Health Effects of Particles

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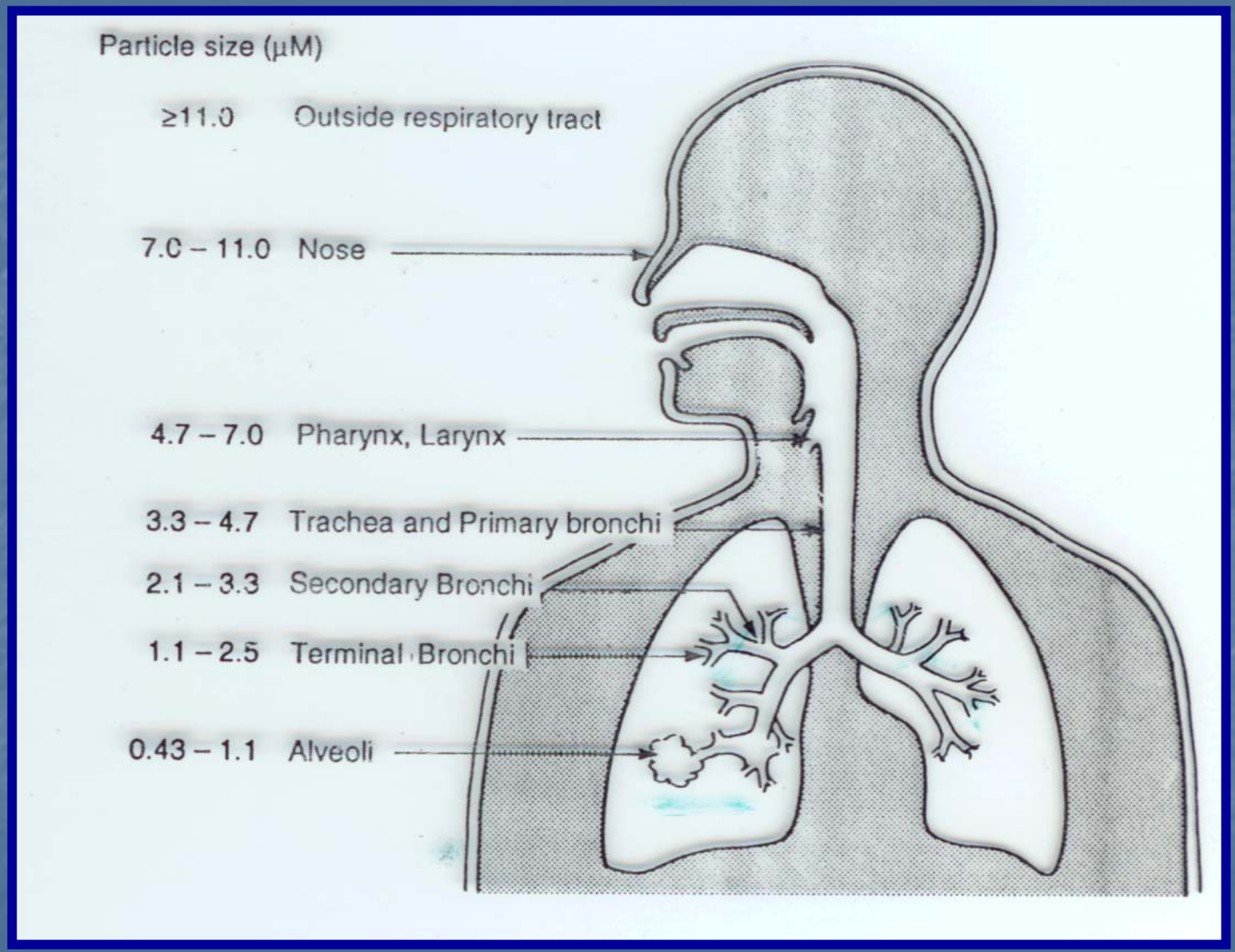
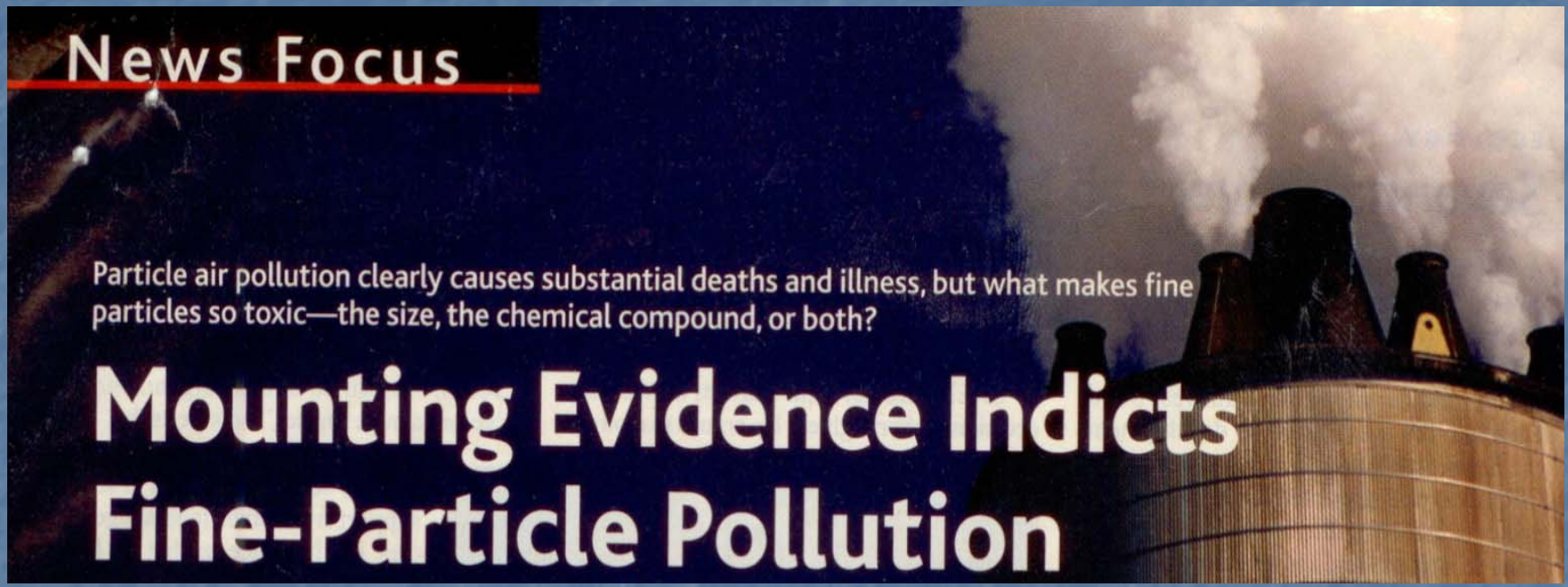
Metropolitan Washington Air Quality Committee
Town Meeting
November 1, 2007


