Medicine's Blind Spot

Claudia S. Miller, MD, MS

In this issue of *Family Medicine,* Rosenberg et al report a threefold greater prevalence of asthma among Ethiopian Jews, former shepherds and farmers who emigrated to urban Israel, than among matched, non-Ethiopian Israeli controls (17% versus 5.8%).[1]

Generally speaking, asthma is more prevalent in industrialized nations and urban areas than in developing nations and rural areas. Indeed, investigators in Ethiopia have found asthma to be 3 times more frequent in an urban Ethiopian population than in a rural one (3.6 versus 1.3).[2] Nonetheless, the findings of Rosenberg's study illustrate several important points.

First, Rosenberg et al present an exemplary, community-based epidemiological study that confirmed their impression that they were seeing in their clinics disproportionately high numbers of Ethiopians with asthma. Of course, such carefully collected data is only the first step toward helping their patients. The authors now must identify and address the factors that account for the increased asthma rates they have documented. This is no simple task, particularly if, as the authors posit, the causes are environmental.

Second, medical schools teach students how to ferret out the causes of fevers and track developmental milestones, but they offer little training on how to deal with environmentally induced illnesses.

Detecting environmentally induced illnesses involves taking a comprehensive exposure history, visiting homes and workplaces, creating a timeline of symptoms and exposures, evaluating data that describe the health effects of chemicals, assessing peak flow readings in relationship to exposures, and working with industrial hygienists who measure airborne levels of pollutants.

These activities are simply not in a physician's armamentarium. Only 68% of medical schools in the United States include environmental medicine in their curricula, with an average of only 6 hours being taught over 4 years.[3] This occurs despite the fact that in the United States, exposures to synthetic organic chemicals in the home and workplace have risen exponentially since World War II.

Simultaneously, the amount of fresh air in homes and office buildings has been greatly reduced since the oil embargo of the mid-1970s, which led to "better insulation" to reduce energy expenditures. On average, people now spend 90% of their days indoors. Together these factors have produced unprecedented exposures to volatile organic chemicals and a host of allergens. Growing numbers of individuals now attribute their asthma, headaches, allergies, fatigue, muscle aches, difficulty concentrating, or depression to such exposures, but most physicians tend to discount or ignore these attributions, in part, because of their lack of training and the absence of useful algorithms for evaluating such concerns.[4]

Third, with respect to the Ethiopian immigrants, what environmental exposures might be at the root of their asthma? Notably, Rosenberg et al found strikingly high rates of eosinophilia in the Ethiopian immigrants whether or not they had asthma (49% and 43%, respectively).

Although eosinophilia accompanies asthma, it is likely that most of the eosinophilia in this population stemmed from the many parasitic diseases present in these individuals when they first arrived in Israel. At that time, only 2.5% suffered from "spastic bronchitis."

Presumably, Israeli physicians treated the Ethiopians for their parasites, and an intriguing question thus arises: could treating individuals for helminth infestations, which are accompanied by eosinophilia and inflammatory mediators, have cured the parasites but left behind an allergic inflammatory milieu ca-

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From the Department of Family Practice, University of Texas Health Science Center at San Antonio.

pable of heightening responses against a multitude of "bystander" antigens and, thereby, led to asthma?[5] There is evidence from other clinical studies to support this possibility. For example, Lynch et al[6] also found an inverse relationship between parasitic and allergic diseases when they compared children in a Venezuela slum who did or did not undergo treatment for helminth infection. There is also experimental evidence to support this possibility because eosinophilia, once believed to play a protective role in asthma, may actually increase bronchial smooth muscle hyperreactivity through the release of free radicals and basic proteins[7] and may also disrupt ciliated bronchial epithelium.[8]

If this hypothetical scenario were true, then perhaps calming the eosinophilic inflammatory process prior to placing the immigrants into crowded dormitories, small hotels, and caravan communities in a hot, humid urban environment rife with allergens (dust mites, cockroaches, molds) and pollutants might have prevented their asthma. Once an inflammatory process has been kindled, however, it is likely that a wide array of factors can perpetuate airway hyperresponsiveness and cause clinical asthma.

