

Evaluation of Children’s Environmental Health Workshop held during the Pacific Basin Consortium Conference, November 12-15, 2017 at the India Habitat Centre, New Delhi

The Children’s Environmental Health (CEH) pre-conference workshop was part of the 17th Pacific Basin Consortium (PBC) Conference for Environmental Health and Sustainability jointly hosted by Public Health Foundation of India and Pacific Basin Consortium. Various international and national researchers, students and national faculty attended the workshop. The CEH workshop was one of three pre-conference workshops scheduled during the PBC conference, along with the Health Impact Assessment and Scientific Writing Workshops. The CEH workshop was conducted on November 14, 2018 from 10 am-12 pm.

The technical experts who spoke during the workshops were:

Peter Sly, Director, Children's Health and Environment Program and Director, WHO Collaborating Centre for Children's Health and Environment (University of Queensland, Australia)

Topic: The vulnerability of children to environmental exposures.

Stephania Cormier, (University of Tennessee Health Sciences Center, USA)

Topic: Ambient and indoor air pollution

David Carpenter, (State University of New York)

Topic: Environmental contributions to neurodevelopmental and behavioural abnormalities.

Preet Dhillon, (Public Health Foundation of India)

Topic: Acute and chronic health effects of pesticide exposure

Information about WHO Travel Awardees

There were 15 post graduate students and early career researchers who were awarded a WHO travel grant. They came from state universities outside New Delhi. The awardees were post graduate students who were engaged in various environmental science and social science fields. Specifically, their fields of study were: environmental toxicology, psychology, demography, economics and population studies, international studies, and environmental science (modeling and measurement of pollution exposures). Their abstracts were accepted for oral and poster presentations. For some, it was their first time to attend an international conference.

We assigned student travel awardees to submit narrative evaluations of the Children's Environmental Health (CEH) Workshop on November 14, 2017. (Appendix 1: List of WHO Travel Awardees)

The organizers adapted the standardized WHO evaluation sheet for CEH workshops and included a few guiding questions for the narrative evaluation. Relevant statements from the participants' narrative evaluations are included in this summary report in quotes. The narrative evaluations are included in this report as part of Appendix 2: CEH Workshop Narrative Evaluations of WHO Travel Awardees.

Questions included in the CEH workshop evaluation form

1. What is your overall assessment of the event? (1 = insufficient to 5 = excellent)
2. In your opinion, was the format of the training, short introductions to the topics and extensive case studies, effective?
3. How do you think the workshop could have been made more effective?
4. Please comment on the organization of the event (1 = insufficient to 5= excellent)
5. What topics would you most like to learn about or discuss at future CEH workshops, including activities or initiatives you think would be useful for the future
6. Are there any India specific topics/scenario that may have been missed and should be included in the agenda?

Guiding questions used in the narrative evaluation

7. What knowledge gaps can you identify in your own field with regards to health impact of pollution on children?
8. Who are the stakeholders in your field (scholars, policymakers, scientists, professional organizations) who could be instrumental in disseminating the importance of children's environmental health?
9. What is your background and how will you use the learnings from this CEH workshop in the future? Did you find the information relevant? Which topics or aspects of the workshop did you find most interesting or useful? What knowledge and information were gained from participation at this event?

The participants found the workshop full of new concepts and enlightening content. Some had never previously considered the impact of environmental exposures on human health, specifically children's health. The content was interesting and generated curiosity for exploring the role of the environment in health outcomes, not only for children but in general. The participants gained valuable insights to foresee the possibilities of CEH as an independent discipline in coming years for research activities and programmes.

"The Children's Environmental Health (CEH) workshop was a surprisingly beneficial academic activity for me."

Recommendation: CEH workshops in smaller cities and Indian universities

More workshops in smaller cities and Indian universities was also recommended by participants. This is something to think about as most workshops tend to be *Delhi-centric* or occur in international meetings or workshops which target specific niches or groups of researchers. This may help in wider dissemination and reaching out to other disciplines.

Environmental issues of concern vary widely in different states or of relative priority to certain group of participants or scientific backgrounds.

Recommendation: Integrate more group and interactive discussions in addition to lectures.

