

# MEDICALADVISORS, INC

## TECHNICAL NETWORK CONSULTING SERVICE®

### ENVIRONMENTAL CARCINOGENS

Environmental Carcinogens  
*Toxicologists from New York*

According to statistics compiled by the National Cancer Institute, in 2005, approximately 1.37 million persons in the US will be diagnosed with cancer, and over 570 thousand will lose their lives; almost all organs and organ systems of both men and women will be affected. The many causes of these malignant diseases include genetic factors, hormones, medical malpractice, sunlight and ionizing radiation, components of lifestyle such as diet, smoking or drinking, and exposure to various chemicals and chemical mixtures. A relatively small proportion of cancer cases can be ascribed to a specific factor with a high degree of certainty.

Two of the earliest recorded observations of environmentally caused cancer were those of John Hill in 1761 and Sir Percival Pott in 1775. Hill recorded an increased incidence of nasal cancer among snuff users, whereas Pott observed that many of his patients with scrotal cancer were chimney sweeps. Dr. Pott was able to relate scrotal cancer to exposure to exposure to soot and coal tar. The observation was not proven conclusively, however, until 1916, when Japanese pathologists showed that skin cancer could be produced on ears of rabbits by the application of coal tar. In the 1860s, Germany became the center for the manufacture of synthetic dyes based on aromatic amines or their products. Years later, in 1895, Ludwig Rehn, a surgeon in Frankfort, reported a cluster of bladder carcinomas in workmen from nearby dye factories. On the basis of epidemiological evidence, 2-naphthylamine was identified as the probable carcinogen; this was confirmed in 1938, when bladder tumors were observed in dogs fed diets containing 2-naphthylamine. One of the difficulties in determining cause is that many years may ensue between exposure to a carcinogen and the development of cancer. Epidemiological data in which the source of cancer causation has been tentatively identified is confirmed, if at all possible, in animal models. Potential carcinogens identified in the laboratory using short term mutagenicity tests and animal bioassays must be confirmed as human carcinogens by well-conducted epidemiological studies. Approximately 30% of cancer deaths from environmental causes have been attributed to smoking and other uses of tobacco. In addition to lung cancer, cancer of mouth, pharynx, larynx, esophagus, and bladder is increased with tobacco use. Various

dietary factors, i.e., aflatoxins, alcoholic beverages, obesity, high fat diet, and nutritional inadequacies account for an additional estimated 38%. Industrial products and occupational exposure to carcinogens are thought to account for less than 5% of cancer deaths from environmental causes, while pollution may account for an additional 2%. The 11<sup>th</sup> Report on Carcinogens (2005) of the National Toxicology Program lists agents, chemical substances, mixtures or exposure circumstances known to be human carcinogens. It also lists those reasonably anticipated to be human carcinogens.

Many other environmental chemicals and factors have been suggested to be carcinogenic. More recently investigated topics include the aniline herbicide Alocchlor (Lasso), shown to be carcinogenic in animal studies but with no evidence of human carcinogenicity. In light of the possibility of cancer and its presence in well water in agricultural areas at rather high concentrations, its registration for use in Canada was canceled in 1985. Other suspect agents include products formed in drinking water by chlorination, the oxygenate gasoline additive MTBE, which also contaminates drinking water, and pressure-treated lumber using chromated copper arsenate. These agents have toxicity associated with their use, but the cancer hazard associated with them is either very low or completely unproven. Continued on page 2

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Acrylamide, used in medical laboratories was recently shown to be a carcinogen to the nervous system. The use of cellular phones has been extensively investigated as a possible cause of brain cancer; no reliable association between cell phone use and brain cancer has been reported. High voltage power lines emit electromagnetic radiation that has been reported to cause headaches. The purported carcinogenicity of power lines has not been proven, however.

The typical tractor/trailer combination weighs on the order of 30,000 pounds empty. Most are capable of transporting loads in the range of 50,000 pounds, making the cargo far heavier than the tractor and trailer itself. Should a load like this not be adequately secured in place, it may shift in transit, which can result in the tractor and trailer rolling over or the driver losing

control. There is nothing subtle about a truck wreck. Tractor/trailer combinations are commonly about 65 feet long and 8½ feet wide and can have a gross vehicle weight of up to 80,000 pounds. When it rolls over or is otherwise involved in a wreck, it can cause catastrophic injuries and/or major damages. Defects in loads may take the form of a hidden hazard within the load. When a cargo vehicle is loaded, heavy goods should be placed on the bottom and lighter goods placed on the top. When heavy containers are placed on the top of a load, they can fall and injure material handlers during the unloading process.

Shippers, manufacturers, distributors, warehousing organizations, motor carriers, drivers, loaders, maintenance organizations, and highway agencies may be culpable when a truck is involved in an accident involving shifting and falling cargo.

### Chemical Carcinogens in the Workplace Industries and Trades with Proven Excess Cancers

| <b>AGENT</b>   | <b>EXPOSURE</b>  | <b>PRIMARY AFFECTED SITE</b>  |
|--|--|-------------------------------|
| <b>ESTABLISHED CARCINOGENS</b>   |  |                               |
| <i>p</i> -aminobiophenyl   | Chemical manufacturing   | Urinary bladder               |
| Asbestos   | Construction, asbestos mining & milling, production of friction products, cement | Pleura, peritoneum, bronchus  |
| Arsenic  | Copper mining & smelting   | Skin, bronchus, liver         |
| Alkylating agents - bis[chloromethyl]ether, etc.   | Chemical manufacturing   | Bronchus                      |
| Benzene  | Chemical/rubber manufacturing, petroleum refining                                | Bone marrow (leukemia)        |
| Benzidine, 2-naphthylamine, and derived dyes   | Dye & textile production   | Urinary bladder               |
| Chromium & chromates   | Tanning, pigment making  | Nasal sinus, bronchus         |
| Isopropyl alcohol synthesis  | Chemical manufacturing   | Cancer of paranasal sinus     |
| Nickel   | Nickel refining  | Nasal sinus, bronchus         |
| Polynuclear aromatic hydrocarbons (PAH) from coke, coal tar, mineral oils, oil shale, creosote | Steel making, roofing, chimney cleaning, combustion sources                      | Skin, scrotum, bronchus, lung |
| Vinyl chloride monomer   | Chemical manufacturing   | Liver                         |
| Wood dust  | Cabinet making, carpentry  | Nasal sinus                   |
| <b>SUSPECTED CARCINOGENS</b>   |  |                               |
| Acrylonitrile  | Chemical and plastics manufacture  | Lung, colon, prostate         |
| Beryllium manufacture, electronics, sec. smelting  | Beryllium processing, aircraft   | Bronchus                      |
| Cadmium  | Smelting, battery plants, welding  | Bronchus                      |
| Ethylene oxide supplies  | Hospitals, sterilization of hospital   | Bone marrow                   |
| Formaldehyde production, health care   | Plastic, textile, & chemical   | Nasal sinus, bronchus         |
| Synthetic mineral fibers, e.g. glass fibers  | Manufacturing, insulation  | Bronchus                      |
| Phenoxyacetic acid   | Farming, herbicide application   | Soft tissue sarcoma           |
| Polychlorinated biphenyls and maintenance  | Electrical equipment production  | Liver                         |
| Organochlorine pesticides  | Pesticide manufacture & application agriculture                                  | Bone marrow                   |
| Silica   | Casting, mining, refracting  | Bronchus                      |

Source: Pitot and Dragon, 2001