

## South-East Asian Children’s Environmental Health: networking to improve health outcomes

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### ABSTRACT

Major progress has been made in improving the health of vulnerable populations, especially children and pregnant women in low and middle income countries after the launch of the Millennium Development Goals in 2000. While fewer children die, many now face the prospect of years lived with disability (YLD) from chronic non-communicable diseases (NCDs). The estimate for the total YLD for children under-5 years of age for South-East Asia was 2,780,104 in 2015. To improve the health outcomes for children globally, the World Health Organization’s Department of Public Health, Environment and Social Determinants of Health has designated a number of collaborating centres, each with differing areas of expertise. The collaborating centres have formed a network to address children’s environmental health (CEH) issues at the local, national, regional and international levels. However, many gaps in knowledge exist. To further this aim, the 1st Regional Workshop of South-East Asian Children’s Environmental Health was held at the Chulabhorn Research Institute, Bangkok, on 18th November 2016. The workshop was attended by three of WHO Collaborating Centres with representatives of five regional countries of Bhutan, India, Myanmar, Thailand and Vietnam. Workshops such as this one are designed to bring together researchers and policy makers from regional areas to identify and close gaps in knowledge.

**Keywords:** Children’s environment health; South-east asia.

### INTRODUCTION

Since the launch of the Millennium Development Goals in 2000, major progress has been made in improving the health of vulnerable populations, especially children and pregnant women in low and middle-income countries. While fewer children die, many now face the prospect of Years Lived with Disability (YLD) from Chronic Non-Communicable Diseases (NCDs). The estimate for the total YLD for children under 5 years of age for South-East Asia (including Cambodia, Indonesia, Laos, Malaysia, Maldives, Mauritius, Myanmar, Philippines, Sri Lanka, Seychelles, Thailand, Timor-Leste and Vietnam) was 2,780,104 in 2015<sup>1</sup>. The top 10 contributors to YLDs are show in Table 1.

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**Table 1. Risk factors contributing to years lived with disability for children < 5 years old in SE-Asia**

Rank	Risk factor	Contribution to YLD (%)
1	Iron-deficiency anemia	21.20
2	Skin diseases	15.15
3	Protein energy malnutrition	8.56
4	Other nutritional deficiencies	8.20
5	Diarrheal diseases	8.14
6	Sense organ diseases	3.92
7	Asthma	3.64
8	Neonatal, preterm birth complications	3.44
9	Congenital birth defects	2.52
10	Hemoglobinopathies and hemolytic anemia	2.40

To improve the health outcomes for children globally, the World Health Organization's Department of Public Health, Environment and Social Determinants of Health has designated a number of collaborating centres, each with differing areas of expertise. The collaborating centres have formed a network (Figure 1) to address Children's Environmental Health (CEH) issues at the local, national, regional and international levels. In addition, two organizations that are formally affiliated with WHO; the International Network on Children's Health, Environment and Safety (INCHES) and the International Society of Doctors for the Environment (ISDE) are partners in the network.

While understanding is increasing of the long-term consequences of exposure to environmental stressors in early life, measurement of the extent of exposure to and the nature of these stressors is missing or incomplete in many parts of the world. Suk and Davis<sup>2</sup> outlined four major needs that need to be addressed before the global burden of environmentally-induced diseases could realistically be tackled.

1. More and better-coordinated local and global data collection on environmental exposures in vulnerable populations related to health impacts and disease etiologies.
2. A global, strategic, epidemiological effort to fill gaps in our understanding of the relationship between environmental exposures and ill health in vulnerable populations.
3. Consideration of the entire environmental pathway - from driving forces to health impact - when designing interventions to improve environmental health.
4. Understanding of the mechanism(s) and interactions between infectious agents, environmental exposures, and genetic predispositions to develop better prevention / intervention methods.

