

South Asian Children's Environmental Health
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PUBLIC
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Glossary

ANC:	Antenatal Care
LMIC:	Low- and Middle-Income Country
NCD:	Noncommunicable Disease
PBDE:	Polybrominated Diphenyl Ether
PAH:	Polycyclic Aromatic Hydrocarbon
SDG:	United Nations Sustainable Development Goal
WASH:	Water, Sanitation, and Hygiene

Day 1 Welcome

William Suk, Ph.D. (NIEHS) and Sathiarany Vong, M.D. (Ministry of Health, Cambodia)

Suk welcomed attendees and noted that the goal of the workshop was to determine the feasibility of further networking and collaborating among children’s environmental health (CEH) researchers. He also noted, “We can’t do this by ourselves. We have to do it in a cooperative and collaborative way.”

Vong echoed Suk and stated, “We are here to establish a strong network in the Southeast Asia region to free our children of environmental worries. Children are our future; they are the heart of the Sustainable Development Goals (SDGs) and will inherit our legacy of policy and technology. The future of our children is in our hands.”

Vong provided an overview of children’s health in Cambodia and noted that under-5 fatalities have declined in Cambodia since 2004 and continue to do so. “However, it remains unacceptable based on neighboring countries,” she said. In Cambodia, more than 169/100,000 deaths are due to the environment, one of the highest in the Southeast Asia region following Laos and Myanmar.

Introductions

See Appendix 1 for a list of attendees.

Presentation of Country Reports

CEH in India

Beerappa Ravichandran, Ph.D. (National Institute of Occupational Health)

Summary of Health in India

There are a number of health threats to children in India related to the environment, including indoor air pollution and outdoor air pollution from both industries and traffic; small-scale industries that generate nanoparticles that are dangerous; and high rates of use of generators that release diesel particulate, including in homes.

CEH Risks and Exposures

NIOH is conducting a study of “rag pickers” in Bangalore as part of their effort to collect data on children in the informal waste disposal and recycling sector. Children collect and sell recyclable parts that have an economic value, including aluminum, batteries, etc. Whole families collect waste together, in poor living conditions near dumping sites that have toxins, chemicals, etc., and the children are particularly vulnerable. There is an added social dynamic, where children and families move as large groups and are “territorial” about their areas of collection. The study has found that these children have poor hygiene and nutrition; are exposed to waste materials; and commonly have leg injuries, gastrointestinal infections, skin diseases, and rabies (because of stray dogs). Other research has found polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) at dumping sites at levels that exceed guidelines. The risk of cancer, particularly due to polycyclic aromatic hydrocarbons (PAHs) and leachate from landfills, is high. Additional findings of tuberculosis, bronchitis, asthma, and pneumonia have been reported.

Children in rural areas often work in agriculture, and for many, they work as unpaid labor for their own family. Pesticide exposures, particularly when it is mixed within the home, are a major health risk. Children often work in “nonhazardous” roles (such as plucking flowers), but organophosphate exposure causes neurological symptoms even at low doses, and families often cannot afford for children not to work. Children often work in fields before school, even if they do attend. This sometimes coincides with early morning pesticide applications and, thus, exposures. Children often don’t use gloves and therefore have dermal exposure, which is compounded by them taking their food with them and not washing hands before eating, thus increasing exposure.

Another NIOH study is looking at sheep farming. Sheep wool is used for carpets, but children are often nearby and the dust and proteins from sheep wool is inhaled. The study team has found DDT and other pesticides on the family, including the children in the house.

Brick kilns remain a major health and occupational safety challenge in India. The government banned child labor in the industry, but sometimes children work with their family and work there anyway. Children also work in extremely dangerous stone quarries. Even when children don’t work in stone quarries, parents often are exposed to high levels of silica dust and many parents bring children to work (due to young age, lack of school, etc.). Mining and quarries are very noisy areas and noise-induced hearing loss is common, even in children.

Research Needs and Challenges

Ravichandran noted that there is a continued need to facilitate further knowledge exchange with researchers, to continue to build capacity in researchers, and to share intervention methodologies and best practices.

CEH in Bangladesh

Shahir Hossain, Ph.D. (EDSO)

CEH Risks and Exposures

Air pollution is a serious issue in Bangladesh and in all of Asia. Air pollution issues get the most attention in Delhi or Dhaka, but rural air pollution remains a major problem. Mothers and children are impacted by indoor air pollution. The link between death rates and exposures is often air pollution.

