Chapter 5
Ecology and Asthma

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Introduction

Ecology is the study of patterns of relationships between organisms and their environment (Green et al. 2001). When applied to asthma, investigators have taken several different approaches to the "environment," usually by studying the effect of the environment on the "organism" defined as people with asthma (Harper 2004; Hart and Whitehead 1990; Stoloff 2000; Lanphear et al. 2001; Gold and Wright 2005; Bousquet et al. 2005; Milton et al. 2004; Parkes et al. 2003; Redd 2002). The exact approach depends on the expertise of the investigator from anthropologist to health services researcher to atmospheric scientist. In each case, the environment is seen through the lenses of the specific scientific discipline. In this regard, few authors have viewed the 'asthma environment' through the lens of the patient or family dealing with asthma. Such a view requires knowledge of the social ecology of asthma that has been addressed most commonly in children with asthma as the nested arrangement of family, school, neighborhood, and community (Earls and Carlson 2001; Klinnert et al. 2002). In this chapter, the work published under the key terms of asthma and ecology will be reviewed and when possible integrated into a holistic approach. The perspective of the person (organism) with asthma will be emphasized. It is the patient centered ecology of asthma that becomes pertinent, and highly relevant to the people who live with work with and suffer from asthma (Fig. 5.1).

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Cultural, Social and Economic Environment

In the United States, asthma prevalence as well as the burden of asthma morbidity and mortality is higher in communities of color, such as those of African American or Caribbean American descent (Gold and Wright 2005; Mannino 2004). The reasons for the differences have been suggested to be genetic, such as the levels of genetic markers (e.g., arginine/arginine) believed to be important in metabolizing and utilization beta agonists (Nelson et al. 2006; Israel 2005) as well as social, cultural, economic, and environmental factors. From the ecology perspective, it is all of these factors plus the interaction of each factor with the other factors that result in the complex bio-psycho-social construct called asthma. For example, people of color are more likely to deal daily with the economic and social stresses of poverty and near poverty (Shanawani 2006) that yield limited time for addressing the management of a chronic illness (Hendrika et al. 2003; Kean et al. 2006; Rydstrom et al. 2004). But racial disparities are not just a consequence of lack of a family's time or access to health care. In a study of people with asthma who participated in managed care plans (Krishnan et al. 2001), African Americans were significantly less likely than Whites to report they had been offered or received education for self-management and avoidance of asthma triggers. Why was a racial subset of the managed care patients treated differently? The answer may be based on the interaction of health professionals' personal experience, and available resources deal with the economic, cultural and life-chaos realities of poor African-American that has evolved into a generalized perception of people of color. Or perhaps it is based on health professionals'

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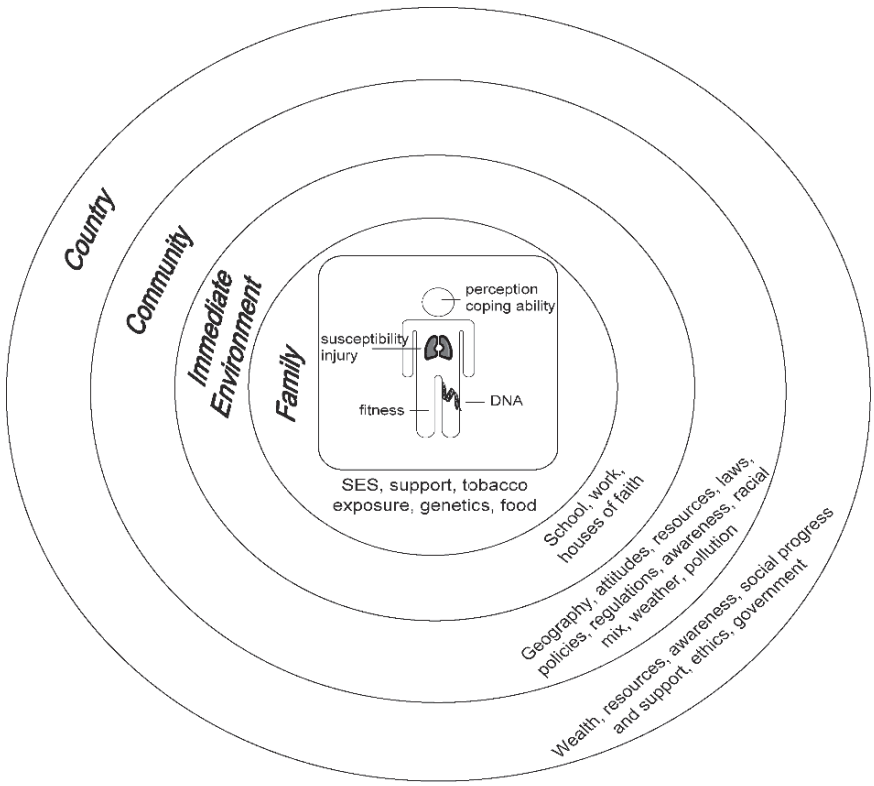

Fig. 5.1 The person with asthma in their socio-physiological-cultural environment

assumptions that asthma education is not accepted, understood, or acted upon even when presented in a manner that is clear to the educator and meets the health professional's needs (Couturaud et al. 2002; Cowie et al. 2002; Neri et al. 2001). Such professional biases are not uncommon and can occur when educational materials ignore the patient's and families' cultural and health beliefs (Becker et al. 1978).