Questions that might help identify contributing exposures include: what are the occupations in which the Ethiopians are now engaged, and what exposures to dusts, vapors, or fumes are associated with those occupations? Are there significant community exposures, in addition to the molds and house dust mites found in their new hot, humid environment? What are the levels of industrial and vehicular emissions, such as diesel exhaust, that may act as an adjuvant, increasing IgE levels and allergies (as happened in Japan where allergy to Japanese cedar pollen developed following the widespread use of diesel vehicles)? What are living conditions like for the Ethiopians? Are they exposed to more tobacco smoke than before, smoke from fuels used for cooking or heating, exhaust from generators for electricity, or trailer insulation that releases formaldehyde or other indoor air pollutants? Did they receive donations of old blankets, pillows, or mattresses teeming with house dust mites? Did their diet change? (Lactobacilli and other probiotics or antioxidants present in their native diets may have played a protective role.)[9] Notably, in their study of urban versus rural Ethiopians, Yemaneberhan et al[2] found that wheezing and house-dust mite sensitivity were positively associated with housing style, synthetic bedding material, and the use of organophosphate insecticides.

It is difficult for physicians, in this and other settings, to envision all of the possibilities. This is why it is important for health care providers to be aware of their patients' environmental exposures, ideally by seeing them firsthand. With what we are learning about the effects of environmental exposures, prescribing steroids for patients with asthma, particularly long-term oral steroids, without attempting to identify environmental contributors and eliminate them, cannot be considered good medicine. In fact, trying to manage asthma without assessing the patients' surroundings is a little like trying to manage diabetes without blood sugar readings.

Doctors used to make house calls. Now most of us see our patients in pristine clinics and hospitals. If we wish to continue to make a difference in the health of our patients in the coming millennium, we will need to find room in overburdened medical curricula to teach "exposure medicine" to the next generation of physicians. We will need to find time, or we will need to send nurses or social workers, to make house calls. We will need research to determine which environmental interventions are cost-effective in reducing office visits, trips to the emergency room, hospital stays, and medication use.

At the University of Texas Health Science Center at San Antonio, we have begun this task by instituting a family practice elective in environmental health for medical students and residents. Participants spend a month at the Texas-Mexico border, where they learn about health problems associated with poor sanitation, water pollutants, emerging diseases, and indoor and outdoor air pollutants. (This elective is available to medical students and residents throughout the United States. Housing is provided at no charge to participants. The Web site is http://steer.uthscsa.edu.) Students visit homes in *colonias* (poorly developed communities that often lack running water, sewers, and paved roads), collect and test water from the Rio Grande River, learn about the challenges faced by public health departments on both sides of the border, and develop an understanding of the effect of cultural beliefs and practices on health. They also make "environmental house calls" to the homes of children with asthma. The students appear to welcome this opportunity to learn about their patients' home and community environments in vivo. One student summed up the experience:

> After some of my classes in medical school, I can say that this month has taught me information I will carry for a lifetime and not just for the next examination.

In conclusion, we are beginning to understand the importance and implications of environmental exposures. The study by Rosenberg et al provides a good example of how important environmental exposures can be in causing common diseases seen in family practice. To ignore the effect of environmental exposures is to ignore a potentially fundamental aspect of patients' health, yet we routinely exclude this topic

in the education of medical students and residents—creating a blind spot in their training and skills. Every medical school has patients with asthma and other environmentally mediated illnesses, and every student should learn about the environmental risk factors and interventions for those conditions. Family medicine educators should take the lead in bringing this important aspect of patients' lives into the mainstream of medical care.

Correspondence: Address correspondence to Dr Miller, University of Texas Health Science Center at San Antonio, Division of Environmental Medicine, Department of Family Practice, 7703 Floyd Curl Drive, #610-L, San Antonio, TX 78284. 210-567-7760. Fax: 210-567-7764. E-mail: millercs@uthscsa.edu.

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