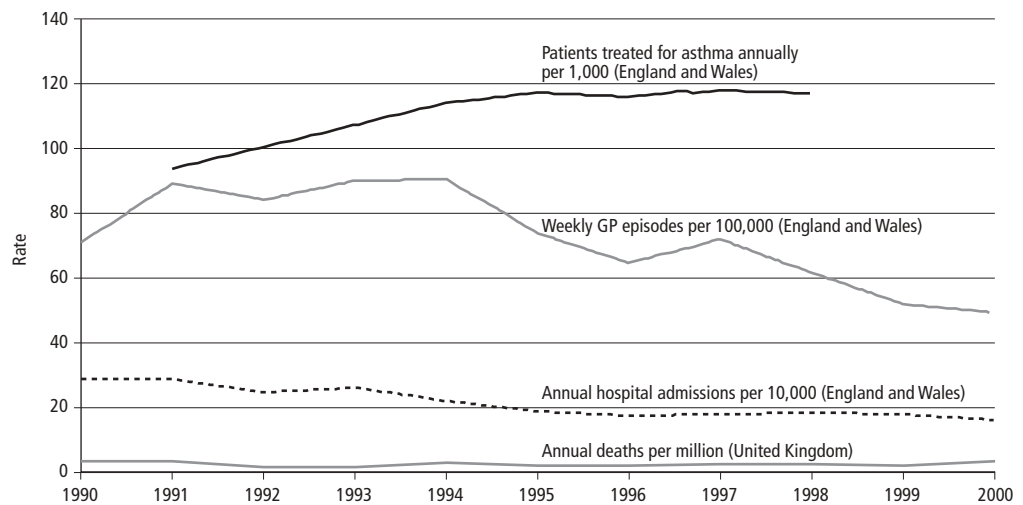


Sources: General Practice Research Database, Weekly Returns Service, Hospital Episode Statistics & Health Solutions Wales, ONS, GROS, GRONI

Figure 7.5

Trends in annual rates of primary care consultations, hospital admissions and mortality for asthma, among children aged 5 to 14 years

England and Wales, United Kingdom



Sources: General Practice Research Database, Weekly Returns Service, Hospital Episode Statistics & Health Solutions Wales, ONS, GROS, GRONI



Patients consulting in general practice

Trends in the proportion of children consulting their general practitioner and receiving treatment for asthma in each calendar year during the 1990s were derived from the General Practice Research Database (GPRD).²⁰ A comparison of GPRD with MSGP4 for 1991/1992 showed that the annual period prevalence of asthma treatment with prior diagnosis in GPRD approximated to the proportion of patients consulting for asthma over a 12-month period in MSGP4.²¹

Across successive National Morbidity Surveys in General Practice,²² the proportion of children aged under five years consulting for asthma increased from 13 per 1,000 in 1971/1972, to 26 per 1,000 in 1981/1982 and 86 per 1,000 in 1991/1992. With the GPRD data (Figure 7.4), the increasing trend in the proportion of children aged under five years being treated for asthma, continued during the early 1990s but levelled off between 1994 and 1998. Among 5- to 14-year-olds, patient consultation rates from MSGP increased from 16 per 1,000 in 1971/1972, to 29 per 1,000 in 1981/1982 to 76 per 1,000 in 1991/1992. The GPRD data (Figure 7.5) showed that the proportion of patients aged 5 to 14 years treated for asthma increased from 94 per 1,000 in 1991 to 114 per 1,000 in 1994, but again the rise was less marked between 1994 and 1998.

Incidence of acute asthma attacks presenting in general practice

The Weekly Returns Service (WRS) of the Royal College of General Practitioners²³ compiles reports of consultations for new episodes of a selected list of acute illnesses from a panel of 'spotter practices'. Asthma attacks are monitored in this way and the WRS data provide a continuous time trend since the mid-1970s, although some changes to the participating practices has occurred.

