

# Studies of Health Impacts Associated with Cleaning Products

The following is an annotated literature review in chronological order, summarizing key findings of numerous scientific studies documenting the health effects associated with various cleaning products.

**Toxicology and Applied Pharmacology 1984**—Musk Ambrette, a commonly used fragrance ingredient, has been found to cause serious brain damage in laboratory animals.

P.S. Spencer, M.C. Bischoff-Fenton, O.M. Moreno, D.L. Opdyke, and R.A. Ford, "Neurotoxic properties of musk ambrette," *Toxicology and Applied Pharmacology* 75 (1984): 571–75.

**Clinical and Experimental Allergy 1997**—Asthma prevalence in schools has been associated with higher relative air humidity, higher concentrations of volatile organic compounds, and mold or bacteria.

G. Smedje, D. Norback, and C. Edling C., "Asthma among Secondary Schoolchildren in Relation to the School Environment," *Clinical and Experimental Allergy* 27, 11 (1997): 1270–78.

**New Scientist 1999**—Frequent use of air fresheners and aerosol sprays in the home contributed to 25 percent more headaches and 19 percent more incidence of depression in mothers and 30 percent more ear infections and 22 percent greater incidence of diarrhea in infants less than six months of age.

R. Edwards, "Far from Fragrant: Disguising Nasty Smells Could Damage Your Health," *New Scientist* 4 (Sept. 1999): 17.

**Eighth International Conference on Indoor Air Quality and Climate 1999**—Floor cleaning products were found to be a cause of occupational asthma.

M. Mendell and G. Heath, "Do Indoor Environments in Schools Influence Student Performance? A Review of the Literature," Eighth International Conference on Indoor Air Quality and Climate, Edinburgh, Scotland, 1999.

**European Respiratory Journal 2000**—Acute short-term exposure to common cleaning chemicals was found to cause a severe asthmatic attack and adult respiratory distress syndrome in an asthmatic subject.

C. Mapp, V. Pozzato, V. Pavoni, and G. Gritti, "Case Study: Severe Asthma and ARDS Triggered by Acute Short-Term Exposure to Commonly Used Cleaning Detergents," *European Respiratory Journal* 16, 3 (2000): 570.

**Scandinavian Journal of Workers Environmental Health**—Asthma prevalence in cleaners of private homes was 1.7 times higher than that of a control group. This incidence was related to kitchen cleaning and furniture polishing.

A. Karjalainen, et al., "Prevalence of Asthma and Other Allergic Diseases in Private Homes," *Scandinavian Journal of Workers Environmental Health* 28, 1 (2001):49–57.

**American Journal of Industrial Medicine 2001**—Janitors and cleaners (625/million) and firefighters (300/million) in California had the highest reported rates of work-related asthma. Half of all work-related asthma cases were associated with agents not known to be allergens.

F. Reinisch, R.J. Harrison, S. Cussler, et al., "Physician Report of Work-Related Asthma in California, 1993–1996," *American Journal of Industrial Medicine* 39, 1 (January 2001): 72–83.

**European Respiratory Journal 2002**—A 22-year comparative study of cleaning women and administrative workers found that cleaners had an increased risk of developing persistent adult-onset asthma.

A. Karjalainen, et al., "Asthma among Finnish Cleaners Employed in Different Industries," *European Respiratory Journal* 19 (January 2002): 90–95.

**Journal of Occupational and Environmental Medicine 2003**—A study of confirmed cases of work-related asthma in four states found that 12 percent were associated with exposure to cleaning chemicals. Of these, 80 percent were new onset cases and 20 percent were work-aggravated cases.

K. Rosenman, M. Reilly, and D. Schill, "Cleaning Products and Work-Related Asthma," *Journal of Occupational & Environmental Medicine* 45, 3 (2003): 556–63.

**Thorax 2003**—Asthma was found to be more prevalent in women previously or currently employed as domestic cleaners as compared to women who had never worked in the cleaning industry. Domestic cleaning work may have a serious public health impact that affects professional cleaners and people cleaning their own homes.

M. Medina-Ramon, et al., "Asthma Symptoms in Women Employed in Domestic Cleaning," *Thorax* 58 (2003): 950–54.

**Thorax 2004**—Children living in homes with higher levels of volatile organic compounds (VOCs) showed a marked increase in their risk of asthma. VOCs are emitted by cleaning products, air fresheners, and building products.

K. Rumchev, "Association of Domestic Exposure to Volatile Organic Compounds with Asthma in Young Children," *Thorax* 59, 9 (2004): 746–51.