Cultural or ethnic beliefs or practices often influence how asthma is perceived and internalized for both the person with asthma as well as their family members (Pachter and Weller 1993; Kleinman et al. 1978). Among Latino communities, asthma is viewed as a "cold" illness amenable to "hot" treatment (Risser and Mazur 1995; Pachter et al. 2002). An inhaler may be viewed as "cold" therapy since the rapid thrust of the drug against the back of the throat may feel cool and therefore viewed as unlikely to help. Simply suggesting that the inhaler be used after a cup of hot tea, soup or water will not interfer with the efficacy of the inhaler, but may greatly improve the inhaler's effectiveness by increasing inhaler use. Distrust of Western medicine, the medical profession, or even Caucasian professionals in general must also be considered a factor in the total ecology of the asthma patient, especially those living in communities of color (Bearison et al. 2002; George et al. 2003; Halbert and Isonaka 2006). There is a need for improved understanding of how ethno-cultural practices, independent of socioeconomic variables, may influence asthma care and the use of health care services and therapies. Open-ended questions such as "In your community, what does having asthma mean?" can elicit informative responses. Understanding, validating, and incorporating a person's ethno-cultural beliefs may ease the patient and family's job of adding the management of a chronic illness to their daily routine (Hendrika et al. 2003; Kean et al. 2006; Rydstrom et al. 2004). It can also make working with the family and patient less frustrating, more satisfying and ultimately more successful.

However, the importance of cultural beliefs does not stop with just the symptoms of asthma and whether or not those symptoms are hot or cold, or due to congestion of the lungs or stress. Among health care

professionals, asthma is considered a chronic disease (National Heart, Lung, and Blood Institute 2007). For people with moderate or severe asthma who experience daily symptoms, the concept of asthma as a chronic disease agrees with their experience. However, only 75–80% of people do not have daily symptoms and may therefore, may not easily accept the concept of asthma as a chronic disease (Apter 2003). It is difficult for the professional and frightening for the patient to suggest that a disease is continuing to affect your lungs even when you have no symptoms. Such suggestions may trigger images of cancer, often the only condition to be accepted as chronic and present without symptoms. The difficulty of advancing the image of asthma as a chronic disease is pervasive. Consider the large number of health care professionals who fail to comply with guidelines recommending daily anti-inflammatory medications for people with persistent asthma (Rastogi et al. 2006).

Health Communication

We communicate about our environments primarily through language. Language discordance between the person with asthma and the group of people explaining and guiding asthma education and management may affect the ability and the desire of the person with asthma to adhere to recommended and appropriate use of health care services (Manson 1988; Halterman et al. 2000). For example, Spanish immigrant parents cited language as the greatest barrier to health care access for their children even in communities with bi-lingual health professionals (Flores 2000). In some languages such as Somali, there is no word for asthma or the constellation of asthma symptoms. Other languages may have many terms that describe several asthma-related symptoms such as wheeze or breathlessness, but fail to have a word that puts these concepts together to form a chronic disease. (Yawn et al. 1999) Asthma related terms may be both gender- and-age dependent. In preschool children the diagnosis of asthma can be difficult and terms such as "bronchitis," "reactive airway disease," or "wheezy bronchitis" are used in culture where males must be strong, asthma may continued to be described by symptoms (Gautrin et al. 1994a, b; Weinberger et al. 2002).

The community environment affects language, and language impacts the environment in which health care professionals attempt to diagnose and treat asthma. A medical interpreter should be used when there is language discordance between clinician and patient (Flores 2004; Baker et al. 1996). On these occasions, the medical interpreter also becomes a cultural interpreter and must therefore be knowledgeable in areas of languages, health terminology, and cultural beliefs to effectively express the questions and answers of both parties in the medical communication. In addition, the interpreter must be willing to share patient-reported cultural and health beliefs with the health care professional rather than "edit" the patient's responses to fit the assumed beliefs of the health care professional (Woloshin et al. 1995).

Not all ethno-cultural beliefs can be so obviously tied to racial or language differences. Few who have traveled throughout the United States would suggest that there are no regional differences between the ethos or culture of Maine, Southern California, and Texas. Undoubtedly, some of the differences are due to the Spanish settlers in Texas, and the Northern Europeans and puritan settlers of Maine. But the differences are also influenced by geography, oceans, mountains, climate and natural and unnatural resources such as timber, oil, minerals, and smog. Those differences impact the prevalence of asthma, the age of asthma onset, the impact of therapy, the seasonality of symptoms, and even the acceptance of the concept of asthma as a chronic condition. Minnesota farmers experience periods of airborne triggers from planting, using herbicides and harvesting grain crops. But they also often have a dislike of conditions that suggest they personally have need for outside support – conditions like asthma that require regular care and affect a crucial body function (breathing). It is not unusual to hear them discuss the need to "work through" the breathing problems and to not become dependent on inhalers. The combination of external and internal environmental factors can make asthma management challenging even in those whose ethno-culture background may superficially appear similar to the majority of US physicians who are White and Anglo Saxons (Yawn et al. 1993).

