ENVIRONMENTAL & OCCUPATIONAL EXPOSURES

Limiting carcinogenic exposures in the environment and in the workplace provides an opportunity to reduce the cancer burden, particularly for workers with unacceptably high exposures.

ENVIRONMENTAL POLLUTANTS

Outdoor air pollution causes between 6 and 8 million premature deaths from lung cancer and other diseases each year. The International Agency for Research on Cancer (IARC) has classified outdoor air pollution and the particulate matter in outdoor air pollution as known human carcinogens. Outdoor air pollution levels are particularly high in rapidly-growing cities in low- and middle-income countries. **MAP 8.1** Diesel exhaust, also classified as a lung carcinogen by IARC, contributes to outdoor air pollution and is also an occupational lung carcinogen.

Indoor air pollution from use of solid fuel (e.g. wood, other biomass, and coal) is estimated to cause about 3.8 million deaths, including about 285,000 lung cancer deaths, each year in low- and middle-income countries. Globally, the number of people cooking with solid fuels has declined, but populations in less-developed countries continue to be exposed to high levels of household air pollution. **MAP 8.2**, **FIGURE 8.1** IARC classifies indoor smoke emissions from coal as a known human carcinogen, and from other types of solid fuels as probable carcinogens.

Exposure to radon is probably the second-leading cause of lung cancer in the United States and Europe. Radon gas forms from the radioactive decay of uranium, found at differing concentrations in soil and rock throughout the world. While the general population is exposed primarily from radon gas entering homes from the soil, exposure to high levels of radon can also occur when the gas is trapped in underground mines.

Populations consuming high levels of arsenic in drinking water have excess risks of skin, lung, and bladder cancer. High levels of arsenic in drinking water have been found in parts of China, Bangladesh, and some countries in Central and South America. Some predominantly occupational exposures, such as asbestos and asbestiform fibers, benzene, and polychlorinated biphenyls (PCBs), may also occur in the general population, albeit at lower levels.

OCCUPATIONAL EXPOSURES

Numerous substances are known to cause cancer in workers. **FIGURE 8.2** Due to the intensity and/or duration of these exposures, the cancer burden can be relatively high among those workers exposed. Exposure to occupational carcinogens remains a concern in low- and middle-income countries, where exposures are likely to be higher than in high-income countries, and regulations and enforcement are often less strict.

Asbestos is an important cause of occupational lung cancer and the unique cause of malignant mesothelioma, and remains an occupational and environmental hazard in many countries. However, there are many other causes of occupational cancer, and asbestos accounts for less than one-third of occupational cancers globally.

FIGURE 8.1

Proportion (%) of population using solid fuels, 1990–2017

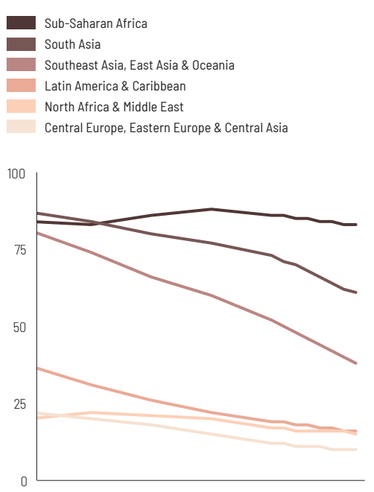
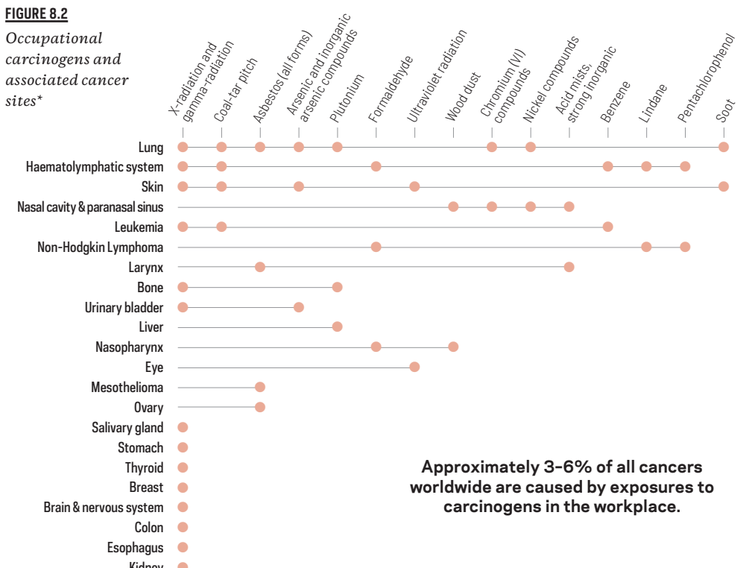