Incidence rates of acute asthma among children under five years of age increased fairly steadily from 0.1 per 1,000 per week in 1976 to 1.5 per 1,000 per week in 1991. The equivalent figures for 5- to 14-year-olds are from 0.2 per 1,000 in 1976 to 0.9 per 1,000 in 1991. From 1991 to 1993, there was little change in the rates, in both age groups (Figures 7.4 and 7.5). Between 1993 and 2000 the incidence rates declined for children in both age groups, except for the temporary rise in 1997 among 5- to 14-year-olds. Recent time trends have been analysed in detail and the fluctuations in asthma trends are not due to diagnostic transfer to or from the most likely alternative label, acute bronchitis.²⁴

Hospital inpatient admissions for asthma

Hospital admission rates derived from the Hospital Inpatient Enquiry (1962 to 1985) and Hospital Episode System (1987 onwards) showed more than a twenty-fold increase in asthma admission rates among children aged under five years, from 0.4 per 1,000 hospital admissions in 1962, to 1.9 per 1,000 in 1976, to 9.1 per 1,000 in 1991. There was a sevenfold rise in 5- to 14-year-olds, from 0.4 per 1,000 hospital admissions in 1962, to 1.1 per 1,000 in 1976, to 2.9 per 1,000 in 1991. After these dramatic increases, admission rates in both England and Wales and in Scotland reached a plateau during the late 1980s¹⁹ and declined in both age groups through the 1990s (Figures 7.4 and 7.5).

The rise in asthma admission rates among children cannot be explained by diagnostic transfer from acute bronchitis,² and the fall was not accompanied by an increase in admissions from other respiratory causes. Although it is not possible from routine HES



data to distinguish first admissions from readmissions or to ascertain attendances at accident and emergency departments, there is evidence to suggest that neither the rise in earlier decades nor the fall in recent years in the UK were entirely attributable to changes in admission threshold and readmission rates.^{25,26}

Mortality

Rates of mortality from asthma during childhood have been on the decline since the epidemic of asthma deaths in the mid-1960s, when they reached 10 per million among children aged under five years and 14 per million among 5- to 14-year-olds.^{2,19} Between 1990 and 2000, asthma related deaths among children aged under five years and those aged 5 to 14 years remained uncommon at around two per million each year (Figures 7.4 and 7.5).

Prevalence

Unfortunately, there have been no nationwide studies to provide information on trends in prevalence or severity of asthma in British children during the 1990s. However, local studies^{27–30} provide some insights. Among pre-school children in Leicester, the prevalence of recent wheezing increased from 12 per cent in 1990 to 26 per cent in 1998,²⁷ accompanied by a rise from 11 per cent to 18 per cent in the proportion of all children diagnosed with asthma. Among 8- to 9-year-olds in Sheffield, the prevalence of recent wheeze increased from 17 per cent in 1991 to 19 per cent in 1999, largely due to a rise in milder forms of wheezing.²⁸ However, the proportion of all children with a lifetime diagnosis of asthma increased by a greater amount, from 18 per cent to 30 per cent.

Results from serial prevalence surveys of 9- to 13-year-olds in Aberdeen are of particular interest as they extend temporal comparisons back to the 1960s. The proportion of children with wheezing in the past three years was 10 per cent in 1964, 20 per cent in 1989, 25 per cent in 1994 and 28 per cent in 1999.²⁹ Another study, which replicated an earlier survey is that of 7- to 8-year-olds in Croydon.³⁰ There was a greater increase in the prevalence of wheeze in the last year during the 1990s (from 13 per cent in 1991 to 18 per cent in 2002) than during the 1980s (from 11 per cent in 1978 to 13 per cent in 1991). In contrast to the Sheffield study,²⁸ the recent increase was not confined to children with infrequent attacks of wheezing.

Hay fever and allergic rhinitis

Table 7.1 shows the prevalence of a lifetime diagnosis of hay fever and a combination of hay fever symptoms in the past year (sneezing, or a runny or blocked nose, plus itchy or watery eyes, not associated with a cold or the flu) among children of different ages in the Health Survey for England (1996).

