8. Allergy and epidemiology

Say what the use, were finer optics given,
To inspect a mite not comprehend the heaven?
Or touch, if trembling alive all o'er,
To smart and agonise at every pore.

Alexander Pope, 1733,
An Essay on Man.

8.1 Introduction

This chapter deals with the allergic disorders associated with dust mite allergens, principally allergic asthma, atopic eczema and allergic perennial rhinitis. The main theme is the natural history of allergen exposure, concentrating on allergen levels and mite population densities in relation to temporal and spatial variation in the prevalence of these disorders, particularly atopic asthma. I do not review epidemiology of asthma or allergy more generally. This topic has been investigated in two large, long-term, international studies of asthma and allergies in adults and children respectively: the European Community Respiratory Health Survey (ECRHS; Burney *et al.,* 1994; European Community Respiratory Health Survey, 1996; Janson *et al.,* 2001; Sunyer *et al.,* 2004; www.ecrhs.org) and the International Study of Asthma and Allergies in Childhood (ISAAC; International Study of Asthma and Allergies in Childhood Steering Committee, 1998; Asher *et al.,* 2006; Pearce *et al.,* 2007; Ait-Khaled *et al.,* 2007; http://isaac.auckland.ac.nz). Several 'environmental' factors have been examined in these studies, including effects of climate (Verlato *et al.,* 2002; Weiland *et al.,* 2004), economic status (Stewart *et al.,* 2001), diet (Ellwood *et al.,* 2001) and mite allergen exposure (Zock *et al.,* 2006). Although there were differences in absolute prevalence values between the two studies, in general the patterns of prevalence were similar: low in Eastern Europe and higher in Western Europe with a strong northwest-southeast gradient, and highest in English-speaking countries (Pearce *et al.,* 2000).

The story of the relationship between dust mites, allergy and asthma is complicated by the fact that atopy, the genetic predisposition to make IgE antibodies to common allergens, may or may not be associated with the presence of disease, and that asthma, eczema and rhinitis can be provoked by agents other than allergens and may not be associated with atopy. Therefore, the disease states of relevance to this chapter are those combining allergen-specific IgE antibodies and/or a positive skin-prick test to dust mite and other common airborne allergens; where there is a family history of atopy; and where patients have active asthma, eczema and rhinoconjunctivitis. Nomenclature of allergy and allergic diseases was revised by Johansson *et al.* (2001) and Figure 8.1 indicates the overlap between atopy and allergic disease