An example of the need for improved data collection is the lack of data specific to the most vulnerable populations. Large discrepancies exist between developed and developing countries in the types of environmental exposures, the routes of exposures, and the resulting patterns of disease. Both societal change and climate change promise to affect the world's most vulnerable populations, worsening current inequities<sup>3</sup>. These inequities exist even within countries. In Australia, a major health disparity exists, with Indigenous population faring much less well than the non-indigenous population. However, for many of the child health exposure indicators proposed by the World Health Organization<sup>4</sup>, data were not available, not separately available for children or only available for Indigenous children<sup>5</sup>. In other countries, e.g. Bhutan, data on children's exposures and outcomes are not separately available.

In addition, the lack of data on children's exposures, coupled with gaps in the science that links early-life exposures to long-term disease risk, may have led to an underestimation of the extent to which environmental exposures contribute to disease. Improved data collection and advances in methods of assessing early-life exposures will aid in understanding these links<sup>6</sup>.

The broad aims of the CEH Network are to provide a coordinated approach to priority areas in CEH<sup>7</sup>. The current Network is reasonably well distributed geographically (Figure 1) where the greatest proportion of the most vulnerable population resides, with the exception of Africa. Each member of the Network acts as a regional node with specific expertise. To take the Network to the next level, we need to be effective in a regional context. To further this aim, the 1<sup>st</sup> Regional Workshop of South-East Asian Children's Environmental Health was held

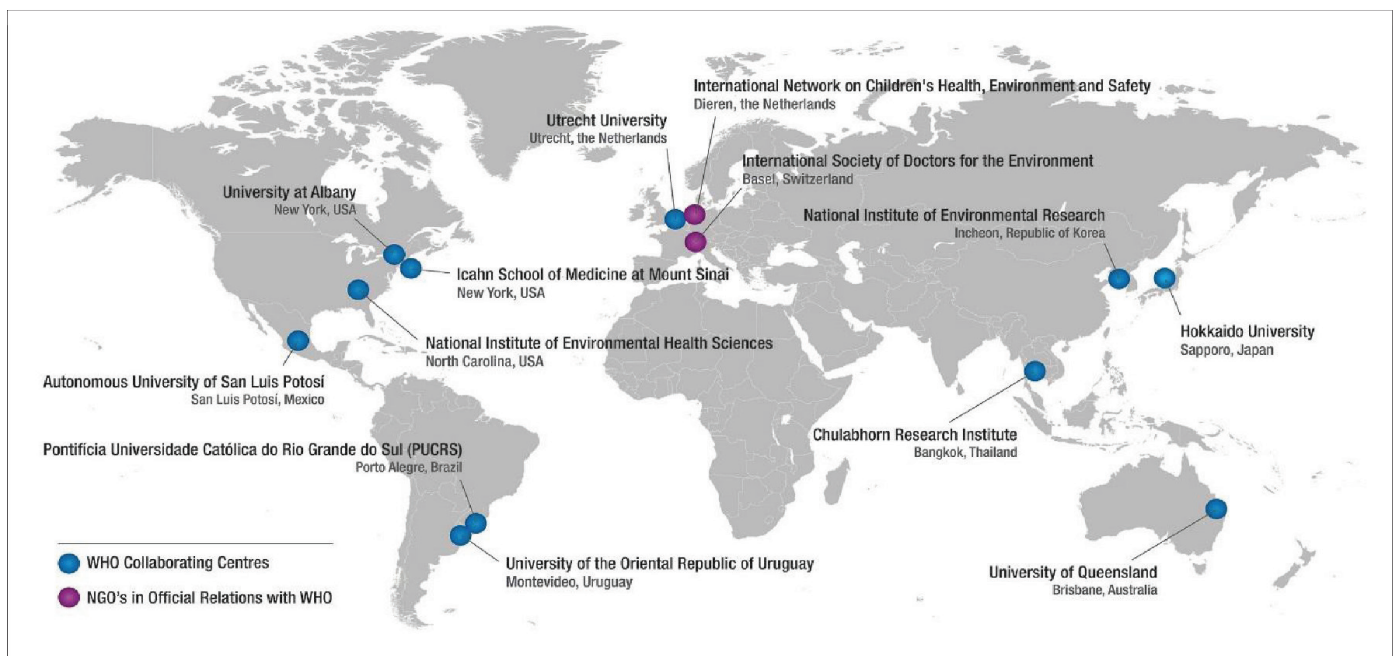


Figure 1. The Global Network of WHO Collaborating Centres in Children's Environmental Health

