

**FOOD FLAVORING WORKERS WITH BRONCHIOLITIS OBLITERANS
FOLLOWING EXPOSURE TO DIACETYL – CALIFORNIA
MAY 15, 2006**

Case 1

A 32 y/o man began working in October 2001 at a facility that manufactures flavoring substances, including artificial butter flavoring. The patient primarily performed dry powder mixing to make various products. He would pour diacetyl and other liquid ingredient into a hole on the blender lid. General room ventilation was inadequate, and no local exhaust ventilation was present. He had no previous history of lung disease and no respiratory symptoms at the time he was hired. He was a lifelong nonsmoker. He had no prior jobs or hobbies with exposure to chemicals.

In December of 2003 he saw his primary care provider with a 2-month history of gradually progressive shortness of breath on exertion, decreased exercise tolerance, intermittent wheezing, left-sided chest pain and productive cough. He was treated with antibiotics and bronchodilators for suspected bronchitis and allergic rhinitis. The patient stopped working in January 2004. However, his shortness of breath became more severe with dyspnea on exertion at 10 to 15 feet. A high-resolution thin-section chest CT showed cylindrical bronchiectasis in the lower lobes, with scattered peribronchial ground glass opacities. Pulmonary function studies in April 2004 showed a severe decline in forced expiratory volume in one second (FEV₁) of 1.10 liters (28% of the predicted value). Static lung volumes by body plethysmography were consistent with severe air trapping. Diffusing capacity was normal. There was no significant response to bronchodilator administration.

In October 2004 he was referred for occupational pulmonary consultation. A repeat high resolution thin-section chest CT showed central peribronchial thickening with central airway dilatation, with subtle areas of mosaic attenuation scattered throughout the lungs, predominantly in the right lower lobe. No lung biopsy has been performed. The diagnosis of probable work-related bronchiolitis obliterans was made on the basis of the clinical history, fixed airways obstruction with normal diffusing capacity, and typical high resolution thin-section CT scan. Over the past 18 months, the patient has continued to have severe shortness of breath without significant improvement in fixed airways obstruction.

Case 2

A 43 y/o woman began working at a flavorings manufacturing facility in 1998. The patient performed mixing of dry powders with diacetyl to make artificial butter flavoring. At the time she was hired, she had no chest symptoms. She was an infrequent cigarette smoker as a teenager. She had no prior jobs or hobbies with exposure to chemicals.

In August 2005 she saw her primary care provider with a one-month history of nasal congestion and cough, and was treated with antibiotics and antihistamines. She developed gradually progressive shortness of breath on exertion, decreased exercise tolerance and nonproductive cough. She was referred to a pulmonary specialist for consultation in November 2005. She was suspected to have work-related asthma and was treated with bronchodilators and oral corticosteroids with minimal improvement in symptoms. A high-resolution thin-section chest CT showed several small areas of patchy ground glass opacities throughout the lung fields. The patient stopped working in December 2005. Pulmonary function studies showed severe airways obstruction with an FEV₁ of 0.55 liters (18% of the predicted value). Static lung volumes by body plethysmography were consistent with severe air trapping. Diffusing capacity was normal. There was no significant response to bronchodilator administration. Bronchoscopy and left thoracotomy with wedge resection of the left lower lobe was performed; pathology showed inflammatory infiltrates in the peribronchial and interstitial areas, with scattered eosinophils. Non-caseating type granulomas with giant cells, and focal areas of interstitial fibrosis were also seen.

The diagnosis of probable work-related bronchiolitis obliterans was made on the basis of the clinical history, fixed airways obstruction with normal diffusing capacity, and typical high resolution thin-section CT scan. Despite treatment with systemic corticosteroids, the patient continues to have severe shortness of breath with minimal improvement in fixed airways obstruction.

Robert Harrison, MD, MPH
Public Health Medical Officer
California Department of Health Services
Occupational Health Branch

Arthur Gelb, MD
Lakewood Medical Center
Clinical Professor of Medicine
Division of Pulmonary and Critical Care Medicine
Geffen School of Medicine
University of California, Los Angeles

Phillip Harber, MD
Professor of Medicine
Division of Occupational and Environmental Medicine
Geffen School of Medicine
University of California, Los Angeles

How to report a case of work-related injury or illness

If you suspect a case of bronchiolitis obliterans caused by exposure to diacetyl or butter flavoring, State law requires you to file a report. According to the California Labor Code (Section 3209.3), every physician who attends an injured employee must file a complete report of every occupational injury or occupational illness with the employer's insurer, or with the employer, if self-insured. The Doctor's First Report of Occupational Injury or Illness (Form 5021) must be submitted by each physician within five (5) days of initial treatment. The Doctors First Report should be submitted to the claim administrator for every work injury or illness, even "first aid" cases where there is no lost time from work and where neither an Employer's Report (Form 5021) nor an Employee Claim Form (DWC-1) are required.

You can find a copy of the Doctors First Report at:
<http://www.dir.ca.gov/dlsr/dlsrform5021.pdf>