FIGURE 8.2

*Occupational carcinogens and associated cancer sites**

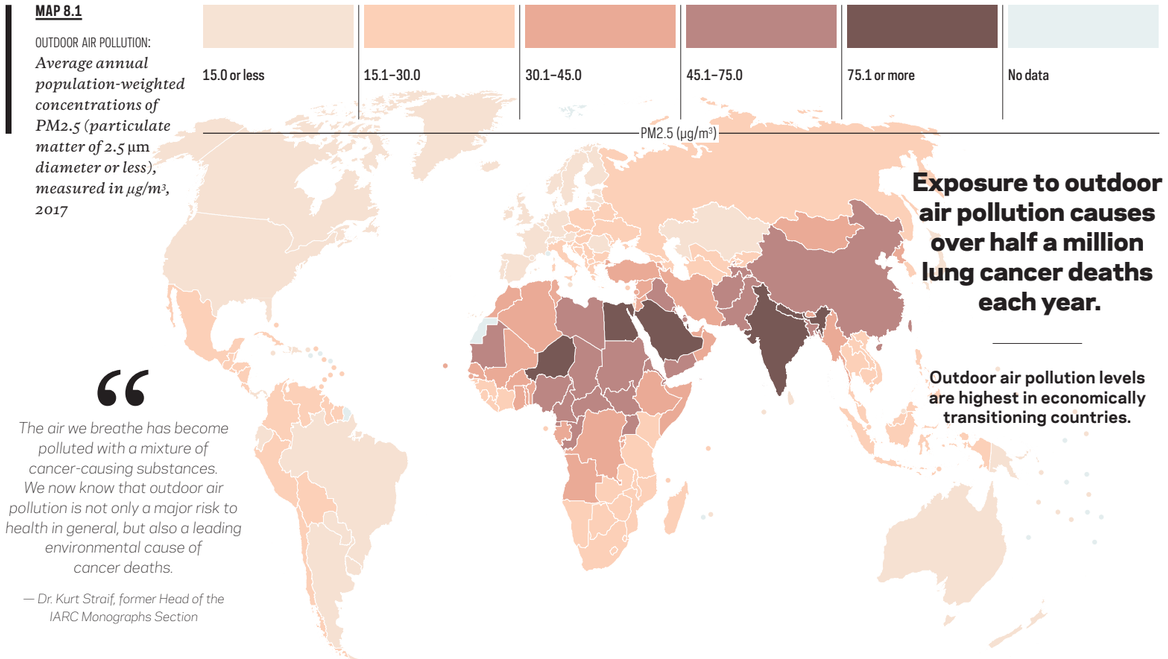


Approximately 3–6% of all cancers worldwide are caused by exposures to carcinogens in the workplace.

*limited to agents with occupational exposure linked to two or more cancer sites

MAP 8.1

OUTDOOR AIR POLLUTION: *Average annual population-weighted concentrations of PM2.5 (particulate matter of 2.5 µm diameter or less), measured in µg/m³, 2017*



Exposure to outdoor air pollution causes over half a million lung cancer deaths each year.

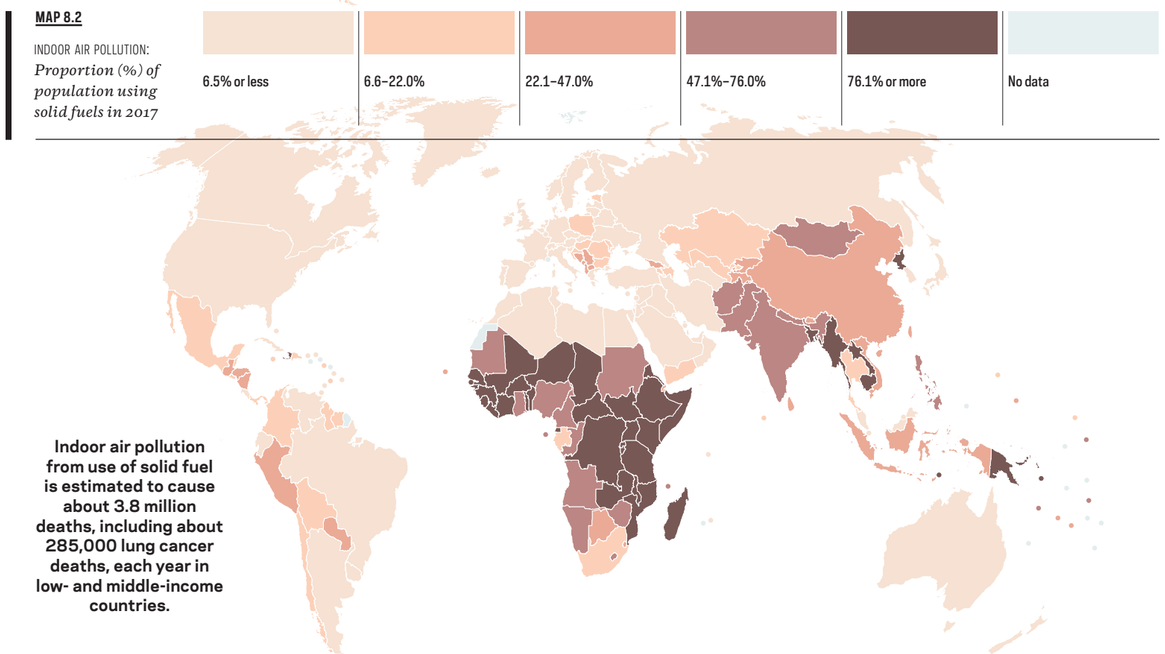
Outdoor air pollution levels are highest in economically transitioning countries.

"The air we breathe has become polluted with a mixture of cancer-causing substances. We now know that outdoor air pollution is not only a major risk to health in general, but also a leading environmental cause of cancer deaths.

— Dr. Kurt Straif, former Head of the IARC Monographs Section

MAP 8.2

INDOOR AIR POLLUTION: *Proportion (%) of population using solid fuels in 2017*



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