**Table 2. Major environmental stressors and health issues identified in country reports**

Country	Environmental Stressor	Health Issues
Bhutan	Air pollution	Diarrheal disease
	Water pollution	Acute respiratory infections Helminths and other infections
India	Water pollution (fluoride, arsenic)	Fluorosis
	Air pollution	Effects of arsenic
	Noise pollution	Acute and chronic respiratory diseases
	Soil contamination	Work place exposures and injuries
	Child labour	
Myanmar	Water pollution (fluoride)	Fluorosis
	Soil contamination (lead from manufacturing fishing sinkers)	Lead poisoning (No separate data for children)
	Air pollution	
Thailand	Air pollution	Acute and chronic respiratory disease
	Soil contamination (mining activities)	Health effects of arsenic
	Water pollution	Diarrheal disease
	Child labour	Work place exposures and injuries
Vietnam	Air pollution	Acute and chronic respiratory disease
	Water pollution (arsenic)	Neurodevelopmental problems
	Soil contamination (lead, herbicides, pesticides, agent orange)	Diarrheal disease
	Child labour	Health effects of arsenic
	Heat waves	Work place exposures and injuries

at the Chulabhorn Research Institute, Bangkok on November 18<sup>th</sup> 2016. The workshop was attended by three of the Network WHO Collaborating Centres, with 2 of the Centre Directors present, and by representatives of five regional Countries - Bhutan, India, Myanmar, Thailand and Vietnam, who presented country reports that addressed CEH and country needs, exposure and disease issues in each country and the importance and benefits that the network could bring to the country. The country reports highlighted both similarities and differences in the major environmental stressors in the countries (Table 2).

## CONCLUSIONS

Three overarching themes emerged from the reports. Children in all countries face significant health problems from: air pollution, exposure to metals and child labour. Ambient air pollution is a significant environmental stressor in all of the countries, although the source differs. Traffic-related pollution is the major problem in India, Thailand and Vietnam, whereas forest fires are a greater problem in Bhutan. Indoor air pollution from biomass fuel is a major problem in rural Myanmar and India and perhaps less of an issue in urban Thailand and Vietnam.

Children in all of the countries are at health risk from exposure to metals, although again the toxicant and the source vary. Arsenic in drinking water occurs naturally in Vietnam but is the result of gold mining activities in Thailand. Parts of India and Myanmar have major problems with excess naturally-occurring fluoride in the water. Lead poisoning from soil contaminated by battery recycling (Vietnam) or from manufacturing in cottage industries (Myanmar) poses threats to children's health.

Child labour, especially in the informal sector, is a major issue in the SE-Asian region. Vietnam estimates that 2.8 million children of aged 5-17 years (total Vietnamese population 94.8 million) are working; 42.6% are female and 86% live in rural areas. Many of these children are exposed to a variety of toxicants in dust related to the production of wooden products, weaving cotton and other activities. These "work" activities take place in the family home in the absence of protection for the workers and "blind" to occupational health and safety authorities. Dismantling and recycling electronic waste (e-waste) is common in SE-Asia, and much occurs in cottage industries located in the family home, especially in India and Thailand. One interesting example of the toxic effects associated with child labour was presented from India where rural children work in the agricultural fields without using proper personal protective equipment picking jasmine and other flowers in the early hours of the day to support the family income. Reports of precocious puberty and other conditions like dermatitis, presumably related to unprotected exposure to sprayed pesticides/chemicals settled on the flowers, are increasing.

The need for better data was obvious from the reports. Bhutan, a country that has achieved all of the Millennium Development Goal 4 and 5 targets, does not have data on environmental stressors specific for children. The Thailand's Ministry of Public health has plans to develop a data base related to CEH based on health information from the provinces and national survey data collected every 2 to 5 years. Such a data collection and storage program could serve as a regional model and advance child health in the region.

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