Data from national birth cohorts studied at age 16 in 1974 and 1986 showed a two-fold variation across the social classes in the prevalence of parentally-reported hay fever or allergic rhinitis, with higher rates in families of non-manual workers.³¹ Data from the MSGP4 showed a similar, but less marked, higher prevalence of children aged 5 to 14 years from non-manual families than manual families consulting for hay fever or allergic rhinitis in 1991/1992 (Figure 7.3). Prevalence rates from the Health Survey for England (Figure 7.2) also suggested slightly higher rates of rhino-conjunctivitis symptoms and of diagnoses of



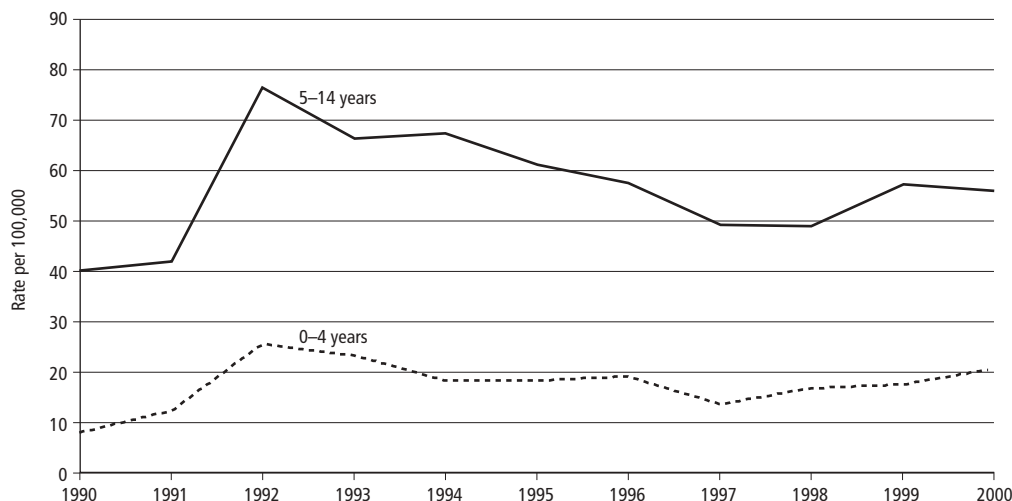
hayfever in children aged 5 to 15 years from non-manual households than manual households. However, the opposite trend was found in younger children aged 2 to 4 years, with a higher prevalence among those from manual households.

Across successive National Morbidity Surveys,²² the proportion of children aged under five years consulting for hay fever or allergic rhinitis increased from 5 per 1,000 in 1971/1972, to 10 per 1,000 in 1981/1982 and 16 per 1,000 in 1991/1992. Among 5- to 14-year-olds, patient consultation rates increased from 18 per 1,000 in 1971/1972, to 35 per 1,000 in 1981/1982 and 52 per 1,000 in 1991/1992. Data from the RCGP Weekly Returns Service²³ suggest that 1991/1992 may have been an unusually bad year for hay fever sufferers (Figure 7.6), so the MSGP4 data may have exaggerated the increase over successive decades. Average weekly consultation rates for hay fever or allergic rhinitis in the WRS (which are episode-based, not patient-based) declined during the early and mid-1990s but then increased again, resulting in a higher consultation rate in 2000 compared with 1990 (Figure 7.6).

Figure 7.6

Trends in average weekly GP consultation rates for hay fever/allergic rhinitis by age

England and Wales



Sources: *Weekly Returns Service*

Hay fever is an uncommon cause of hospital admission, and admission rates for allergic rhinitis among children aged under 15 years declined slightly between 1990 and 2001 (Figure 7.7). There are no national data relating directly to trends in prevalence of hay fever during the 1990s, but local figures from Sheffield primary school children suggested a rise through the decade: from 12 per cent in 1991 to 16 per cent in 1999.²⁸ There was a less marked increase among 9- to 13-year-olds in Aberdeen: from 12 per cent in 1989 to 13 per cent in 1994.²⁹

Eczema or atopic dermatitis

Table 7.1 shows the prevalence of a lifetime diagnosis of eczema and a classic combination of symptoms (chronic itchy flexural rash) in the past year among children of different ages in the Health Survey for England (1996).



Data from parental interview and medical examination of national birth cohorts born in 1958 and 1970 and studied during the 1960s, 1970s and 1980s suggested that eczema was a disease associated with relative affluence.^{31,32} This is reflected in the prevalence of symptoms and diagnoses in school-aged children from the Health Survey for England (Figure 7.2), where prevalence was slightly higher among children from non-manual households than those from manual households. However, MSGP4 data showed that a lower proportion of pre-school children of professional and managerial workers consulted their family doctor for eczema in 1991/1992 (Figure 7.3).

