

## RESOURCES FOR WORK-RELATED ASTHMA

Given the potential economic, social and legal ramifications of diagnosing a patient with work-related asthma, having accurate, timely and well-referenced material on work-related asthma is important.

There are approximately 400 known causes of work-related asthma. The best source for an up to date list is a French web site (the site is in English also) [www.asmanet.com/asmapro/asmawork.htm#start](http://www.asmanet.com/asmapro/asmawork.htm#start)

Information can be accessed by substance name or by occupation. Each listing has jobs where exposure can occur, substances, reported incidence, job conditions under which exposures have caused disease, symptoms, diagnostic information and references. Sample pages from the website are shown on pages 2 and 3 of this newsletter. For a limited number of the references you can link to Medline and immediately obtain an abstract of the article. Many of the specific references have been updated in 2002, all at least in 1999.

There are also supplemental sources of information:

National Institute for Occupational Safety and Health Asthma and Allergies Page:  
[www.cdc.gov/niosh/topics/asthma](http://www.cdc.gov/niosh/topics/asthma)

This web site enables you to access specific reports performed or funded by NIOSH. For example, when one types in latex on their Nioshtic-2 search, 41 reports are identified. For reports in the published literature, the abstract is available on-line while for reports published by NIOSH the whole report is available on-line.

On a related topic, one can find good information on indoor air issues in offices and schools [www.cdc.gov/niosh/topics/indoorenv](http://www.cdc.gov/niosh/topics/indoorenv). An additional source on indoor air is the EPA, [epa.gov/iaq/hbhp](http://epa.gov/iaq/hbhp). The EPA site provides access to the "Tools for Schools" Action Kit ([epa.gov/iaq/schools/index.htm](http://epa.gov/iaq/schools/index.htm)). This kit allows administrators or teachers to assess their school for indoor air quality problems. It is an easy to follow guide for identifying these problems and providing suggestions for corrective action.

Another related issue that has recently received coverage in the popular news media is mold. The CDC Center for Environmental Health web site [www.cdc.gov/nceh/airpollution/mold/default.htm](http://www.cdc.gov/nceh/airpollution/mold/default.htm) is an excellent site to begin to obtain reliable information on mold.

Finally, if you want to have a hard copy text on work-related asthma, the most comprehensive is the 741 page book titled *Asthma in the Workplace*, 2<sup>nd</sup> edition. eds Bernstein IL, Chan-Yeung M, Maol JL, Bernstein DI. New York: Marcel Dekker, Inc. 1999.

Kenneth Rosenman, MD remains available at our toll-free number 1-800-446-7805 or via email [Rosenman@msu.edu](mailto:Rosenman@msu.edu) to consult on specific patients or issues.

The following table is an example of what can be viewed from [www.asmanet.com/asmapro/e031-040.htm](http://www.asmanet.com/asmapro/e031-040.htm)