Expectations and Health Beliefs

Expectations are another part of the intellectual or belief environment that affects asthma management. Many Americans, particularly people of color, accept suboptimal levels of asthma control perhaps because

they are unaware of the possibilities of improved asthma management and its ability to enhance their quality of life (Pearlman et al. 2006). Several large asthma studies have described the current level of asthma symptoms that appear to be tolerated by American of all ages, both genders, and many cultures (Yawn et al. 2002; Halm et al. 2006; Riekert et al. 2003; Children and Asthma in America 2006). This lack of high expectations may be affirmed by physicians who often fail to assess the burden of asthma during asthma-related visits (Cabana et al. 2003; Yawn 2004; Stoloff and Boushey 2006; Yawn 2008). The failure of health care professionals, especially in pediatrics, family medicine and internal medicine to inquire about the frequency and severity of symptoms may affirm for the patient that symptom burden is not important, not amendable to treatment and that only "attacks" should be monitored and treated. Such low expectations regarding the ability to address the everyday burden of asthma may be what drive the lack of adherence to daily anti-inflammatory therapy and other self-management behaviors (Halm et al. 2006; Riekert et al. 2003). Recognizing the combination of low expectations and fears about the side-effects of daily inhaled steroids highlights how knowing the ecology of asthma can clarify the underlying patterns of overuse of rescue medications or avoidance of activities to avoid symptoms (George et al. 2003; Leickly et al. 1998; Mansour et al. 2000; Van Sickle and Wright 2001).

Health Literacy

To the social ecology surrounding asthma, we must add health and reading literacy. One in four American adults cannot read and comprehend most written health material (Kirsch 1993; Doak et al. 1996) due to limitations in reading abilities and health literacy. Simply targeting educational materials to a fifth grade reading level as determined by an Anglo American scoring tool is insufficient. Most tools that assess reading levels have limited ability to differentiate between common health-related words such as pneumonia that may be familiar from complex concepts represented by words of the same length and number of syllables. To date we have no computer-based tools that are easy to use to determine the health literacy level of any materials let alone the cultural acceptability of written materials. With this is mind, it may be appropriate to consider written materials as the last resort rather than the panacea for all patient education (Neri et al. 1996; Kelso et al. 1996; Patel and Potter 2004; Williams et al. 1998). Pictures, videos and even cartoon drawings may be more useful than pamphlets full of text (Paasche-Orlow et al. 2005). What are we adding to the ecological mix when we introduce materials that cannot be read or understood or are in direct contradiction to a common community health belief?

For the researcher, disentangling the impact of economic stress from cultural imperatives is often important. Assigning causality requires this separation. However, for the health care professional trying to provide care for asthma, the separation may be less useful. Attempting to understand how to provide care, education, and support is more about identifying barriers and finding solutions than attributing those barriers to poverty or ethnicity or religion or culture. Few studies have addressed the identification of barriers in the context of assessing and improving adherence to medical care for asthma. This would be an appropriate application of the social and medical ecology of asthma to health care.

Using Ecology to Improve Asthma Outcomes

In medical parlance, most of the topics discussed so far in this chapter would fall under the concerns regarding adherence or non-adherence to therapy and control of asthma (Rand 2005; Bender 2006; Adams et al. 2004; Suissa et al. 2000; Williams et al. 2004; Weinstein 2005). Adherence is a measure of how well we as health care professionals advise and offer therapy considered important and doable by the patient and their families. We appear to have limited success in our efforts to incorporate these factors into our education and treatment plans since even in clinical trial settings medication adherence often falls to less than 50% of doses within weeks to months of treatment initiation (Jonasson et al. 2000; Onyirimba et al. 2003; Krishnan et al. 2004; Burkhart and Rayens 2005). While some non-adherence is unintentional (forgetting medications), much non-adherence is volitional and based on patient- or parent-reasoned and purposeful decision

making, decisions based on the ecology of their asthma "community" including their interactions with health professionals (Adams et al. 2003; Bender et al. 2003; Osterberg and Blaschke 2005). The two types of non-adherence (intentional and non-intentional) both result from the person's asthma ecology (physical, cultural, economic and personal environment). However result from different interactions and therefore require different solutions. Tables 5.1 and 5.2 are summaries of the published literature on barriers and solutions to several ecological factors affecting asthma management. Table 5.1 addresses issues that are often unique to children and adolescents; issues common to adults with asthma are summarized in Table 5.2.