The content and inclusion of case studies made comprehension much easier. However, participants recommended that a segment be allotted for the discussion of case studies in addition to the lecture. Including a *break out session* could help in bringing out richer discussions and encourage greater participation and sharing of ideas. Environmental issues could be discussed in the context of cultural biases/traditions which will also enrich the lectures.

They found the case study format as very effective in communicating new information. The participants appreciated learning from the experiences of researchers from other countries, and the problems of environmental pollution globally. Understanding how change was made possible, and research that changed policies in other countries was really important for our young researchers to hear.

However, some of the presentations were longer than necessary, and as a result reduced the time allotted for

“I liked the in-depth analysis of the topics by the speakers and appreciated cutting through the interdisciplinary themes. Speaker had substantial knowledge about the contemporary researches and displayed a precision towards explanation of complex topics. The way this workshop handled delicate issues of children, is highly commendable, inspirational and thought provoking. It provided me and other participants too, valuable insights to foresee the possibilities of CEH as an independent discipline in coming years for the research and development which is needed to be done in this area.”

Quality and content of lectures

“Overall, as a participant, I found the workshop well-structured, comprehensive, rich in content and useful for implementation in their respective countries. The workshop provided an excellent opportunity to learn from and exchange experiences with other countries. The workshop was highly in terms of content and methodology. It will be more beneficial if include additional topics and more group and interactive sessions in future workshops.”

discussion among the workshop participants and technical experts.

“Workshop has number of positive aspects both in the area of content and as well as logistics arrangements. The workshop was timely and very well organized. The presenters were good and committed. A lot of new knowledge was acquired and the opportunity to see the programme and to learn and share experiences with other countries was appreciable. Timely sessions, focus on the topic and discussions were the other positive aspects of the workshop. ”

“One of the presentations was too long and hence it didn’t succeed in delivering the message it wanted to convey, therefore the presenters need to be more specific and must aim at connecting the dots in the stipulated time.”

Recognizing cultural practices and biases

“India is one among the largest countries of the world hence workshops like these, in future could be more effective if cultural practices and biases could be discussed and analyzed individually too. I would consider it as a brilliant initiative that provided the participants valuable insights into the CEH. This workshop met its purpose as per my belief and knowledge about the topic.”

Interesting topics discussed during the workshop

- The vulnerability of children to environmental exposures (in-utero exposures, and perinatal health outcomes)
- Environmental contributions to neurodevelopmental and behavioral abnormalities.
- Acute and chronic ill effects of pesticide exposure and air pollution

Overall, the awardees found the topic of children’s susceptibility and vulnerability to environmental pollution (specifically air pollution and respiratory health effects) as most interesting followed by the information on uneven environmental health burden and resulting deaths in Asia compared to the rest of the world. Participants were keen to know more about pollution’s neurodevelopmental effects and its links to cognitive dysfunction.

Additional topics in future CEH workshops and relevant to Indian context

- Balance between development and environmental protection, and policy development specific to children’s environmental health
- Socio-economic status of children exposed to environmental pollution
- Women’s reproductive and sexual health like HIV and RTI, and effect of environment on women’s and child’s health (mental and reproductive health)
- Water pollution (ex. Ganga river)
- Solutions suited to the Indian situation
- Occupational exposures of children (ex. rag pickers)
- Dietary intake as consequence of environment, cropping season and effect on nutritional status
- Disposal of diapers and diarrhea incidence

Poverty and environmental health

“I feel that emphasizing upon the socio-economic status of the children included in the research study would yield better outcomes and might surprise too. The findings would thus contribute effectively to formulate better plans and make better policies ultimately.

Demographics could be considered to add new dimensions to the findings working upon the geographical dynamics”

Gaps: Prevention and awareness

“As I am from medical field I have seen doctors talk more on diseases and their treatment. Very less interest is given to prevention and awareness.”

Recommendation: Sensitive discussion on poverty and its role in increasing susceptibility and risk of exposure of children to pollution

Poverty and social inequities play a crucial role in mitigating risk and determining susceptibility of children to environmental risk. Discussing health effects of air, water or chemical pollution as biomedical scientists is just one approach to elucidate the harmful effects of a degraded environment. Nuanced discussion on the political economy of health and disease will enable more researchers to reflect on better policy interventions and pursue integrated solutions towards better health outcomes.