The collection of waste in Bangladesh is “totally horrible” and all waste is collected together and dumped, mostly taken to a landfill. Landfills are hazardous and children who are “waste pickers” are often at the landfill. Hossain noted, “Everyone sees it every day, but no one will discuss the issue of how waste impacts children.”

Lead paint and lead poisoning is a major issue in Asian countries. In 2012, seven different organizations in Asia started a lead-free paint project. Bangladesh, Nepal, Sri Lanka, the Philippines, India, and Indonesia are part of the effort. In many of these countries, manufacturers have reduced lead use and are moving to zero lead paint. But the problem is that while the regulation is good on paper, it requires enforcement. Due to lack of transparency, corruption, etc., the political commitment to enforcement is lacking and “it doesn’t really work.”

Toxic toys are an under-reported issue. Tests of toys sold in Bangladesh have found lead, cadmium, bromine, and chromium in toys (some at levels more than 97 percent above the EU ceiling). This is a serious issue and a serious environmental health issue. In one test, a Rubik's cube from Bangladesh was found to have OctaBDE (a chemical banned under the Stockholm Convention). Most of the unsafe toys are produced by China, Thailand, and India. The products are spreading all over Asia, even beyond countries where the toys are produced. Children's cosmetics and toy jewelry have also been found to have elevated rates of harmful substances. EDSO found arsenic in baby lotion, and titanium dioxide is sometimes found in kids jewelry items.

Child labor and occupational hazards for children remain a major issue in Bangladesh. Children work in tanneries and are exposed to heavy metals (lead, cadmium, mercury). Bangladesh has 50,000 children working in e-waste and informal recycling. Shipbreaking is a major industry in Bangladesh, but the shipbreaking yard is a "killing field" and many children work there and are exposed to heavy toxic metals from e-waste and ships.

CEH in Nepal

Hari Dott Joshi (Yeti Health Science Purbhaanchal University)

Summary of Health in Nepal

The average life expectancy in Nepal is 66.6 years. The infant mortality rate is 55/1,000 live births in rural areas and 38/1,000 live births in urban areas. The under-5 mortality rate is 64/1,000 live births in rural areas and 45/1,000 live births in urban areas.

CEH Risks and Exposures

Indoor and outdoor air pollution are major risks for children. Sixty-four percent of indoor cooking is done with firewood and 10 percent of households burn cow dung. This is particularly problematic in the mountainous areas of the country where there is limited/no ventilation in the home due to cold outdoor temperatures. A recent study found that many children are exposed to high levels of PM₁₀ and PM_{2.5} for more than five hours per day. The same study found correlations with eye issues, and respiratory ailments associated with these exposures. Ambient air pollution, particularly in Kathmandu, is a major challenge. Pollution comes from brick laying, construction projects, and vehicles. The pollution is so dangerous that there is a government campaign to encourage people to NOT walk in the mornings in the Kathmandu valley. This pollution is particularly a threat to children walking to school in the mornings.

Water, sanitation, and hygiene (WASH) challenges remain major threats to CEH. Forty-eight percent of households have safe drinking water in Nepal. Fifteen percent of households practice open defecation or have no sanitation facility, while 38 percent have unimproved sanitation. There is limited systemic surveillance of water quality and many studies have found varying levels of unsafe water and contaminants. There is a government policy of having one toilet for every 50 students in school, however the reality is that there are usually 127 students for every one toilet. Lack of toilet facilities has been shown to reduce female school attendance and therefore female literacy. There is a correlation between toilets in schools and female literacy across Nepal.

Additional exposure risks to children in Nepal include child labor in brick laying and similar industries, lead pollution, and climate change. All five major vector-borne diseases are now endemic in Nepal and there has been an observed shift in the range of vectors to +2,000 meters above sea level. Cold waves are a new issue in Nepal with an observed 5 percent increase in the incidence of Acute Respiratory Infection (ARI) in cold months. ARI deaths have been observed to increase by 2.68 percent for every 1 degree Celsius decrease in the daily minimum temperature.

CEH Policies in Nepal

Health is noted in the new 2016 Constitution of Nepal. The National Health Policy of 2014 and National Water Supply and Sanitation Policy of 2014 are relevant to CEH issues. Nepal also has a climate change policy from 2011, and national improvement plans for WASH and for the health sector have been established. Implementation of most policies is overseen by the Ministry of Health, however child welfare is governed by the Ministry of Women, Children and Social Welfare.