Table 5.1 Barriers to adherence: children and adolescents

Barriers to adherence: children and adolescents	Potential solutions
(1) Steroid fear (Yawn 2003a, b; Muntner et al. 2001)	
(2) Improper inhaler technique (Scarfone et al. 2002)	Nurse teaching (Hung et al. 2002; Rydman et al. 1999; O'Donnell et al. 1997)
(3) Side effects of drugs (Leickly et al. 1998; Bender and Bender 2005; Yawn 2003a, b; Muntner et al. 2001)	Better adherence with education and written action plan vs. usual care (Levy et al. 2000; Lindberg et al. 1999; Lindberg et al. 1999; Gibson et al. 2002)
(4) Parent unsure about effectiveness of medications (Leickly et al. 1998; Bender and Bender 2005; Yawn 2003a, b; Muntner et al. 2001)	Negative studies (Cowie et al. 2004; Colland et al. 2004)
(5) Child refuses meds (Leickly et al. 1998; Yawn 2003a, b)	
(6) Forgets meds (Leickly et al. 1998)	
(7) Can't avoid cigarette smoke and other triggers (Leickly et al. 1998)	Smoking cessation can be successfully provided at all ages. (Ryckman et al. 2006)
(8) Belief that disease is not severe (Bender and Bender 2005; Muntner et al. 2001)	
(9) Concerns about dependency on drugs and need to tough it out (Bender and Bender 2005; Yawn 2003a, b, Muntner et al. 2001)	
(10) Variable diagnoses of clinicians (Yawn 2003a, b)	
(11) Misunderstanding of use and role of medications.(Farber et al. 2003; Peterson-Sweeney et al. 2003)	
(12) Cost of medications (Bender and Bender 2005; Yawn 2003a, b)	
(13) Multiple caregivers (Rand 2005)	

Table 5.2 Barriers to adherence: adults

Barriers to adherence: adults	Potential solutions
(1) Fear of systemic steroids (Yawn 2003a, b; Janson et al. 2003)	
(2) Disruption of life activities (Bender and Bender 2005; Bender et al. 1998; Janson and Roberts 2003)	
(3) Minimization of symptoms (Janson and Roberts 2003)	(3) Use of Peak Flow Meters for poor perceivers (Gibson et al. 2002)
(4) Uncertainty regarding what to do (Bender and Bender 2005; Janson and Roberts 2003)	(4) Written asthma action plan that allows modification of doses (Gibson et al. 2002)
(5) Lack of understanding or belief in value of controllers (Farber et al. 2003; Butz et al. 2001)	(5) Self management education and nurse based case management (Adams et al. 2003; Gibson et al. 2002; Janson et al. 2003; Powell and Gibson 2006)
	Better explanations, regular appointments and written action plan (Adams et al 2003) Physicians who answer more questions, do more tests. (DiMatteo et al. 2000)
(6) Previous experiences (Yawn 2003a, b)	(6) Continuity of Care (Love et al. 2000)
(7) Need to "tough it out" (Yawn 2003a, b; Janson et al. 2003)	
(8) Costs (Bender and Bender 2005)	

Unintentional or intentional non-adherence may be caused by a stressed or chaotic lifestyle and be sporadic or consistent (Bender et al. 1998; DiMatteo 2004). Non-adherence based on intent is associated with a myriad of reasons and may vary with age, social economic status, gender, knowledge base, health-related beliefs, perceived symptom burden and risk of morbidity and mortality, co-morbid conditions, and cultural context (Apter 2003; Leickly et al. 1998; Rand 2005; Bender et al. 1998; DiMatteo 2004; DiMatteo et al. 2000; Bender and Bender 2005; Yawn 2003a, b; Janson and Becker 1998; Farber et al. 2003; Butz et al. 2001; Muntner et al. 2001; Peterson-Sweeney et al. 2003). The solutions for many of the barriers have been tested in limited populations making generalization to diverse ecological situations difficult, if not impossible. Other barriers require solutions that rely on culturally competent "common sense" and are seldom evaluated or shared in the medical literature. This area of inquiry remains wide open for research and quality improvement programs.

The Everyday Necessities and Ecology of Asthma

Every person requires food, water, and shelter to sustain life. Each of these necessities can interact with the systems that contribute to the biological and physiological basis of asthma. Literature is replete with information on the hygiene hypothesis of asthma, and the Allergic March (Klinnert et al. 2002; Annenberg Center, YR). These are usually presented in the context of childhood asthma, often dealing with the onset of asthma. In this section, a slightly different approach is taken.

In allergic asthma, the person's nutritional environment is generally approached as the source of triggers or allergens. Beginning with early exposure to sustenance other than breast milk, foods are seen as an exposure that may hasten a person along the allergy trajectory (Fig. 5.2). Even in-utero exposures have been mentioned as potential allergy triggers (Klinnert et al. 2002). However, little research have explored the social and psychological implications of foods as dangerous or "pathological" substances. One obvious consequence might be stigmatization of the child who cannot consume any food containing whey or peanuts. Imagine always having to think before you eat a cookie from a friend's lunch or have breakfast or dinner at a neighbor's house or even enjoy Valentine or Halloween candy. Little has been published on the social and psychological impact of having to "fear" something so closely associated with a happy childhood as a peanut butter and jelly sandwich, or milk and cookies. From the ecology perspective, issues can arise from the interactions among asthma, food, friends, social gatherings, and even self-image.