Across successive National Morbidity Surveys,²² the proportion of children aged under five years consulting for eczema, atopic dermatitis or related conditions were similar in 1971/1972 (90 per 1,000) and 1981/1982 (87 per 1,000) but increased to 197 per 1,000 in 1991/1992. Among 5- to 14-year-olds, patient consultation rates increased steadily from 28 per 1,000 in 1971/1972, to 33 per 1,000 in 1981/1982 to 48 per 1,000 in 1991/1992. Some of these changes may be due to differences in the eczema-related diagnostic labels classified together in each morbidity survey.

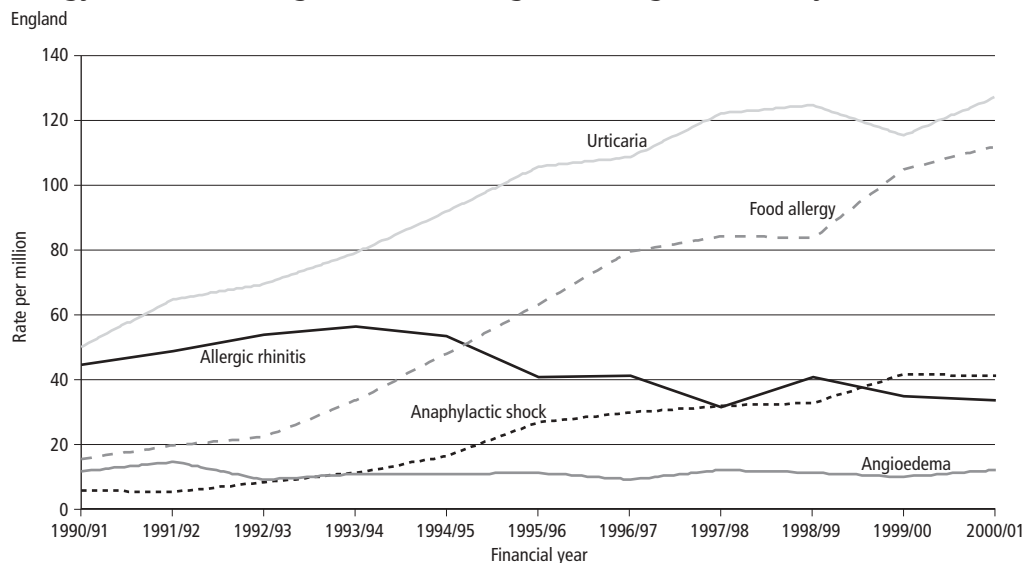
There are no national trend data for the prevalence of childhood eczema during the 1990s, but local figures suggest a continuing rise. The proportion reported as ever diagnosed with eczema increased from 28 per cent in 1990 to 44 per cent in 1998 among pre-school children in Leicester,²⁷ from 18 per cent in 1991 to 31 per cent in 1999 among 8- to 9-year-olds in Sheffield,²⁸ and from 12 per cent in 1989 to 18 per cent in 1994 among 9- to 13-year-olds in Aberdeen.²⁹

Food allergy, urticaria, angio-oedema and anaphylaxis

There are few prevalence studies of allergic disorders other than asthma, hay fever and eczema, and none with national coverage, so the burden of disease is estimated imperfectly from hospital admission data. Figure 7.7 summarises recent trends in hospital admission

Figure 7.7

Trends in hospital admission rates for allergic rhinitis, anaphylactic shock, food allergy, urticaria and angio-oedema among children aged under 15 years



Sources: Hospital Episode Statistics



rates for selected allergic diseases and complications during the 1990s. There has been a dramatic rise in admission rates for food allergy, urticaria and anaphylactic shock, with no evidence of diagnostic transfer from the most likely alternative diagnoses, angio-oedema.

Although these figures may reflect changing patterns of referral and admission for allergic complications, they are consistent with a local study that showed a three-fold increase in the prevalence of allergic sensitisation to peanuts among three-year-olds in the Isle of Wight, from one per cent in 1989 to three per cent in 1995.³³

International and regional variations in asthma and allergic diseases in children

Table 7.2 summarises the results of self-completed questionnaire surveys of 13- to 14-year-old children in mainland Britain and selected other parts of the British Isles, by comparison with the global range of prevalence figures obtained in the International Study of Asthma and Allergies in Childhood (ISAAC).⁷⁻¹² Among 56 countries included in the ISAAC study, Great Britain (England, Scotland and Wales combined) ranked second highest for prevalence of eczema symptoms, third highest for asthma symptoms and thirteenth for symptoms of allergic rhinoconjunctivitis.