Challenges to Improving CEH in Nepal

Lack of coordination among government organizations and implementation are continued challenges to improving CEH, as is weak enforcement of existing policies. Some health interventions required a change in cultural practices and behavior, such as the relationship between preferred household design and indoor cookstove use. Geographic challenges make delivery of care difficult, and compound the complexity of disasters, deforestation, and climate change.

CEH in Bhutan

Chador Wangdi (Ministry of Health, Bhutan)

Summary of Health and Population in Bhutan

The total population of Bhutan is less than 1 million people. Seventy percent of the country is forested, and 58 percent of the population is dependent on agriculture. There is a constitutional mandate that 60 percent of the country retain a forest cover. While policies exist, some are “paper tiger” and not enforced. Ninety-five percent of the population has access to improved drinking water, and 70 percent has access to improved sanitation. More than 40 percent uses solid fuel for heating and cooking. The leading causes of disease in children under 5 in Bhutan are respiratory diseases, skin diseases, diarrhea, and digestive system diseases.

CEH Risks and Exposures

Air pollution is a major threat to children’s health. In Bhutan, 95 percent of the population has access to electricity, but 40 percent of population lives in a house where solid fuel is used for cooking. There is a preference for wood style cooking and its flavor, particularly in rural areas where solid fuel is used by more than 53 percent of the population. In many of these homes, women carry the children on their back when cooking, thus increasing cooking-related indoor air exposures. Winter heating in traditional homes and rural areas is also done by burning wood. Some urban areas continue to use traditional stoves and kerosene heaters during winter, and 2011 was first time air was found to exceed ambient air quality standards due to fuel burning in winter.

Statistics for improved drinking water coverage and sanitation have improved throughout the country, however diarrhea and waterborne disease remains a leading cause of under-5 diseases. There remains a behavioral preference for open defecation in some areas, despite the presence of improved sanitation facilities.

Stunting in children has decreased significantly but remains in rural areas and the eastern region of the country. Anemia remains common in children under 5 in Bhutan. While rates have declined, more than 43 percent of children are anemic. Pregnant women have good health coverage, with many attending prenatal visits and with anemia rates lower than those of nonpregnant women. However, only 52 percent of pregnant women see prenatal care in the first trimester. Breastfeeding rates are high, with nearly half of women reporting exclusive breastfeeding. Upon weaning from breastfeeding, there is reported low dietary diversity for introduced complementary foods, with a low percentage of children being given iron rich foods at ages 6-23 months. The Ministry of Health is seeking to distribute nutrition powder to health centers, particularly where iron rich foods are less available.

There is no segregation or treatment of waste. Informal waste collectors sort and re-sell scraps from waste. The capital, Thimphu, generates nearly 50 tons of waste per day and it is all dumped into one landfill only 12 kilometers from the city. None of the waste is segregated, sorted, or recycled. Leaching of chemicals and fires (accidental and intentional) at landfills contribute to air and water pollution.

Very few chemicals are manufactured in the country. Most chemical products are imported from India. Pesticides are used often, and asbestos is commonly used and found in many areas. There is no regular monitoring data on carcinogens, and there is a general lack of awareness of carcinogenic substances and no separate legislation to deal with carcinogenic chemicals.

Research Needs and Challenges

Presently there are no studies specific to Bhutan that explore the correlation between air pollution and respiratory/eye diseases.

CEH in Vietnam

Le Thai Ha (National Institute of Occupational and Environmental Health)

Summary of Health and Population in Vietnam

There are 26 million children under 16 in Vietnam. There are increasing health disparities between Kinh majority individuals and ethnic minorities, between urban and rural residents, and between those in mountainous areas of the country compared to the lower delta areas. Child poverty is very high in the northern mountains, and in Vietnam 40 percent of poor children live in rural areas. About 50 percent of rural children attend pre-school, whereas 75 percent of urban children do.

The under-5 mortality rate in Vietnam is 20.2/1,000 live births and diarrhea is the leading cause of under-5 death (10 percent of U5 deaths). Additional diseases commonly impacting children include dengue fever and hand, foot, and mouth disease.

CEH Risks and Exposures

Vietnam has high rates of children without access to clean water, reaching upwards of 80 percent in the Highlands and Mekong River Delta. Fifty-three percent of schools don't provide drinking water for students during school hours. Seventy-three percent of schools have latrines, however more than 50 percent are estimated to not meet sanitation standards.