Food is not the only issue that can set the child or adult with asthma apart and set them up for exclusion or stigmatization by family, friends, and classmates

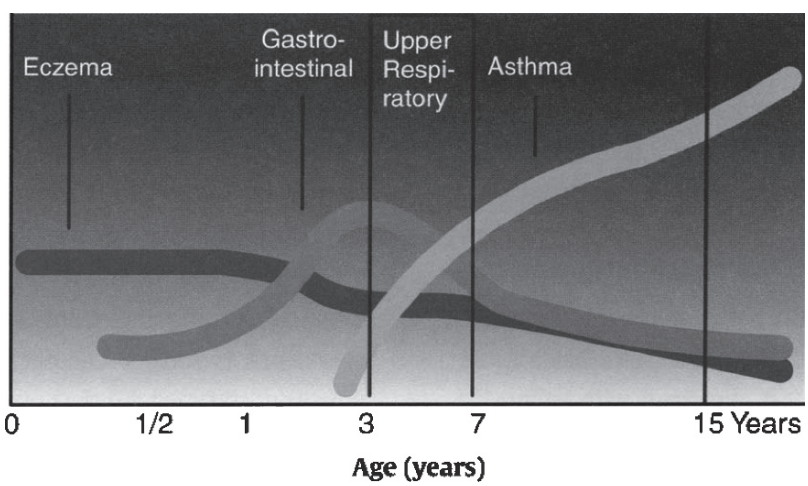

Fig. 5.2 The Allergic March. From: Anonymous 2000

(Yawn 2003a, b). Parents report not being able to work due to a child's asthma or a school's inability to manage asthma exacerbations and symptom variability. Adults must select occupations based on potential exposures to irritants and allergens. Families have to consider where they can live, where they can play or where they can vacation, whether or not they can have furry pets or friends with pets. Assessing and selecting acceptable physical environments can drive many life decisions for the family with asthma.

From the Parent Perspective

Parents of children with asthma report several concerns in their life with asthma. The medical aspects of properly identifying, and managing symptoms and inflammation are important and often difficult. However, there are many other concerns related to the child's ability to safely attend school as well as the stress that asthma places on every member of the family, including siblings of the child with asthma. Stress is a constant companion in any family with a child who has frequent symptoms or who has ever had an exacerbation leading to a visit to the emergency department or to a hospitalization. In the child with frequent symptoms, the mother may find working difficult since she is often called by day care, school, or after school care workers who are not always prepared to handle asthma flare-ups. The financial burden of asthma can be very large even with health insurance. And most important is the constant fear expressed by every parent regardless of the severity of their child's asthma (Yawn 2003a, b).

During a series of seven focus groups from around the US, parents of several races and ethnicities and from high, middle, and low socio-economic status developed consensus on a group of five major domains in their life with asthma. These domains describe a large part of the ecology of their asthma world: (1) Parents have many unmet asthma-related expectations, including being sure they have the proper diagnosis, and access to high quality care from professionals who can explain asthma, and its management in terms they understand. (2) The impact of asthma on daily life is pervasive. (3) Asthma can result in significant emotional burdens for those with asthma and for parents of children with asthma. (4) Financial concerns related to both asthma and asthma care are overwhelming for many families. (5) Parents of children with asthma often feel helpless and lack a sense of control over the disease and their lives.

From the Healthcare Perspective

Asthma ecology from the health care perspective is less well developed than it is from the patient and environmental perspective. In fact, only one paper could be found that included asthma, ecology, and health care, in the same title. That study attempted to move from the health care utilization study based in one setting, such as the office or emergency department, or one population, such as that of a large managed care organization (American Lung Association 2001; Donahue et al. 2000; Christakis et al. 2001; Department of Health and Human Services 2000; Persky et al. 1998; Yawn et al. 2004; Nelson et al. 1997; Rand et al. 2000; Legorreta et al. 2000) to a representative sample of the US population (Green 2001). The ecology model forces examination of the total context of health care, and it therefore provides useful additional information describing the patterns of contact in all health care settings giving the clinician, administrator, or policy maker the necessary foundation for interpreting the data. The point is to understand how people with asthma interface with the current health care system. Such information might help identify areas for capacity building, group empowerment, community relations enchancement, and culture challenges between the health care relations establishment and patients and families experiencing asthma.

In 1999, on average children with asthma were more likely to make contact with the health care system compared to children without any chronic illnesses: 1.3 times more likely to have at least one office visit; 2.2 times more likely to seek care in an emergency department (ED); and 3.2 times more likely to be hospitalized. For adults with asthma the impact was similar: they were 1.6 times more likely to make at least one office visit in 1 year; 2.9 times more likely to visit the ED; and 2.9 times more likely to be hospitalized compared to adults aged 18 to 45 without other chronic illnesses (Yawn et al. 2005).