**Asthma caused by isocyanates**  
( E 33 created=February 1999/Updated=01/03/99 + 2002 )

Jobs	Agents	
Adhesive industry, Automotive industry, Carpenter, Automotive industry, Chemical industry, Coachworks, Foundry worker, Joiner, Mechanic, Metallurgist, Painter, Plastics industry, Tinsmith	1,3 bis cyclohexane pre-polymer, BIC, Diphenylmethane diisocyanate, HDI, Hexamethylene diisocyanate IPDI Isocyanates, Isophorone diisocyanate, MDI, Naphtalene diisocyanate, NDI, Polyurethane, TDI, TGIC, Toluene diisocyanate, Triglycylisocyanurate	
Incidence	Conditions	Symptom
<p>Incidence: Approximately 5% of exposed subjects.</p> <p>Isocyanates are direct irritants to the respiratory tract. Their toxicity can result in fatality.</p> <p>Atopy does not play a predisposing role.</p> <p>Immunological mechanisms involving the anti-bodies IgE and IgG have been demonstrated. Other mechanisms involving bronchial beta-receptors or the inhibition of cholinesterase have also been suggested.</p> <p>Bronchial response can be either immediate or delayed. Sensitized subjects may be intolerant to cruciferae. In the case of painters, sensitization results from mixtures of products (eczema may occur).</p>	<p>Sensitization: plastics ( TDI and MDI ), car paints ( HDI and IPDI ), polyurethanes ( TDI ), casting/melts and glues ( MDI ). <b>Exposure; purely via the airways, may induce cutaneous sensitisation even in the absence of any contact with the skin.</b></p> <p>Isocyanate induced asthma ( particularly TDI ) is characterized by lymphocyte activation and secretion of pro-inflammatory cytokines. After exposure has ceased, a "remodeling" of the airways persists. The realisation of the problems associated with TDI, MDI and HDI, etc has led the industries to use oligomers with high molecular weights ( BIC ) with the aims of reducing the risks of sensitization. The norms for tolerable levels of these monomers are not sufficient to prevent work-related asthma. No norms have been fixed for polyisocyanates or polymer precursors. <b>The response to TDI is regulated by the MHC class II loci DQA1 and DQB1. Fire retardants contain polyurethanes. A Swedish study performed in 2001 demonstrated that above 300° C these polyurethanes degrade with the liberation of isocyanate-containing compounds ( TDIs and monomers of TDI ).</b></p>	<p>Asthma develops fairly quickly, however it is marked by its severity and persistence once established. Improvement is only observed several weeks after exposure to the risk has ceased. Asthma and hypersensitive lung disorders have been reported following exposure to polymer. As well as the classical clinical symptoms, myalgia, arthralgia and nausea have been reported ( in approximatively 26% of cases ). Toxic reactions can occur ( .05 ppm ). One fatal case at the workplace has been reported following exposure to MDI in a pre-sensitized subject. Bronchial hyperreactivity often persists even after exposure has ceased. <b>TGIC often results in contact skin dermatitis.</b></p>
Diagnostic	References	
<p>Skin prick test: 5mg/ml TDI-HSA, 3.4mg/ml TM-HSA ( Na salt of TMA 1/200 ); these tests are no longer in widespread use.</p> <p>Immunological dosage: RAST/CAP RAST TDI, MDI and HDI. Bronchial provocation test ( in Hospital ).</p>	<p>Chest 2000,18:1183 Petsonk E.L. et al.</p>	
<p><b>[Medline]</b> Redlich CA, Stowe MH, Wisnewski AV, Eisen EA, Karol MH, Lemus R, Holm CT, Chung JS, Sparer J, Liu Y, Woskie SR, Appiah-Pippim J, Gore R, Cullen MR.</p> <p><b>Subclinical immunologic and physiologic responses in hexamethylene diisocyanate-exposed auto body shop workers</b> Am J Ind Med. 2001 Jun;39 ( 6 ) :587-97.</p>		

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**EXAMPLE OF: Table of jobs/occupations sensitive to asthma** ([www.asmanet.com/asmapro/jobs.htm](http://www.asmanet.com/asmapro/jobs.htm))