Particle size (μM)
≥11.0 Outside respiratory tract
7.0 – 11.0 Nose
4.7 – 7.0 Pharynx, Larynx
3.3 – 4.7 Trachea and Primary bronchi
2.1 – 3.3 Secondary Bronchi
1.1 – 2.5 Terminal Bronchi
0.43 – 1.1 Alveoli


News Focus
Particle air pollution clearly causes substantial deaths and illness, but what makes fine particles so toxic—the size, the chemical compound, or both?
Mounting Evidence Indicts Fine-Particle Pollution

How Dirty Air Hurts the Heart

A decade ago, most cardiologists never suspected that breathing tiny particles of soot and dust could damage their patients' hearts, let alone trigger a heart attack. Today "there's no doubt that air pollution plays a role in cardiovascular disease," says cardiovascular researcher Robert Brook of the University of Michigan, Ann Arbor.

Fine particles seems to affect the heart in two ways: by changing the heart's rhythm and by causing systemic inflammation. Many studies—from animal experiments to tests in which retirement home residents wore heart monitors—have shown that breathing particle pollution can slightly quicken the pulse and make the heart beat less variable. The mechanism isn't yet known, but … ity is that airway receptors stimulate nerve… able heart rate, in turn, makes …

Air Pollution and Cardiovascular Disease

A Statement for Healthcare Professionals From the Expert Panel on Population and Prevention Science of the American Health Association

Robert D. Brook, MD; Barry Franklin, PhD, Chair; Wayne Cascio, MD; Yuling Hong, MD, PhD; George Howard, PhD; Michael Lipsett, MD; Russell Luepker, MD; Murray Mittleman, MD, ScD; Jonathan Samet, MD; Sidney C. Smith, Jr. MD; Ira Tager, MD

Coarse Particulate Matter (PM2.5–10) Affects Heart Rate Variability, Blood Lipids, and Circulating Eosinophils in Adults with Asthma

Karin Yeatts,1 Erik Svendsen,2 John Creason,2 Neil Alexis,1 Margaret Herbst,1 James Scott,2 Lawrence Kupper,3 Ronald Williams,4 Lucas Neas,2 Wayne Cascio,5 Robert B. Devlin,2 and David B. Peden1

Fine Particulate Air Pollution and Mortality in 20 U.S. Cities, 1987–1994

Jonathan M. Samet, M.D., Francesca Dominici, Ph.D., Frank C. Curriero, Ph.D., Ivan Coursac, M.S., and Scott L. Zeger, Ph.D.

Cardiovascular Risks from Fine Particulate Air Pollution

Douglas W. Dockery, Sc.D., and Peter H. Stone, M.D.

Environmental Cardiology

Studying Mechanistic Links Between Pollution and Health Disease

Aruni Bhatnagar

Ambient Air Pollution and Atherosclerosis in Los Angeles

Nino Künzli, Michael Jerrett, Wendy J. Mack, Bernardo Beckerman, Laurie LaBree, Frank Gilliland, Duncan Thomas, John Peters, and Howard N. Hodis

Fetal Growth and Maternal Exposure to Particulate Matter during Pregnancy

Jan Dejmek,1 Sherry G. Selevan,2 Ivan Benes,3 Ivo Solansky,1 and Radim J. Srám1

The Influence of Ambient Coarse Particulate Matter on Asthma Hospitalization in Children: Case-Crossover and Time-Series Analyses

Mei Lin,1 Yue Chen,1 Richard T. Burnett,2 Paul J. Villeneuve,1 and Daniel Krewski3

Total Suspended Particulate Matter and Daily Mortality in Cincinnati, Ohio

Joel Schwartz

The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age

W. James Gauderman, Ph.D., Edward Avol, M.S., Frank Gilliland, M.D., Ph.D., Hita Vora, M.S., Duncan Thomas, Ph.D., Kiros Berhane, Ph.D., Rob McConnell, M.D., Nino Kuenzli, M.D., Fred Lurmann, M.S., Edward Rappaport, M.S., Helene Margolis, Ph.D., David Bates, M.D., and John Peters, M.D.