Neglected tropical diseases, including soil-transmitted helminthiasis (STH), are a major threat to children's health. Sixty-seven million people live in STH endemic areas and school-aged children are the most at risk. In some areas, infection is as high as 86 percent of the population. Leading contributors to high rates are lack of sanitation, use of human compost in agriculture, barefoot walking, and consumption of raw vegetables.

Lead poisoning in children remains a problem. Sources of lead exposure include lead mines; industrial production; recycling "villages" (where a majority of industry dismantles lead batteries); the use of traditional drugs, and lead and lead paint in toys. Lead battery recycling used to be common in residential areas, however new policies have moved activities to an industrial zone. A study in the recycling village of Dong Mai found blood lead levels of children in excess of 45 ug/dL (which usually is treated with chelation). After an intervention in the village, no children were found to have levels in excess of 45 ug/dL and the average level was reduced to 14.63 ug/dL. Children's blood lead levels have also been found to be elevated near lead mines in the country.

Chronic arsenic contamination is common in many provinces and the main source of exposure is from contaminated groundwater. An NIOEH team studied a cohort of children exposed to arsenic from groundwater and found increases in neurobehavioral disorders, including anxiety.

Research and Health Needs and Challenges

There continues to be a need for sanitation and water in remote areas, but efforts to provide water must address natural arsenic contamination as well. A study on the effects of arsenic exposure on physical development, mental health in children, and genetic polymorphisms related to arsenic metabolism would be welcomed.

STH reduction measures must include treatment, clean water, and behavior change. A study is also needed to understand what is effective and can help maintain control of STH.

There is a continued need to reduce lead poisoning in children. In doing so, efforts must include education, worker protection (for those in mines and high-risk environments), and continued monitoring of interventions. Research is still needed in villages with similar issues to Dong Mai to explore measures that may prevent children's exposure.

CEH in Thailand

Ubon Cha'on, Ph.D. (Khon Kaen University)

Summary of Health in Thailand

Neonatal and child mortality is low in Thailand, with a neonatal mortality rate of 3.5/1,000 live births and an under-5 mortality rate of 8.6/1,000 live births. Eight percent of live births are diagnosed with

congenital anomalies (the [five most common birth defects in Thailand](#) include congenital heart defect, limb abnormalities, cleft lip and palate, Down syndrome, and congenital hydrocephalus).

CEH Risks and Exposures

Thai women don't breastfeed at the rates of many other neighboring countries and often breastfeed for a shorter duration of time. An estimated 16 percent of children are stunted, yet Thailand has the fastest increasing rate for childhood obesity in the world. There is a high prevalence of junk food consumed (food high in calories and fat) and soft drinks and sugary coffee are common in children's diets.

Glyphosate and paraquat are commonly used in agriculture and have [been found](#) in high rates in maternal and fetal serums. Pesticides are commonly used on fruits and vegetables, as growers like to use toxicants to protect crops from insects.

Flooding is a major threat to children's health and in addition to threats usually associated with floods, schools often don't have clean water after floods and thus if open, are not safe for children.

Chronic kidney disease of unknown etiology (CKDu) is a growing problem. The relationship between CKDu and water is being investigated.

CEH in Sri Lanka

Inoka Suraweera, M.D. (Ministry of Health, Sri Lanka)

Summary of Health and Population in Sri Lanka

The total population of Sri Lanka is 21 million people and 77 percent of children live in rural areas. The under-5 mortality rate is 10/1,000 live births and the infant mortality rate is 8/1,000 live births. It is important to note that while the infant mortality rate has declined, the majority of under-5 deaths are neonatal. Congenital malformations are the most significant cause of neonatal death and [there are not yet studies to understand the environmental associations in Sri Lanka](#).

"We need healthy children, and if you have healthier children, you have a healthier nation."

- Inoka Suraweera, Ministry of Health, Sri Lanka

CEH Risks and Exposures

Outdoor air pollution has increased in Sri Lanka and the increase is correlated to an increase in private vehicle sales. Open burning of plastics generates dioxins, etc. due to lack of formal waste disposal and is a common contributor to outdoor air pollution. Estimates have noted that indoor air pollution remains a larger threat than outdoor air pollution in Sri Lanka (as of 2014), however data specific to Sri Lanka is limited. Nearly 60 percent of the population uses biomass fuel for indoor cooking in Sri Lanka. The highest use of biomass is in rural areas, where an estimated 86 percent of the population uses firewood. Poor ventilation, the absence of chimneys, and the practice of using polytene (plastic bags) to initiate a fire all contribute to indoor air pollution. Unlike other countries in the region, heating is rarely a contributor to indoor air pollution due to the warm natural climate. A World Bank study in Sri Lanka found that indoor air pollution is a predictor of diabetes among adults, and is a predictor of stunting, underweight, and wasting in children under 5.