**Environmental Health Perspectives 2004** – Children exposed to phthalates had a higher incidence of being diagnosed with asthma, rhinitis, or eczema. Phthalates were measured in house dust from bedrooms and a dose-response relationship was confirmed. Phthalates are found in PVC (polyvinyl chloride) or VCT (vinyl composite tile) flooring, plastics, adhesives and many other products. Dust from bedrooms with PVC or VCT flooring was more likely to have higher concentrations of phthalates.

CG Bornehag et al. "The Association Between Asthma and Allergic Symptoms in Children and Phthalates in House Dust: A Nested Case-Control Study," *Environmental Health Perspectives*

**Thorax 2005**—Prenatal exposure to the use of disinfectants, bleach, carpet cleaner, window cleaner, air fresheners, paints, dry cleaning fluid, aerosols, and pesticides increased the risk that the young child would have persistent wheezing. Scientists determined that the more frequently the chemicals were used, the greater the risk of persistent wheezing, which can be a precursor to asthma.

A. Sherriff, A. Farrow, J. Golding, and J. Henderson, "Frequent Use of Chemical Household Products Is Associated with Persistent Wheezing in Pre-School," *Thorax* 60 (2005): 45–49.

***Environmental Health Perspectives 2005***—85 mothers and sons were tested for phthalates in their urine. The mothers with the highest levels of phthalates in their urine late in their pregnancies produced babies with genital abnormalities. This same effect has been seen in rats, but this is the first evidence that phthalates are causing a similar effect in humans. In rats, “phthalate syndrome” causes a decrease in testosterone levels, lower sperm counts, infertility, and testicular abnormalities in the mature animal.

H. Shanna, S. Swan, K. Main, F. Liu, et al., “Decrease in Anogenital Distance among Male Infants with Prenatal Phthalate Exposure,” *Environmental Health Perspectives* 13, 8 (2005): 1056-1061.

***15th Annual Congress of the European Respiratory Society 2005***—The authors presented the results of a study that linked household sprays and new onset asthma. 4,200 subjects who cleaned their own homes took part in the study, with 3,500 participants initially being asthma free. After nine years, the data showed that the incidence of asthma was greater in participants who used sprays more frequently. “Between 11 percent and 18 percent of new asthma cases can be attributed to frequent use of household aerosols.” The most hazardous of the sprays used were room, furniture, and window sprays. Using ammonia, bleach, or dye solvents was also found to put people at risk for developing asthma.

Jaakkola and Maritta, “Asthma and Housework: A Few Home Truths,” 15th Annual Congress of the European Respiratory Society, Copenhagen, Sweden, 2005.

***Occupational and Environmental Medicine 2005***—Asthma symptoms in domestic cleaning women are associated with exposure to bleach and possibly other irritant agents. The public health impact of using cleaning products that contain irritants could be widespread because the use of these products is common in the workplace and at home.

M. Medina-Ramon, J.P. Zock, et al., “Asthma, Chronic Bronchitis, and Exposure to Irritant Agents in Occupational Domestic Cleaning: A Nested Case-Control Study,” *Occupational and Environmental Medicine* 62, 9 (September 2005): 598–606

***Indoor Air Chemistry: Cleaning Agents, Ozone and Toxic Air Contaminants 2006***—The “research focused on two common classes of ingredients in cleaning products and air fresheners: ethylene-based glycol ethers, which are classified as toxic air contaminants, and terpenes, which react rapidly with ozone.” The researchers measured exposures from several different scenarios and found:

- Users of products with high levels of ethylene-based glycol ethers or terpenes should make sure the areas being cleaned are properly ventilated during and after cleaning.
- Some products should be used in a dilution rather than full strength.
- Cleaning supplies should be promptly removed from occupied spaces.
- Using ozone generators or ionizing air cleaners should be avoided, especially where cleaning products that contain terpenes or air fresheners are used.

W. Nazaroff, et al., *Indoor Air Chemistry: Cleaning Agents, Ozone and Toxic Air Contaminants*, Air Resources Board Contract No. 01-336, Berkeley, Calif.: University of California, Berkeley, April 2006, available at <http://www.arb.ca.gov/research/abstracts/01-336.htm>.

L. Greensfelder, “Study Warns of Cleaning Product Risks,” University of California, Berkeley, press release, April, 2006.

***American Journal of Respiratory and Critical Care Medicine 2007*** – “The use of cleaning sprays at least weekly was associated with the incidence of asthma symptoms or medication and wheeze. The incidence of physician-diagnosed asthma was higher among those using sprays at least 4 days per week. Risks were predominantly found for the commonly used glass-cleaning, furniture, and air-refreshing sprays.” A similar correlation was not found with products not applied in spray form.

Jan-Paul Zock, et al, “The Use of Household Cleaning Sprays and Adult Asthma”, *American Journal of Respiratory and Critical Care Medicine* Vol 176 .pp. 735-741, (2007)