During the discussion, some participants did not believe that Indian air quality standards will ever reduce to reach recommended levels by the World Health Organization. Prof. Sly reiterated that it despite numerous challenges, we need to value the universal right of children to breathe clean air. Indian children are as deserving as other children in other countries to live in a clean environment.

Narrative Evaluation Highlights

Our awardees were mostly from non-health related fields. There were participants from environmental sciences and with technical laboratory experience in quantifying exposures to air, water, soil and industrial chemicals. We have included excerpts from the student’s narrative evaluations to highlight common themes and learnings from the CEH workshop.



Local-level data even though small numbers may be of importance in the next few years as we try to establish Indian specific data on pollution health impacts, especially on reproductive health as maternal and child health outcomes is a major priority of the Ministry of Health and Family Welfare. Human biomonitoring studies in India are not as widely distributed. It may be mainly conducted as small pilot studies by graduate students in environmental science departments. Through the conference, these students were able to meet each other and discuss common interests and methodologies. It was quite useful for the organizers to meet various students and their mentors as we start to conduct a landscape review of environmental scientists interested in the intersection of human health effects and quantification of environmental exposure.

“Yes, extracted information from delivered talk is absolutely relevant to my research work. In this conference, expert speakers from nearly all parts of the world confirmed, with their wide-ranging studies, that HBM [human biomonitoring] is a useful tool for detecting human exposure to industrial chemicals, as well as to natural substances. Collection of information from this conference on contribution of various unwanted pollutants in poor pregnancy suggests number of ideas for future planning regarding broadening in my research work.”

Students from the population sciences/demography became interested in the increasing burden of environment-related diseases and increases in health expenditure.

“The workshop has made me to look into deep to add up and link up my existing knowledge and research interest of demography with what I got to know through the workshop. These could be associated not only to children’s health but also for others in the population like increasing burden of diseases as a consequence of environment, increasing health expenditure due to environment diseases, environment and its role in accidental mortality outcome and even environmental health from gender’s point of view, environmental pollution and fertility outcomes.”

In addition, the importance to understanding child behavior in response to environmental stimuli gave new perspectives to some of the students.

“As psychology studies and analyzes behavior in all possible dimensions, I was able to relate to the workshop well for it was based on the environmental behavior of children, mainly concerning their health. I believe that a significant change in the social behavior can work wonders, provided it is

the change that is anticipated for good. The workshop made me understand the vulnerabilities to which children are exposed and provided insights for designing study frameworks as remedial measures to deal with those vulnerabilities.”

“David’s session was the most enriching part of the workshop for me personally as it was an intersection of public health with the discipline I come from. He provided me with better ideas and inspired everyone as per my belief. David explained how lead had become a major pollutant impacting the health and well-being of children. He explained the reasons and mechanisms of chemical contamination and how it had become the prime cause of cognitive malfunctioning further leading to behavioral disorders.”

“I am a neuroscientist working at the intersection of child neurodevelopment and environmental exposures. This workshop was extremely beneficial for me as it informed me about the latest ongoing research. The implication of prenatal and early childhood environmental exposures leading to exacerbation of inflammatory biomarkers emerged as a critical point of research. This also led to discussions about the community-led efforts that could be encouraged to bring down the extent and severity of exposures. Also, the policy level changes that would need to be made to help in the amelioration of disease were brought to the fore.”

The technical experts provided information that further highlighted the importance of women’s health in children’s environmental health outcomes.

“The Children’s Environmental Health workshop has given me to enhance exposure on some key issues related to my study area like women’s health, which is one of essential part of my thesis work. By attending this program, it has given information about new methods, techniques and tools which will be very useful for my studies and also in future. Workshop was helpful to include possible questions and issues which I could address in my thesis.”