The regional differences in England for the prevalence of asthma and allergic diseases were small in comparison with the global variations (Table 7.2). Results from a nationally representative sample of schools in the Irish Republic, Channel Islands and the Isle of Man were generally consistent with the British range, suggesting that asthma and allergic disease were fairly evenly distributed throughout the British Isles.

Within England, there was a higher prevalence of asthma symptoms outside the major cities.¹¹ For instance, the South West had the highest proportions of children reporting wheeze in the past year (35 per cent), more than four wheezing attacks (11 per cent) and a history of eczema ever (25 per cent). The highest proportions of children reporting a history of asthma was in East Anglia and Oxford (23 per cent) and the lowest was in the North Thames (18 per cent). More children in East Anglia and Oxford (39 per cent) reported a history of hay fever than children from other English regions. However, there was little difference in the prevalence of recent symptoms of either hayfever or eczema.¹²

Conclusions

Asthma and allergic diseases are very common among British children: in the Health Survey for England,⁴ 39 per cent of 2- to 15-year-olds had received diagnoses of asthma or eczema or hay fever, and two per cent had been diagnosed with all three conditions. The spectrum of disease and its consequences for health services is most clearly described for asthma, and less is known about the relationship between the 'mountain of morbidity' and 'shadow of sickness' for other allergic diseases.

After three decades when prevalence studies, primary care contacts and hospital admission rates all suggested a rise in the burden of asthma among children,² these measures became dissociated between 1990 and 2000 (Figures 7.4 and 7.5). One interpretation is that improved treatment of asthmatic children, including more widespread use of 'preventer'



therapy with steroid inhalers, reduced the incidence of acute severe attacks of wheezing, and the need for urgent consultation in general practice or admission to hospital.²⁴ However, at a regional level in England there was a very poor correlation between admission rates for asthma and the prevalence of wheeze (even of severe wheeze) among children,³⁴ suggesting that referral and admissions policies, rather than the incidence of acute attacks, are potentially the important determinants of asthma admission rates.

No epidemiological studies have attempted to explain the recent time-trends in asthma or allergic diseases in terms of changes in known or suspected risk factors for these conditions. However, three such studies of the trends during the 1970s and 1980s^{31,35,36} failed to identify any demographic, perinatal or environmental factor, which could explain more than a small proportion of the large changes in prevalence of asthma, hay fever or eczema.

International comparisons placed Britain close to the top of the world-wide league of asthma and allergy prevalence. Although these are based on self-reported questionnaire data, the large differences in symptom prevalence between England and Albania, for instance, are corroborated by objective tests such as exercise-induced bronchospasm (for asthma) and skin examination (for eczema).³⁷ However, the reasons why children in Britain and other English-speaking countries, such as Australia, New Zealand and Canada, experienced such a high burden of asthma, hay fever and eczema remain obscure.

Global time trends in asthma and allergic diseases are being assessed by the third phase of the International Study of Asthma and Allergies in Childhood. During 2000 to 2002, this repeated the questionnaire surveys conducted in diverse study centres in the mid-1990s, including many of the parts of the British Isles mentioned in Table 7.2. With the Health Survey for England 2002 collecting data specifically on children for comparison with 1997, there will soon be new insights into the trends in prevalence in both younger and older children in England. Both sources include standardised questions on eczema and hay fever symptoms, as well as asthma, filling an important gap in our current knowledge of time trends in allergic disease in the UK.

