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PREFACE

Emissions from motor vehicles, industrial processes, power generation, the household combustion of solid fuel, and other sources pollute the ambient air across the globe. The precise chemical and physical features of ambient air pollution, which comprise a myriad of individual chemical constituents, vary around the world due to differences in the sources of pollution, climate, and meteorology, but the mixtures of ambient air pollution invariably contain specific chemicals known to be carcinogenic to humans.

Recent estimates suggest that the disease burden due to air pollution is substantial. Exposure to ambient fine particles ($PM_{2.5}$) was recently estimated to have contributed 3.2 million premature deaths worldwide in 2010, due largely to cardiovascular disease, and 223 000 deaths from lung cancer. More than half of the lung cancer deaths attributable to ambient $PM_{2.5}$ were estimated to have been in China and other East Asian countries (Lim *et al.*, 2012).

In February 2003, the IARC Monographs Advisory Group on Priorities for Future Evaluations recommended that IARC develop a series of Monographs on air pollution. The topic is obviously complex, given the variety of environments where exposures to airborne carcinogens take place, the diversity of the sources, and the numerous components of the air pollution mixture that may contribute to its carcinogenicity. Recognizing this, the 2003 Advisory Group recommended that there be a focused Advisory Group to plan a series of IARC Monographs on air pollution.

In December 2004, this special Advisory Group meeting was convened in Lyon. Participants provided a state-of-the-art overview on topics related to exposure characterization, atmospheric and engineering sciences, epidemiological studies on cancer, results of pertinent cancer bioassays, and data elucidating potential mechanisms of carcinogenicity of compounds related to air pollution. These presentations were followed by discussions in subgroups established according to the structure of the IARC Monographs (exposure, cancer in humans, cancer in experimental animals, and other relevant data) and plenary sessions to identify all major issues that were critical for the development of the series of Monographs. Specifically, the participants were tasked with the following:

- Develop a list of agents and exposures to be evaluated in a series of IARC Monographs on air pollution and cancer.
- Identify the key issues to consider in the evaluations and critical research gaps.
- Make recommendations for bundling related agents into the same meeting.
- Make recommendations on the sequencing and scheduling of the meetings.

According to these recommendations, subsequent Monographs meetings were held over the next few years:

- Volume 92 (October 2005): Some non-heterocyclic polycyclic aromatic hydrocarbons and some related exposures (IARC, 2010a).
- Volume 93 (February 2006): Carbon black, titanium dioxide, and talc (IARC, 2010b).
- Volume 95 (October 2006): Household use of solid fuels and high-temperature frying (IARC, 2010c).
- Volume 103 (October 2011): Bitumens and bitumen emissions, and some *N*- and *S*-heterocyclic polycyclic aromatic hydrocarbons (IARC, 2013a).
- Volume 105 (June 2012): Diesel and gasoline engine exhausts and some nitroarenes (IARC, 2013b).

As preparation began for the sixth meeting in this series of Monographs on air pollution (Volume 109: Ambient air pollution), the need to provide an overview and detailed background information on different aspects of air pollution and cancer took on renewed importance. To that end, it was decided to update earlier draft manuscripts that had been prepared based on presentations at the initial Advisory Group meeting in 2004. While serving as a Visiting Scientist in the IARC Monographs section, Aaron Cohen worked with Jonathan Samet, chair of the Advisory Group meeting in 2004, and IARC to manage this update and ensure publication before the IARC Monographs meeting on ambient air pollution in October 2013. The book that resulted now includes the following chapters:

- A working group report (written by Jonathan Samet on behalf of the Advisory Group); so as to capture the original recommendations of the Advisory Group, this chapter has not been updated.
- Eleven of the original manuscripts have been completely revised and updated by the original authors or by experts not present at the initial Advisory Group meeting.
- Two of the original manuscripts (by Vineis *et al.* and Katsouyanni *et al.*) have been updated with an addendum.

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