Knowledge gaps in their field of study

- Lack of liaison between researchers and clinicians
- Paucity of evidence-based research in India. Lack of state-level data
- More focus is into curative care rather than preventive care
- Policymakers should be included in our discussions, presentations and conferences so that they take note of the importance of our environment
- All stakeholders of research uptake must be engaged
- Need of health camps and school awareness campaigns about health effects of pesticide exposure
- Lack of data in the field to conduct research studies, no integration of women’s health studies
- More research is needed in risk reduction methods

“The gap is mainly data driven. There are not sufficient data available to work in this field. Organizations or independent researchers funded by some institutions are mainly working in this field. Early researchers or student researchers have to face the problem.”

“There are knowledge gaps pertaining to children’s exposure to pollution through placenta and breastmilk. These gaps are even larger in countries like India. India has a large geographical area and each of its states have different health concerns. Data needs to be made available at a state level. Since children spend most of their time with their mothers, research needs to be done on mothers’ health in conjunction with CEH. However, other children live in adverse environments that are vastly different from those of generations ago. Comparative studies are needed to understand what works and what does not for different regions.”

“In terms of neurodevelopmental challenges and cognitive implications of environmental exposures, research needs to be strengthened, as well as the understanding of associations between exposures and outcomes needs to be emphasized on. Very little is known about the mechanisms leading to such neurodevelopmental issues such as PAH exposure due to air pollution (indoor and ambient) or pesticides leading to neurotoxicity or sanitation and hygiene challenges causing environmental enteropathy and frequent gut related infections which are being implicated in disorders such as Autism and ADHD. Another crucial area of research is the impact of E-waste and metal exposures on children’s neurodevelopment as a large number of children are involved in scavenging and segregation of E-waste. This a growing area of relevance and demands research.”

Stakeholders in their field who could be instrumental in disseminating the importance of children’s environmental health?

The awardees identified the same set of stakeholders who would be instrumental in advocating for children’s environmental health research. These stakeholders include NGOs, academia, medical professionals as well as public health professionals, intergovernmental organizations and the community. In addition, innovative approaches would require reaching out to technology partners.

“The stakeholders in the field of public health are policymakers, NGOs, Intergovernmental organisations (IGOs), academic researchers, medical professionals, public health professionals and community (adults and children). The policies formulated by policymakers have a significant effect on health of human beings. To improve the environmental health of children, policymakers can design policies that:

- promote environmental hygiene
- strengthen the environmental authorities
- encourage collaboration between academia, government and industry
- allot increased state and local government resources to raise awareness about the connection between children’s health and toxic exposures and toward prevention and protection

- promote and enforce regulations that decrease toxic chemical releases into the environment with particular consideration to children’s health
- develop standards for eco-friendliness in children’s products like toys”

“In our field, the scholars and scientists, policy makers are stakeholders, by direct and indirect methods they are generating qualitative and quantitative data related to exist problem such as poor pregnancy with help of their research work. Moreover, collaboration among disciplines and those at state and local agencies and community-based organizations those focus on improving pregnancy outcomes at national and international levels that will be beneficial for awareness in society.”

“As suggestions, important stakeholders in forwarding the field of children’s environmental health could be technology partners. Focus should be put on designing tools by which early assessment of childhood cognitive disability can be carried out. This could include gaming tools, the back-end data of which could help in identifying child developmental milestones. Other diagnostic modalities such as EEG, fNIRS etc could be used conveniently in community settings to provide information about structural and functional aspects of the brain. Also, behavioural batteries and tests, as per the gold standards (Bayley’s Scale of Infant Development), relevant to the Indian context would need to be designed and standardised.”

“Medical professionals are an important part of the curative medicine in CEH. While they treat children for their diseases resulting out of environment, they can also counsel or advise them for adopting preventive behaviour. Public health professionals come in the frame for encouraging preventive behaviour. This is done through social and behavioural changes. Public health professionals should target schools, slums, night shelters where children are the most vulnerable and educate them on environmental hazards. Children should be made aware of climate change and of the need to protect the environment. This should be done through audio-video medium to make it easier to understand.”

COMMUNITIES AS STAKEHOLDERS

“Another critical involvement would be of the communities themselves. They shall need to identify their environmental challenges and design strategies for mitigation of these harmful exposures in the most sustainable manner. Empowering community health volunteers and enabling them with relevant information would help in this process of information dissemination and overcoming environmental challenges, by the community.”

