

SENSOR Occupational Lung Disease Bulletin

A project of the Massachusetts Department of Public Health's Occupational Health Surveillance Program,
the Massachusetts Thoracic Society, and the Massachusetts Allergy Society

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Dear Health Care Professional,

Previous issues of the Bulletin have provided information on specific respiratory hazards known to cause asthma. In this issue, we present a case of baker's asthma, an occupational disease recognized since the Roman age. SENSOR programs in Michigan and California as well as our own in Massachusetts, have received case reports of baker's asthma. In Massachusetts, eight cases of baker's asthma have been reported since 1993. The California SENSOR program has undertaken investigations of bagel bakeries to measure levels of wheat flour and cinnamon, both known asthmagens. This information will contribute to the establishment of a recommended guideline, known as a threshold limit value (TLV), for airborne exposure to flour dust in the workplace. Currently, there is no such guideline.

Bulletins which include case studies are generally well-received by the health care professionals on our mailing list. We would like to thank Dr. Verne Backus and Dr. William Patterson for providing this case study and discussion. If you have an interesting case you would like to present in a future issue of the Bulletin, please let us know.

Sincerely,
Catharine Tumpowsky, MPH
Project Director, Work-Related Asthma Surveillance Project

WORK-RELATED ASTHMA IN A BAKER

By Verne Backus, MD, MPH

Case Description

A 32 year old Brazilian-born immigrant began working three years ago as a baker in a small bakery shop in the greater Boston area. He developed symptoms of asthma approximately one year ago. Because he worked seven days per week, he did not obtain any treatment for the first six months. He was eventually treated at an emergency room for sinusitis and given a beta-agonist inhaler. Over time, his symptoms, including nasal congestion and stuffiness, wheezing, and chest pain worsened. He needed his inhaler upon awakening and several more times during the day. At work he was plagued by a constant rhinorrhea.

He noted that the bakery where he worked has considerable flour dust and minimal ventilation, especially during the heating season when the windows cannot be opened. These conditions precipitated his first visit to the emergency room last winter and this year led to the current evaluation.

During our initial evaluation, results from simple spirometry were within normal limits, however, he had used his inhaler just prior to the appointment. A serum total IgE returned abnormal at 196 and he had 23% eosinophils in his differential. Because he worked seven days per week, pre and post work-week spirometry could not be performed and a baseline could not be established. We asked him to begin a peak-flow diary and to make his next appointment at the end of a work shift after minimizing his medication.

The following week he left his inhaler in his car and experienced an exacerbation causing him to leave work before noon and present to our clinic. Pre and post bronchodilator spirometries showed an FVC of 1.44 liters, which improved to 3.14 liters, and an FEV1 of .99 liters improving to 2.11 liters. His peak flow diary indicated peak flows generally in the 300-320 range, except for one on Saturday when he only worked a half shift and it rose to over 400. He was given samples of Serevent and Allegra and then counseled about the risk of continuing to try to work in this environment.

Four days after our discussion about the risk of progression of disease if he continued to work in this environment, he quit his job at the bakery. Peak flow meter readings immediately jumped up to over 400. They continued to rise to the mid 550 range over the next ten days. Repeat spirometry three days

REPORT NOV. AND DEC. CASES NOW
By January 31st, report all occupational lung disease cases seen for the first time in November and December, 1998. If you have NOT seen any cases, it is not necessary to return the report form.

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after quitting work indicated an FVC which had increased to 4.5 liters and an FEV1 of 3.5 liters. He no longer required any beta agonist once removed from the exposure and began decreasing dependency on the other medicines. Ten days after leaving the bakery he felt much better and stated that for the first time in over a year, his sense of smell returned. The patient was advised to look for new work in an environment that does not have flour exposure and preferably one that has low dust levels as well. He continues to be alert for any other exposures which may precipitate symptoms. A baker's RAST test is pending.

Discussion

Workers exposed to flour are known to be at risk for developing allergic respiratory diseases, especially rhinitis, bronchitis, and asthma. Studies indicate that the prevalence of asthma in bakery workers is around 10% although this number is an underestimate due to selective self removal of affected workers. This occupational hazard has long been recognized. During Roman times, miller and baker slaves were required to wear masks and gloves when in contact with flour. Furthermore, Baker's Asthma was well described by Ramazzini in 1700.

Generally, it is believed that outside of individual predisposition factors, duration and intensity of exposure to antigens in the flour are responsible for IgE-mediated allergy sensitization. The level of flour dust generated in the work environment is an important factor. Many antigens have been identified in flour made from wheat, rye, barley, and oats as well as other baking additives such as amylase, hemicellulose, and papain. In addition, contaminants in flour and yeast such as molds, weevil, and mites are common allergens. Of interest are the similarities of some wheat flour allergens with those of common grass pollen and the fact that some belong to a family of seed specific inhibitors of insect and mammalian alpha amylases used as a biological defense against insect parasitization. Many water insoluble glutenins and gliadins are also implicated emphasizing the diversity of allergens.

Skin prick tests have not been sensitive and inhalation challenge tests may have more risk than necessary for the diagnosis that can be made from the peak flow diary and pre and post shift spirometry.

In this case, the diagnosis was made from the history, the dramatically responsive beta agonist challenge after decreased medicine use at work, the patient's peak flow diary, and his serum IgE levels. Though his seven day work week prevented the collection of pre and post work-week spirometry, his diagnosis was supported by peak flow measurements which improved over 50% after

removal from exposure and his dramatically improved FEV1 (by 2.5 liters).

The patient was counseled that though we could treat him medically, his disease might progress in spite of medication if he continued to work in this environment. We stressed the disease was reversible early on but with continued exposure the likelihood of irreversible progression was very real. He was given a letter recommending medical removal for his employer. Most important was his symptomatic improvement, "I can smell for the first time in a year", and his ability to wean off the medicines.

This article was written by Verne Backus, MD, MPH, Resident, Occupational and Environmental Medicine Harvard School of Public Health. The patient was seen at Massachusetts Respiratory Hospital with Dr. Howard Hu as attending. Consultation with Dr. William Patterson, Occupational Health and Rehabilitation, Inc.

Editor's note: This case underscores the importance of early recognition of occupational asthma and cessation of exposure to asthma causing agents. Fortunately, this worker's health improved after he left his job. Often, asthma symptoms persist and may worsen despite removal from exposure. Unfortunately, this worker developed a serious occupational disease which resulted in his losing his job. This case highlights the human and economic burden that can be caused by occupational disease and the need for primary prevention.

Number of Lung Disease Cases Reported to MA SENSOR, March 1992-October 1998

	September 1998	October 1998	Total to Date (3/92-10/98)
Asthma	5	3	6290
Silicosis	0	0	10
Asbestosis	0	0	118
Chemical Pneumonitis	0	0	14
Total Number of Lung Disease Reports	5	3	771