

A RISK-BENEFIT ANALYSIS OF PARTICULATE MATTER AIR POLLUTION CONTROL PROGRAMS IN KYOTO CITY, JAPAN

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The objectives of this study were to assess potential health risks and avoided economic costs (or anticipated Abenefits@) of not implementing new environmental policies for particulate matter (PM) in Kyoto city and compare these future risks and benefits. Assuming a 10% decline in PM, the point estimates of the numbers of possible cases of premature mortality and morbidity that could be prevented in the year 2013 were (1) 98 long term deaths in adults aged 30 years and older (population 965,916), (2) 119 cases of chronic bronchitis in adults aged 30 years and older, (3) 218 cases of cardiovascular disease in adults aged 65 and older (population 282,077), (4) 90 cases of pneumonia in adults aged 65 and older, (5) 1,393 asthma attacks in asthmatics (population 12,683), and (6) 135 cases of acute bronchitis in children aged 8-12 (population 60,253) during one year period. The point estimate of medical costs plus lost productivity in adults and children was \$644 million USD (70.8 billion yen). The estimates for the benefits of avoided PM pollution control in the year 2013 were (1) \$66 million for stationary source controls, (2) \$34 million for diesel motor vehicle controls, (3) \$0.6 million for governmental costs, and (4) \$101 million for total costs (11.1 billion yen).

The health risk to no-control benefit ratio of 6.4 suggests that additional future pollution control policies would successfully prevent a large expense to the society in medical care and lost productivity while imposing lesser cost to the private sector in control equipment, to government in oversight expenses and to society in opportunity costs. An inexpensive control option is road vacuuming. Intermediate options include differential road pricing, retrofitting diesel particulate filters, and reformulating diesel fuel. High cost options include adding particulate controls, such as wet scrubbers, baghouses, and electrostatic precipitators on uncontrolled stationary sources.