Ninety percent of mothers breastfeed for six months and more than 97 percent of deliveries are institutional. More than 10 percent of the population has diabetes and the proportion is [expected](#) to increase. A [recent study found](#) that 38 percent of children aged between 10-14 years were obese and 20 percent overweight. More and more children are exposed to dietary factors, sedentary behaviors, and unhealthy habits. There remains, however, a double burden of nutritional problems in Sri Lanka as both malnutrition and obesity are increasing.

Many industries have no proper disposal mechanisms for waste or chemicals and inappropriate use of agricultural chemicals is common. More than 80 percent of workers in the country work in the agricultural sector and there is limited to no PPE use while synthetic pesticide usage, particularly herbicides, is [increasing](#). CKDu is a major problem, which may be related to pesticide and chemical use.

Dengue remains a major problem. Thirty percent of dengue patients in 2017 were 5-19 years old. In 2017, there were more than four times the number of cases compared to the 2010 and 2016 average.

The country has seen an increase in floods, droughts, and landslides, and children and families are often forced to move due to these events.

[Research and Health Needs and Challenges](#)

Improved surveillance to capture baseline data is needed, as is increased research on the environment and children's health, particularly understanding of early exposures on adult health.

“We can share and not reinvent the wheel and learn from others’ experiences.”

- Inoka Suraweera, Ministry of Health, Sri Lanka

Day 2 Welcome

Summary of Day 1 Discussions

Betsy Galluzzo and Brittany Trottier (NIEHS)

Themes from country reports included many similar challenges and health risks, continued need for improved access to WASH.

- The presence of policy is only useful if it is supported by enforcement and coordination between governing agencies.
 - Disparities continue to make health gains uneven across gender, regions, geographic locations, native populations, and urban and rural areas.

Collaboration Between Ministries in Sri Lanka

Inoka Suraweera, M.D. (Ministry of Health, Sri Lanka)

“When it comes to environmental health and occupational Health (EOH), it is about working with other sectors. As far as the Ministry of Health (MOH) in Sri Lanka is concerned, we can’t work alone. In things like maternal-child health, the MOH can play a major role on their own. But with environmental health, each ministry must ‘hold hands’ with the others to achieve objectives.”

In Sri Lanka, the MOH is separate from Ministry of the Environment (MOE). The MOH has identified a focal point for EOH. To make change, “you need a focal point at MOH for EOH and you need to develop their capacity.”

Suraweera thanked the Chulabhorn Research Institute for helping her development. Capacity goes beyond technical areas and includes good communication skills to help develop rapport between ministries. It is important to identify the focal point in the MOE in each area. Beyond identifying the related content area (climate change, waste, etc.), the role of the health sector also needs to be identified. In solid waste management the role of health care is in awareness raising: “If you identify the role of the MOH in each area, it becomes easier to discuss.” Once work starts, the input of the MOH to MOE decisions, and of MOE on MOH decisions, is important and carries weight. The health justifications help make the case.

She shared an example of this related to plastic bags (see box at right). To implement the ban, different ministries with different priorities had to collaborate. Often, such as the case with plastic bags, the health justification is a major factor that can “help convince the other ministries to achieve major objectives.”

Environment and health priorities can be competing with other priorities, but if committed a system is established it will move along.

Banning Plastic Bags in Sri Lanka

Plastic bags are produced in massive amounts and can’t be recycled in Sri Lanka as there is not a proper disposal mechanism. Some of the discarded bags become breeding sites for mosquitos that carry dengue. Other times, people burn the bags outside and inside the houses, to start the cooking firewood.

To combat the issue, the Ministry of the Environment and Ministry of Health collaborated and convened the meeting. The MOH highlighted the health impacts of dengue and the risks of burning plastics and indoor air pollution.

A committee was formed and prepared a Cabinet paper outlining the reasons for the suggested ban. The ban went into effect in September 2017.

Suraweera also emphasized the need to work with the community and at the grassroots level: “What we plan at the national level has to be implemented by the grassroots teams. They will take the services of each program to the communities. We have also strengthened district level capacity. We do annual environmental reviews and we invite the regional people to the review, so they hear other problems and understand the need to work together. This helps build rapport for health and the environment.”