- ...
27. CHEMICAL LABORATORY STAFF Asthma caused by colouring reagents (021)
  28. CHROME PLATER Asthma caused by chromium salts (042)
  29. CLEANING STAFF see Service Personnel
  30. CLOTHING INDUSTRY Asthma and fibrosis caused by textiles made from natural fibres (059)
  31. COACHWORKS Asthma caused by isocyanates (033)
  32. COFFEE INDUSTRY Asthma caused by green coffee beans and roasted coffee (015)
  33. COFFEE PACKER see SEED PACKER
  34. COMBINE HARVESTER DRIVER Asthma and alveolitis in workers handling cereal seeds (028)
  35. CONDOM MANUFACTURING INDUSTRY Asthma caused by lycopodium powder (036)
  36. CONFECTIONER Asthma in the food processing industry (003)
  37. CONSERVED FOOD INDUSTRY see CANNERY FACTORY EMPLOYEE
  38. COOK Asthma caused by garlic dust, spices and aromatic herbs (002)
    - Asthma in the food processing industry (003)
    - Baker's Asthma (013)
    - Asthma caused by seafood (039)
    - Asthma caused by inhalation of powdered chicken's egg (043)
  39. CORK MAKING INDUSTRY Asthma and suberose alveolitis caused by cork (035)
  40. CONSMETICS INDUSTRY Asthma caused by aliphatic amines and polycyclic compounds (005)
    - Asthma caused by cochineal dust (018)
    - Asthma caused by enzymes (024)
    - Asthma caused by formaldehyde (025)
    - Asthma caused by vegetable gums (030)
    - Asthma caused by lycopodium powder (036)
    - Asthma caused by vanillin (062)
    - Asthma caused by aerosols of sterilisation agents (068)
  41. DAIRY WORKERS Asthma caused by enzymes (024)
  42. DELICATESSEN Asthma in the food processing industry (003)
  43. DENTIST Asthma caused by lycopodium powder (036)
    - Asthma caused by platinum and palladium salts (049)
  44. DETERGENTS MANUFACTURER Asthma caused by enzymes (024)
  45. DIAMOND WORKING Asthma caused by metal carbides or hard metals (017)
  46. DOCKER Asthma and alveolitis caused by insect proteins, arthropods and shellfish (009)
    - Asthma caused by green coffee beans and roasted coffee (015)
    - Asthma and alveolitis in workers handling cereal seeds (028)
    - Asthma caused by soya (054)
    - Asthma caused by oilseed (060)
  47. DOCTOR Asthma caused by penicillins and cephalosporins (011)
    - Asthma caused by macrolids (037)
    - Asthma caused by aerosols of sterilisation agents (068)
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**EXAMPLE OF: Table of agents and substances which can cause asthma** ([www.asmanet.com/asmapro/agents.htm](http://www.asmanet.com/asmapro/agents.htm))

1. 1-5 NAPHTYLENE DIISOCYANATE Asthma caused by aromatic amines and their derivatives (006)
  2. 1,3 BIS CYCLOHEXANE PRE-POLYMER Asthma caused by isocyanates (033)
  3. 6-APA AMPICILLINE Asthma caused by penicillin's and cephalosporins (011)
  4. ABIETIC ACID Asthma caused by colophony (020)
  5. ABIRUANA Asthma and alveolitis caused by wood (012)
  6. ACACIA Asthma and alveolitis caused by wood (012)
  7. ACACIA GUM Asthma caused by vegetable gums (030)
  8. ACARUS FARRIS Asthma caused by dust mites in barns (031)
  9. ACARUS SIRO Asthma and pulmonary disorders in cheese makers (026)
    - Asthma caused by dust mites in barns (031)
  10. ACRYLAMINE Asthma caused by coloring reagents (021)
  11. ADRAGANTE GUM Asthma caused by vegetable gums (030)
  12. ALGINATE Asthma caused by vegetable gums (030)
  13. ALLIUMCEPA SEED Asthma caused by garlic dust, spices and aromatic herbs (002)
  14. ALPHA AMYLASE Baker's Asthma (013)
  15. ALTERNARIA Baker's Asthma (013)
    - Asthma and alveolitis in workers handling cereal seeds (028)
- ...

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**Address service requested.**

In this issue:  
Resources for Work-Related Asthma

**\*PS** Remember to report all cases of occupational disease!

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**Michigan Law Requires  
the Reporting of  
Known or Suspected  
Occupational Diseases**  
Reporting can be done by:  
**FAX** (517) 432-3606  
**Telephone** 1-800-446-7805  
**E-Mail** ODRREPORT@ht.msu.edu  
**Web** www.chm.msu.edu/oem  
**Mail** Michigan Occupational Safety & Health Administration (MIOSHA) Management and Technical Services Division P.O. Box 30649 Lansing, MI 48909-8149  
Reporting forms can be obtained by calling (517) 322-1817 or 1-800-446-7805

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