But viewing asthma care through a patient centered ecology lens shows a different view of health care service use and variations in the patterns of use of

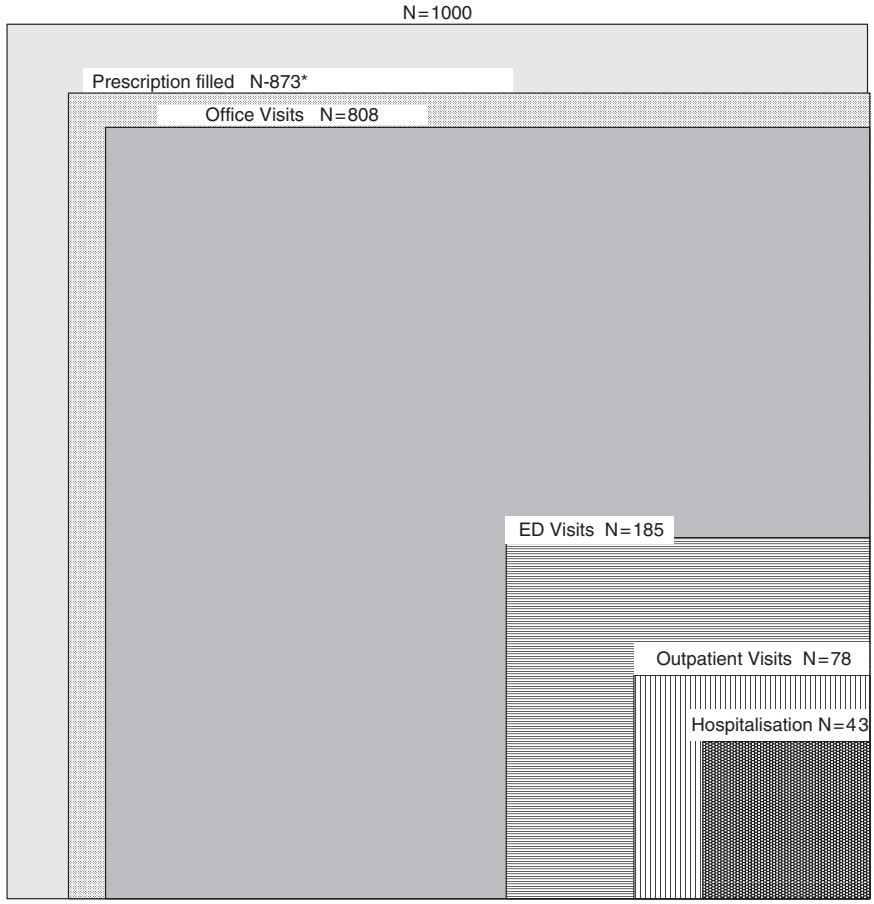

Fig. 5.3 Ecology of medical care for children with asthma

different types of services (Figs. 5.3 and 5.4). For example, data from the Medical Expenditure Panel Survey that completed in-depth interviews with a nationally representative sample of adults and the parents of children (Yawn et al. 2005; Green et al. 2001) reported that 13.6% of the parents of children with asthma reported that their child had asthma symptoms but no health care contact during 1999; 10.9% of adults with asthma symptoms made no health care visits. Overall these children and adults had the same average income, and racial distribution but were more likely to be uninsured ($p<0.01$) than those who had symptoms but made at least one ambulatory visit. In addition, 5.2% of children and 3.6% of young adults with asthma visited the ED or were hospitalized, but reported no ambulatory care visits during 1999. The children and adults with asthma who made ED or hospital visits but no ambulatory visits were more likely to be uninsured, to have no usual source of care, and to live in a metropolitan area, compared to adults and children with ED or hospital asthma visits plus ambulatory asthma visits during 1999 ($p<0.05$ for each characteristic). The adults with only ED or hospital asthma care visits also had a lower self-reported health status than adults with asthma having ambulatory visits as well as ED or hospital visits.

The ecology model of health professional asthma care not only serves to identify groups of patients with apparent gaps in care, but also serves to help reassess hypotheses related to patient characteristics and receipt and site of care. For example, the greater reliance on emergency department and hospital care for patients with asthma compared to those without asthma is not affected by the presence of insurance, contrary to the predictions of some researchers and policy makers (Department of Health and Human Services 2000; Nelson et al. 1997; Suissa and Ernst 2001). If it is contact with health care that leads to the diagnosis of asthma,