Suraweera concluded by noting that “Sri Lanka is a small country, so it’s [collaboration] not so hard. But it might be more difficult in a large country.”

Discussion

The following questions were raised during the discussion: Are you using local research or global data? What is “enough” for the justifications you need for policy?

Suraweera responded, “I look at the global research, but we do have studies, particularly on dengue breeding. The plastics impacts we need to do more research. But I like to think that if something has been proven for humans in other countries, we should not be reinventing the wheel in our country. We need to control it in our country. If humans exist in Sri Lanka, then it holds true for Sri Lanka as well.”

Coordinated Approaches to Children’s Environmental Health

William Suk, Ph.D. (NIEHS)

Suk explained the need for a network of researchers interested in CEH: “We need to have a network in order to seize on opportunities for emerging issues and diseases.”

The idea of a network is also to build capacity. The World Health Organization (WHO) has more than 800 Collaborating Centres (WHOCCs), not all of which are involved in environmental health or CEH. Some focus on children’s health without the environmental component. WHOCCs in occupational health or other fields may have work that aligns well with CEH research and should be linked to the CEH network.

There are very few WHOCCs working in CEH in Africa. But each current Centre or meeting participant probably knows another researcher working in Africa. Each Centre and attendee can be a “hub” that can help assist in training and in research and in filling in gaps on the map (where there are not Centres).

The next step to a CEH network is to develop a system of surveillance (using databases) for understanding CEH exposures and challenges worldwide. These challenges include those related to e-waste, indoor air pollution, developmental origins of health and disease (DOHaD), climate change, and research into the increasing double burden of infectious and chronic diseases.

“In the end these problems and challenges are local to communities. Unless the community has a solution, it is not helpful. The goal of this group has been, and should continue to be, that we publish locally, in a journal that will be read here. Unless it’s in the community, it’s only a scientific paper.”

“We have all these communications, but unless we ‘hold hands’ it won’t work. A network is one way to ‘hold hands.’”

- Inoka Suraweera, Ministry of Health, Sri Lanka

“It takes 17 years for original research to benefit an individual via clinical care. How can we be sure a child today can benefit sooner than that? We can work together.”

- William Suk, NIEHS

The recent [Lancet Commission on Pollution and Health](#) report includes a discussion of the health impacts of pollution on children. The report dispels the myth that pollution is inevitable. It also includes important information on the impact of pollution on children and notes that children face the highest risks because small exposures to chemicals *in utero* and in early childhood can result in lifelong disease and disability, premature death, as well as reduced learning and earning potential. Deaths due to all forms of pollution show a peak among children younger than 5 years of age and disability-adjusted life years (DALYs) resulting from pollution-related disease are highly concentrated among infants and young children, reflecting the many years of life lost with each death and case of disabling disease of a child. Early life exposures to neurotoxic pollutants such as lead and mercury can impair cognition, diminish the ability to concentrate, and disrupt behavior, thus reducing lifetime earnings. Routine biomonitoring studies have detected many dozens of toxic pollutants in the bodies of children and pregnant women.

What can a network do for your country?

Peter Sly, M.D., from the University of Queensland noted that the commonality of issues means that “if it’s happening somewhere else, there may be someone else to connect with.” And that by connecting “we can move from isolated examples to teams.”

Networks such as those that are currently working in Asia to eliminate lead in paint and reduce the use of mercury were proposed as a model to bring different countries together.

Networks were noted as important within countries, as multiple participants noted multiple ministries are responsible for policies that impact CEH and that reporting on common elements requires a network within a country to find and report data. This often leads to no ministry “owning” children’s health issues.

In 2003, WHO established five indicators of CEH. A team in Australia looked for the exposure data that WHO was looking at and even Australia didn’t really have it—there was only outcome data.

Suggested: A regional project of looking at suitable indicators for CEH

The network could undertake an activity led by one Centre, and that group would send documents for comments, collate, etc. The Public Health Foundation of India (PHFI) and the Center for Environmental Health could be involved, as could other Centres in India, like the Indian Council of Medical Research (ICMR), and collectively they can form a platform for data collection. Possible indicators should be grounded in SDGs.

Current successes in Asia and South Asia should be noted and built upon. Examples from common antenatal care (ANC) indicators used in multiple countries in the region could serve as a model because they help demonstrate improvement and are feasible.