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Table 7.1 Prevalence of symptoms in the last year and diagnosis ever of asthma, hayfever and eczema by age and sex

England 1996, Scotland 1998

Numbers and percentages

Age in years	Number of children	Percentage of children								
		Any wheeze or whistling in the chest	4 or more attacks of wheeze	Woken by wheeze >1 night/week	Speech limiting wheeze	Ever had asthma	Rhinoconjunctivitis ¹	Ever had hayfever	Itchy flexural rash ²	Ever had eczema
England 1996										
Boys										
2-6	1,667	23	10	7	6	23	7	6	22	29
7-10	1,287	14	6	4	4	23	10	9	18	23
11-15	1,446	20	9	3	4	23	17	17	21	19
All ages	4,400	20	9	5	5	23	11	11	21	24
Girls										
2-6	1,613	18	8	6	4	18	6	4	22	27
7-10	1,274	15	7	3	3	17	11	7	24	25
11-15	1,367	18	8	3	4	19	17	14	25	21
All ages	4,254	17	8	4	4	18	11	8	23	24
Children										
2-6	3,280	21	9	7	5	21	7	5	22	28
7-10	2,561	15	7	3	3	20	10	8	21	24
11-15	2,813	19	9	3	4	21	17	16	23	20
All ages	8,654	18	8	4	4	21	11	9	22	24
Scotland 1998										
Boys										
2-6	715	19	6	5	4	19				
7-10	555	15	6	3	3	20				
11-15	717	15	6	2	2	19				
All ages	1,987	16	6	3	3	19				
Girls										
2-6	675	18	6	5	3	14				
7-10	540	12	4	4	2	16				
11-15	690	13	5	2	2	17				
All ages	1,905	14	5	4	2	16				
Children										
2-6	1,390	19	12	10	6	17				
7-10	1,095	14	10	7	6	18				
11-15	1,407	14	10	4	4	18				
All ages	3,892	15	10	7	5	18				

Sources: Health Survey for England 1996, Scottish Health Survey 1998**Notes:**

1. Itchy watery eyes with sneezing or runny/blocked nose without cold in the last 12 months.

2. Itchy skin affecting face, eyes, neck, elbows, ankles or behind the knees in the last 12 months.

Table 7.2 Prevalence of symptoms in the last year and label ever of asthma, hayfever and eczema in 12-to 14-year-olds, 1994–1996

British Isles and worldwide

	Number of children		Percentage of children							
	Any wheeze or whistling in the chest	4 or more attacks of wheeze	Woken by wheeze >1 night/week	Speech limiting wheeze	Ever had asthma	Rhinoconjunctivitis ¹	Ever had hayfever	Itchy flexural rash ²	Ever had eczema	
Countries of the UK										
England	20,712	33	9	4	9	21	18	36	17	23
Wales	2,351	34	9	4	9	22	19	33	15	21
Scotland	4,444	37	12	5	10	21	20	33	17	21
English NHS Regions										
North East										
& Yorkshire	3,709	34	9	4	9	20	19	33	17	21
North West	3,029	30	9	4	8	20	19	33	16	23
Trent	2,207	34	9	4	8	22	16	36	16	23
West										
Midlands	2,219	30	8	4	9	21	19	36	16	23
East Anglia & Oxford	2,324	34	10	3	9	23	18	39	16	25
North										
Thames	2,220	31	7	3	8	18	16	36	19	24
South										
Thames	2,297	31	10	3	9	21	17	38	17	21
South West	2,707	35	11	3	10	21	17	36	15	25
Other parts of the British Isles										
Guernsey	1,170	35	10	4	9	21	18	35	15	22
Jersey	1,135	35	11	3	9	19	17	36	19	22
Isle of Man	1,467	33	9	3	9	19	20	36	16	18
Republic of Ireland	3,147	29	8	3	6	15	19	25	14	9
Global range 463,801										
Minimum prevalence		2	0	0	1	2	4	0	0	0
Maximum prevalence		33	10	6	11	28	40	48	19	57

Sources: Austin J et al (1999) *Arch Dis Child* 81, pp 225–230; Kaur B et al (1998) *Br Med J* 316, pp118–124; ISAAC Steering Committee (1998) *Eur Respir J* 12, pp 315–335; Strachan D P et al (1997) *Paed Allergy Immunol* 8, pp 161–176; Williams H et al (1999) *J Allergy Clin Immunol* 103, pp 125–138.

Notes:

1. Itchy watery eyes with sneezing or runny/blocked nose without cold in the last 12 months.

2. Itchy rash coming and going for at least six months and affecting face, eyes, neck, elbows, wrists or behind the knees in the past year.