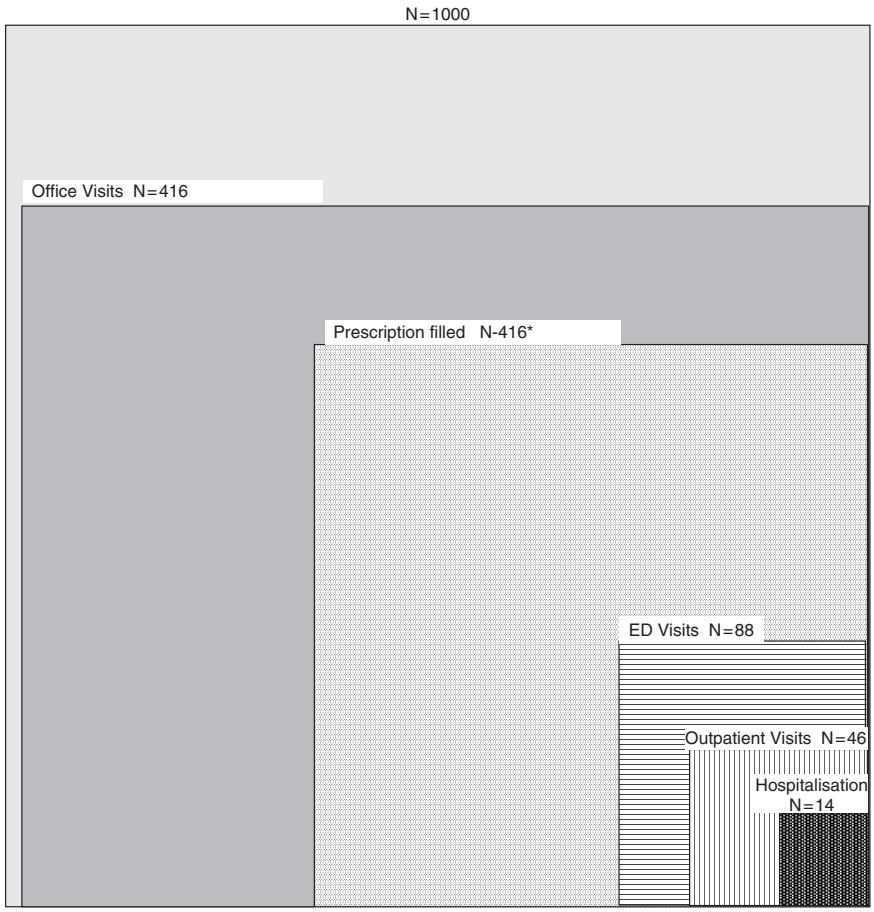

Fig. 5.4 Ecology of Medical Care for children with no chronic conditions. From: Yawn et al. 2005

using the recognition of asthma as a prerequisite for services may simply exacerbate the disparities related to undiagnosed (and therefore untreated) asthma for the estimated 75 million Americans without consistent health insurance (Olesen et al. 2001). The uninsured are often the people whose social, demographic and economic profiles are associated with an increased risk of having or developing asthma, thus amplifying the impact of current disparities.

How to Use Ecology Studies to Improve the Lives of People with Asthma

Social ecology has been suggested as a framework for transforming the impact of disease and health on people's lives (Stokols 1996). Maton suggests a need for a multi-disciplinary, multilevel approach that provides capacity-building, group empowerment, relational community-building and culture sensitivity (Maton 2000). Such a community effort requires several steps beginning with the recognition that much of health and disease is not a result of health care or the lack of it (The World Health Report 2006). Accepting this broader ecological model of health and disease often means that many community organizations and individuals will need to move outside the comfortable bounds where they usually provide care, education, services, or support. Attempts to lessen the burden of asthma must become the community and societal goals, not simply the responsibility of patients and health professionals. Many cities, counties, and even states have begun that transformation by moving smoking exposure to the center of our social consciousness and banning smoking in public places such as restaurants,

near schools, at sporting events, and even in bars. This can be the first step to a "community of caring" for people with asthma.

Smoking bans require policy or even legislative change accomplished by people in many disciplines and professions working together (Maton 2000). In the 1990s, several groups moved single disease coalitions to a new level, forming asthma coalitions. Community coalitions are one well-recognized community organization model for impacting social ecology (Wandersman et al. 1996). Although the focus is on the community in these efforts, information from programs developed for other chronic conditions show that the impact must be on the family and include the eco-cultural features that affect their everyday routines. The effectiveness of programs developed by community asthma coalitions will be judged as positive or negative based on the relevance for individual family's ecology models.

Several groups of community asthma coalitions have taken on this challenge and succeeded to varying degrees (Clark et al. 2006a, b; Peterson et al. 2006; Lara et al. 2006; Nicholas et al. 2006; Rosenthal et al. 2006; Butterfoss et al. 2006; Kelly et al. 2006). The *Allies Against Asthma* is one of the largest and oldest of the collaborations of community asthma coalitions to develop integrated models of care by bringing together partners who can address the multiple factors influencing asthma (Clark et al. 2006a). Among these coalitions the term "care" is broadly defined to include all of the aspects of ecology that others have studied in asthma: medical care, indoor and outdoor environmental concerns, interpersonal support, financial burdens, psycho-social barriers to improved health and education matched to community members needs, and understanding (Clark et al. 2006a). The coalitions work because they bring together diverse groups to address issues of mutual concern, widen