“The role of community cannot be emphasized enough. If the people of community come together for their children, they can make the environment a much better and safer place for children to be in. Sometimes, the teachings by community can be more effective than by any public health professional.”

Additional benefits of the conference attendance

Awardees benefitted from attending the conference in other ways apart from having the chance to present their work and improve their communication skills. For some, it was the first time to attend an international conference and meet with peers and senior researchers and discuss work conducted in other countries. They learned about various methods and approaches to improve their own work, and increased their confidence after receiving affirmation of the importance of their research. The PBC also arranged a networking event for students to speak and interact with other senior researchers and scholars on November 14, 2017.

“For the first, I was attending any workshop whether national or international. Apart from the presentation materials, the comments and discussions, way of presenting and compiling the theme based materials were quite interesting for me. It has given me a chance to improve me as a presenter, researcher. Especially the personal interaction with other researcher was good experience. Lastly, I feel that attending this workshop was a whole new and great experience that has enhanced my confidence and my research thinking”

“Most of the topic presented in workshop focus on the most alarming issues such as environment and its effect on child, which is one of the most critical contributors to the global toll of more than ten million child deaths annually as well as a very important factor in the health and well-being of children. As this topic is not relevant or I have not worked on child health issues, but the methods and techniques used in case studies presented in workshop will be definitely used in future.”

“This workshop program also provides me an opportunity to become a part of the global network that includes scholars and professionals across the world who dedicated towards enhancing health standard around the world. Moreover, the program helps me to find out appropriate policy relevant documentation in Indian context by acquiring diverse experiences form scholars and policy makers across the globe.”

“This is really a very wonderful experience for me to listen such well-known personalities during this conference, moreover I gather lots of imperative information about deleterious effect of pollutants on children’s heath at global level.”

“More such workshops must be organized and new collaborations could be considered by Public Health Foundation of India (PHFI) and Pacific Basic Consortium (PBC), involving younger adults and children in such workshops might yield better outcomes as per the anticipations. PHFI has done a commendable job by enticing the conference participants with such an enriching academic

activity, making the day more special than it actually was going to be. PHFI deserves great accolades for having organized a consortium of interdisciplinary intelligentsia; I express deep gratitude for offering me the opportunity to interact with likeminded professionals and academicians.”



Participants and attendees of the CEH workshop

List of WHO Travel Awardees for Pacific Basin Consortium Conference (Nov. 14-16, 2017; India Habitat Centre, New Delhi)

| No. | First Name | Last Name | Institution | City, country | Title | Student | Accepted | email |
|-----|-------------------|------------------------|--|------------------------------------|---|----------------------|--|--|
| 1 | Abhijit | Mathur | IIPH Gandhinagar | Gandhinagar, Gujarat, India | Community perspective on climate change in Rural Rajasthan (jointly with Padam Jain) | Student | Student poster | abhijit_mathur3@hotmail.com |
| 2 | Abhishek | Sharma | Institute for Population Sciences | Mumbai, India | Effect of persistent household poor sanitation on stunting: Evidence from Longitudinal study | Student | Student oral | 2n.abhishek@gmail.com |
| 3 | Faisal | Hassan | Aligarh Muslim University | Aligarh, India | Disorders in India and Emergent Needs of Evidence Based Policies for Public Health | Student | Student poster | faisal.hassan.rizvi@outlook.com |
| 4 | Laxmi | Singh | Ambedkar university | Agra, India | Assessment of lead and cadmium in placenta of Indian women and its association with birth weight | Student | Symposium 8: Developmental and Environmental Origins of Health and Disease | singhlaxmi028@gmail.com |
| 5 | Mackwin | D'Mello | Nitte University | Mangalore, India | Death rates attributable to environment: a comparative study between WHO-Searo and Central Africa countries | Early career faculty | Poster | mackwin_21@yahoo.co.in |
| 6 | Madhuri | Verma (c/o Lekh Verma) | Ravishankar Shukla University | Chhattisgarh 492010, India | Emission estimation of aromatic and halogenated VOCs from household solid fuel burning practices | