

## SY13

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## EFFECTS OF AIR POLLUTION ON ASTHMA

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Modern day air pollution can be attributed to pollutants encountered both from outdoor as well as indoor conditions. Rapid economic expansion in Asia, with enormous increase in energy utilization, have led to deterioration of outdoor air quality in major cities within this region. Traditionally, outdoor air pollutions can be divided into two major categories, i.e. sulfurous smog (the London Smog) and photochemical smog (the Los Angeles Smog). These two categories have their own distinct characteristics. Nevertheless, air pollution within the Asian region does not fit into either one but rather are the combinations of both. The typical air pollutant found in the developed nation, i.e. ozone and oxides of nitrogen, are not the current major problem for Thailand. Ozone can be very dangerous to the airways of asthmatics by virtue of its capacity to induce airway inflammation via the recruitment of inflammatory cells such as eosinophils, neutrophils and macrophages into the airways. Beside its irritant effects, ozone can lead to deterioration of lung functions, increase in rates of hospital admission due to asthma and to increase in both nonspecific and specific hyperresponsiveness of the airways. On the other hand, detrimental effects of oxides of nitrogen, another gaseous pollutant converted from hydrocarbon by the effect of ultraviolet radiation in sunlight, is not quite as conclusive. Several laboratory studies using different dosing level of nitrogen dioxide yielded incongruent results as regard to pulmonary effects from this pollutant. A recent meta-analysis on this subject indicated that effect of nitrogen dioxide can be dangerous to respiratory system. The more prevailing pollutants in Thailand belonged to the more sophisticated and the more difficult to differentiated group of particulate air pollution from both sulfur and other oxides products. This complex group of particulates are emanated products from incomplete combustions of hydrocarbon by various types industrial plants such as energy producing plants from coal and natural gas and from incomplete combustion of vehicle fuels particularly from diesel exhaust engines. Respiratory health effects of these dust and other particulates are well studied. Children of less than 6 years of age are the most susceptible group especially those suffering from previous respiratory disease such as asthma. Asthmatic children in particular can develop more coughing, phlegm and other chest complaints on exposure. Increase in medications required for the control of symptoms and increase in emergency room visits and in in-hospital treatment for asthmatic attacks have been previously demonstrated. A study from the United States indicated that those with preexisting conditions such as with cardiac and pulmonary problems are at increase risk of dying when exposed to this group of pollutants in a dose dependent manner. The increase in particulates in major cities in Asian countries such as in Hong Kong, Bangkok, Kuala Lumpur are at the most alarming rate that no one has ever witnessed before in the history of air pollution studies. This has led to a uniform increase in prevalence rate of asthma and, more particularly, of allergic rhinitis within this region as have been demonstrated in the collaborative ISAAC studies. Prospective researches to determine effects of this increase are underway in most countries with one from Thailand being presented in depth here in this symposium. Measures to deal with such increase as well as for to further prevent rapid deterioration of this polluting conditions are being sought for actively and should be of high priority for health authorities from countries within this region.

## SY13

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THE HEALTH EFFECTS OF PM<sub>10</sub> ON SCHOOL CHILDREN IN BANGKOK

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**BACKGROUND:** While studies in many countries have shown associations between respirable particulate matter (PM<sub>10</sub>) and different health outcomes, i.e., respiratory symptoms, daily mortality, hospital admissions, and etc, little is known about the health effects of PM<sub>10</sub> on Bangkok residents where the ambient PM<sub>10</sub> levels exceed both the annual and 24-hour standards. The present study used cross-sectional and time-series studies to assess the health effects of PM<sub>10</sub> on Bangkok school children aged 7 to 12.

**METHODOLOGY:** 1203 students participated in the cross-sectional study. Health effects of PM<sub>10</sub> were assessed from standardized questionnaire and lung function tests. From these students, 160 were recruited to participate in a time-series study in which the subjects recorded daily respiratory symptoms and peak flow measurements (PEF) for 56 consecutive days.

**RESULTS:** *Cross-sectional study.* Children who studied in schools located in areas with "high" and "medium" ambient PM<sub>10</sub> levels showed statistically significant higher odds ratio of respiratory symptoms (ranging from 1.4 to 3.21) than the control group. With regards to lung functions, there was no statistical differences in lung functions between the study and the control groups.

*Time-Series study.* Four models were used to evaluate potential associations between PM<sub>10</sub> and respiratory symptoms and between PM<sub>10</sub> and PEF. The results suggested a daily association between PM<sub>10</sub> and respiratory symptoms but they were only suggestive because the associations depended on the way pollution exposures were assigned. The same inconsistent associations were also observed with PEF.

## SY14 Genetic and Metabolic Disorders

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## BIRTH DEFECTS AMONG CHINESE CHILDREN

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From October 1986 till September 1987, with the sponsorship of the Material and Child Health Department of the Ministry of Health, a total of 945 hospitals participated in the monitoring of birth defects, which was a significant and unprecedented endeavor. Based in hospitals, the monitoring covered 1,243,284 perinatus (from 28 weeks into pregnancy to 7 days after birth). This study gave us an initial map of the distribution and order of high risk and common deformities, and laid the basis for the exploration of the pathogeny and for the formulation of preventative measures. The results of this monitoring was publicized in May 1988 and a book entitled 'Maps of Birth Defects in China' was compiled.

Since 1988, the monitoring became routine. 478 hospitals were involved in this dynamic monitoring. Ten years of monitoring have collected relevant data of more than 5 million perinatus. More than one hundred kinds of deformities were monitored, 67,000 cases of children with deformities were found and more than 2 thousand color pictures of congenital deformities were collected.

The monitoring of birth defects in China showed that the rate of congenital deformities were 130.1 per 10 thousand during years 1986 through 1987, 104.0 per 10 thousand in 1988, 106.3 per 10 thousand in 1989, 105.3 per 10 thousand in 1990, 92.2 per 10 thousand in 1991 and 84.2 per 10 thousand in 1992, showing a tendency of decrease. The rate of neural tube defects also decreased: 27.4 per 10 thousand during 1986 and 1987, 25.3 in 1988, 27.4 in 1989, 25.7 in 1990, 20.9 in 1991 and 18.0 in 1992, with a dramatic decline of anencephaly and encephalocele. In addition, hydrocephalus, esophageal atresia and talipes equinovarus and other severe deformities also showed a tendency of decrease.

In the past ten years, the MCH work was attached importance all through the world. The Chinese Government was also active in this field with the formulation and issue of the "National Programme of Actions for Child Development in 1990's", the "National Programme of Actions for Women's Development" and the "Law on Maternal and Infant Health Care". Making use of this momentum, we proceeded smoothly with our Baby-Friendly Hospital Initiative and the MCH project, gaining both social and economical benefits. The MCH work developed rapidly with the gradual improvement of the three-level MCH network, reinforcement of maternal health care, improvement of equipment in MCH hospitals at all levels and upgrading of capability of prenatal diagnosis. The health education on the "Law on Maternal and Infant Health Care" consolidated people's sense of health care. Additionally, ten years of monitoring of birth defects established and improved the nationwide three-level birth defects monitoring network based on hospitals and the corresponding report system, and a force on the research of birth defects were formed; The monitoring work has also promoted the nationwide perinatal health care work and is one of the effective measures to reduce the incidence of birth defects.

## SY14

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## TRENDS IN DIAGNOSING INHERITED METABOLIC DISEASE

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For the diagnosis of inherited metabolic disease (IMD), clinical examination and pedigree analysis have been providing indications to what category of disorders should be investigated. Recently, the comprehensive catalog of human genes and genetic disorders, Mendelian Inheritance in Man, has been made available on-line (OMIM) through Internet world wide web service (<http://www3.ncbi.nlm.nih.gov/Omim>). At the end of 1996, there were 8319 entries (phenotype/gene locus) in the OMIM database and frequently updated, which is very useful in aide of clinical diagnosis through its online clinical synopsis search function worldwide.

Measurement of specific metabolites in blood, urine, or other body fluids has been and still is the most useful method for the diagnosis of inherited metabolic disease. The newly developed powerful analytical chemistry methods, e.g. tandem mass spectrometry, is applying to the measurements which will make the determination of metabolites more sensitive and/or more efficient. Demonstration of lack of enzyme activity, protein deficiency, or defective metabolism *in vivo* will continuously to be used as a diagnostic aide for some IMDs. Meanwhile, different methods of DNA analysis for determination of gene mutations or linkage prediction have been applied for the diagnosis of some IMDs and will be an important routine diagnostic method for most IMDs in the future.