Scope and activities (timeframe) for potential indicators project

- 1) Send materials that your country has looked at (if any), look at what was proposed by WHO in the past, and understand how relevant the indicators are to your country.
 - a. 3-4 months for a first response
- 2) Refine indicators using a Delphi type process to develop something acceptable.
 - a. 4-6 months
- 3) Reach consensus as to what indicators are reasonable to collect.

- a. Sly challenged people now to look at what data their country is collecting and reminded them that even data in different formats is useful.
- 4) Once indicators are determined, evaluate who else needs to be in the room. Who else needs to be involved from the government? From academia?

Discussion of proposed indicators project

It may be that a conclusion from this effort is that global indicators are not right—that each country collects similar data that is best for the country. The best fit may not be one committee-derived set of indicators. Keeping the task and indicators confined to a region may be good.

Exposure indicators are important, but so are development and mental health indicators. This project might need to take a very broad approach to measurement. Educational outcomes should also be considered.

There are existing databases for noncommunicable disease (NCD) indicators, including those at the National Institutes of Health (NIH) and the International Agency for Research on Cancer (IARC). A next step before kickoff should be to look at what registries exist and to overlay that with regional information.

Action item: Sly will share the indicators work and findings from Australia. He will follow up with PHFI on determining what to share for comments.

Training in the region

PHFI statisticians are being trained and we are trying to become a regional hub to train other researchers who want to build their capacity in modeling. PHFI is part of the NIEHS GEOHealth Hubs and serve as a regional hub for training. They host NIH Fogarty International Center (FIC) scholars as well. Funding from FIC may also be used for training.

Professor Reddy Visit

Professor K. Srinath Reddy, president of PHFI, visited.

Sly thanked PHFI and Reddy for the hospitality and assistance.

WHO Global Plan of Action

Peter Sly, M.D. (University of Queensland)

Sly noted that WHO is working on a new strategic plan for CEH. In his role as a WHOCC, he has been asked to help draft an updated plan. He provided an overview of the last plan, which expired in 2015. The summary below reflects the discussions and ideas shared.

WHOCCs created a series of slides and trainings that are in the “train-the-trainer” style. Recently they have updated trainings, including pollution and mercury, etc. The goal of the materials is to train field teams and for them to customize content according to their region and situation. WHO is starting to move training online via MOOCS as well.

Awareness raising for areas was an important focus of the last plan. E-waste was one of those areas that was noted as needing additional awareness, while CEH as a stand-alone issue was a new idea.

Sly asked the group: “What do we want to see in the new WHO plan?” Many SDGs and subsections are relevant to CEH. Any plan created will need to have the SDGs in mind.

The plan will have a focus on chronic diseases and NCDs. Additional suggestions for topics from the audience included:

- Find a “selling point” and include children in it. We have to show the interlinkages between environmental aspects and how they influence children’s health.
- All governments are concerned with ANC and immunizations and growth monitoring. This is because they have control goals. We need to show in this plan that while we monitor growth and give food, we can’t have poisoned air.
- There needs to be “buy-in” and policy-level actions for governments.
- A plan should always encourage monitoring and evaluation of activities.
- The plan should be focused on inclusiveness: We need more stakeholder participation in the process. Stakeholder participation should be inclusive and should include grassroots networking. All efforts should link grassroots to the top.

Who should the target audience be?

- Policymakers.
 - This could include a comparative analysis of industry standards of products that target children, which may help show policymakers that across countries we have different standards for letting products in.
- A combination of researchers, practitioners, and policymakers and the public. There is a need to engage the public in this plan. Even children need to be involved to create curricula for school children.
- Media.
 - Research is important, but it needs to be used to change the current environmental health situation. It’s one thing to produce resource materials, but they are of no value to media if they (reporters) are not well educated, if they don’t address the issue.
 - There is a need to help with the advocacy and public awareness of our reports, a need to show consequences via a simple message or image.
 - Policymakers and researchers and media speak a different language.
 - There should be a tool for environmental health researchers to “engage” with the media, to manage meetings, and to help effectively take advantage of people’s time.
- Academic health professionals and voluntary health workers.
 - Both are the “front line” in CEH and are the users who should be able to customize this document.
- Technologists.
 - The plan should be a report that speaks to technology and innovators who can help create affordable, easy-to-adopt solutions.
 - There might be a quick and easier way to innovate and find an acceptable solution to many problems. “We researchers often wait for perfect.”
 - Many startups are working with communities on implementation of interventions. It is ok to move outside of the “stringent” research domain.
 - There are technologies that are valuable with smartphones, etc.