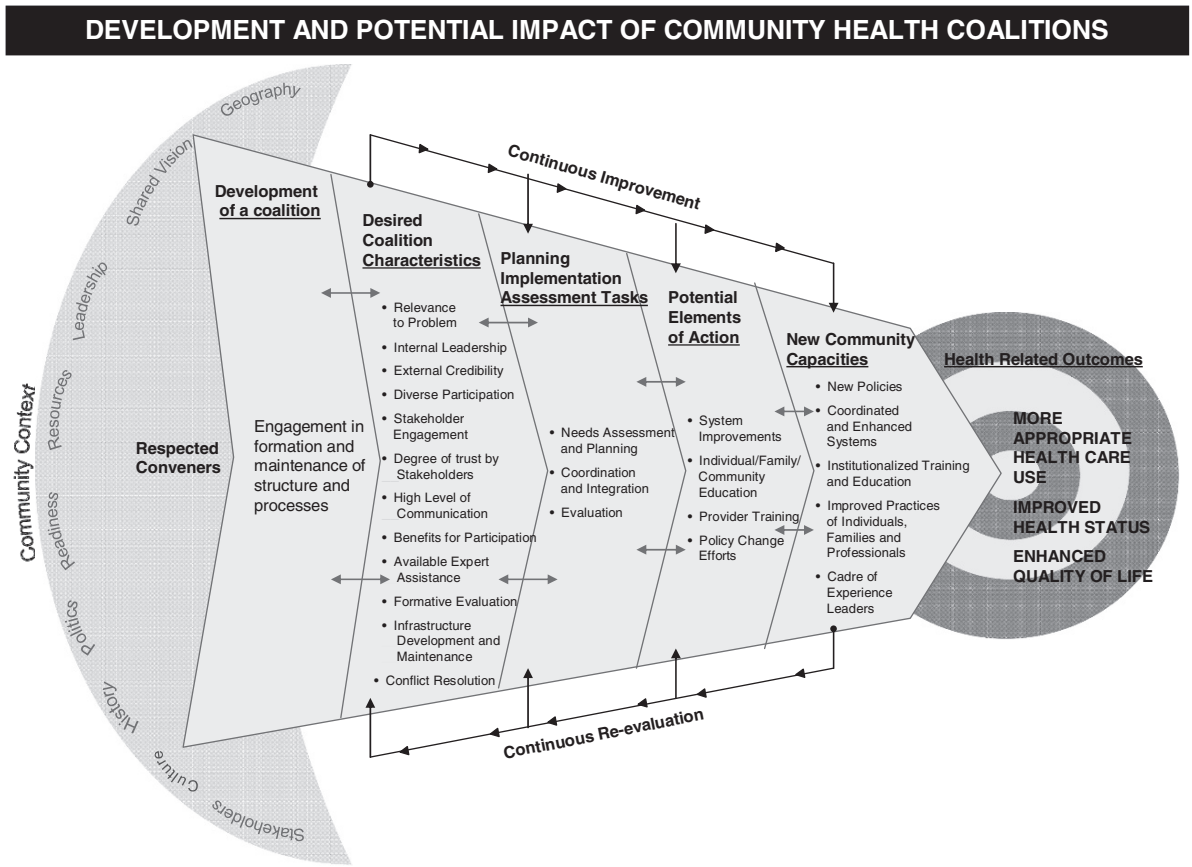

Fig. 5.5 Development and potential impact of community health coalitions. From: Clark et al. 2006a

people's spheres of influence, facilitate interaction to enhance creativity and innovation, and pool resources to address system-wide issues (www.AlliesAgainstAsthma.org). The success of community coalitions is often based on the skills of individual leaders and facilitators and the persistence of the core group and needs that stimulated the programs. These community coalitions require many elements but primarily key leaders willing to accept the challenge and continue to work through the many layers of community change. The coalitions must use leverage points and linkages if they are to succeed (Grzywacz and Fuqua 2000). Sustainability is paramount to these coalition activities (Gallimore et al. 1989). Additional variations of the coalition model need to be developed and health professionals taught how to work effectively and collaboratively within a coalition model.

The ecology of asthma needs to be pulled together into a conceptual framework that will allow researchers, community activists, people with asthma and professionals in many fields to uncover common goals and action plans. The model presented by Clark and her colleagues drawn from the experiences of the *Allies Against Asthma* is a potential starting point for this framework (Fig. 5.5). Embedded in the context of the community (culture, history, politics, readiness, resources, etc.) and moving through the formation, planning, implementation, and evaluation to the birth of new community capacities and capabilities, this model can be expanded to incorporate the full spectrum of the ecology of asthma and serve as a road map to guide using ecology to change community and patient outcomes.

Summary

Like most chronic human conditions, asthma is the result of many environmental factors interacting with the human organism. The environmental factors must be considered in the broadest ecological sense including: the physical environment such as air quality, housing quality, and personal safety; a social environment that avoids stigmatization, supports diversity of beliefs, and personal resources; and a health care environment that minimizes barriers to access whether financial, geographic, ethnic, or informational as well as the corporal environment that maximizes use of current personal and physiological resources. The ecology models used by many disciplines appear to allow this broad approach to asthma prevention, and management. Until this ecological approach is embraced, it is likely that asthma will continue to be a major concern throughout the world and disparities in local, regional and national asthma burden will continue.

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