- Data collection via phone (and to get response) is encouraging.
- Interlinkages among audiences is important.
 - Engage primary school children to induce behavior change.
 - Many children have phones and are connected. Can we “connect” them to the innovators and help make sure that our kids are not discussing the same issues in 10 years?
 - PHFI noted that there is a “chatbot” that can detect behavior change in children’s actions, and it alerts to behavior change early. Development of this required linkages between behavioral health and children and technology professionals. This could be done for CEH also.

What other topics must a plan cover?

- We need to generate the evidence in every country, to convince policymakers you need evidence.
 - Bhutan did the National Adaptation Programme for Action (NAPA 1-2) for climate change but health had a minimum role in it. There needs to be more baseline information for policymakers.
 - Sly noted this would be in an introduction to explain existing gaps do still exist.
 - Action item: facilitate collection of data to fill gaps.
- The plan must emphasize social justice and equity and inclusion.
 - Children have the same right wherever they are.
 - Certain countries have differences in mobile phone access; the plan needs to be able to be “translated” into the context of a specific country to include everyone in each location.
 - In India there are multiple types of school systems. Government school vs. private schools. This needs to be considered and one should not be advocated for alone.
 - The plan should include items customized for target population and age group (age, gender, school status)
- Study the costs and benefits of how we pay for improvements.
 - In Thailand, the government tried to tackle the problem of water supply, but people don’t like the new water because they have to pay for the new water. The health evidence is less clear to users. We need to consider the perception of consumers when we want to improve environmental health.
 - A similar phenomenon occurs with battery recycling: people don’t want to stop the activity (unsafe recycling and dismantling) because it is how they get money. They don’t see the blood lead levels.
- Recognize that this is a nascent field in some areas.
 - There is a need for a landscape analysis to understand the gaps and what we know.
 - We can suggest a series of regional workshops to inform major local issues, to understand gaps in data and what actions can be taken.
 - “Regional workshops to inform, understand, and plan.”
 - There is a need for training and to find out who provides training on specific topics.
- Consider “good data.”

- What minimal amount of data is needed? What resources can you leverage?
- There is a need for RDRE: Reliable Data, Robust Evidence.
 - Not just data analysis, but data analytics.
- Big data comes into this as well as “public health intelligence.”
- Working with communities to implement and research and enhance community interaction.
 - Much of the past plan was written so it depends on who uses and implements the plans.
 - Sly reminded the group that this can be something for “us” (the CEH community) to “drive” and that it should emphasize good models that can be shared and expanded.
 - There should be action to reach those nongovernmental organizations or others in children’s health and to engage them in discussing *environmental* health and solutions.

Details of making a plan

- Sly clarified that the plan won’t have specific projects named.
 - It will include topics and suggestions such as “investigate interaction with technology for assessing and implementation.”
 - There may be templates that can be customized for regional or local context.
- “Taking the action plan on the road” and presenting about it to help end-users understand it before it is released and before a country is expected to customize it.
- Concrete activities and steps are a way to get WHO documents off a shelf and therefore content may reflect this. Past plans have included discussion of specific steps: 1) make leaflets, 2) hold workshops for media, 3) create a global strategy for media outreach.
- The plan will include short-, mid-, and long-term goals.
- Toolkits were previously included and can remain part of the plan. In order to add toolkits to the new plan, “we need to understand what tools need to be ‘in the box.’”
 - Monitoring and evaluation tools were recommended by the audience.

Final Remarks

Peter Sly, M.D. (University of Queensland) and William Suk, Ph.D. (NIEHS)

Co-chairs thanked attendees and noted that “we have heard many common issues and challenges. Policy and action are two of them. We also heard that there are models that work. The Sri Lankan model of collaboration is a good model for many of us.”

Sly concluded by noting that “there is value in working together and that we can learn from each other by taking advantage of regional hubs of expertise.” The WHO Plan of Action for Children’s Environmental Health should be “an aspirational document that can be locally customized and contextualized.”

Suk concluded by noting, “The CEH Global network is a success, but we can do better, and we have to if we want to enhance the effectiveness of this type of activity. But today was an important step, because in the words of Inoka Suraweera from this morning, ‘Here we are, holding hands, working to protect children.’”



CEH workshop participants posed for a group photo during lunch. [Image courtesy of PHFI]

Appendix 1: Attendees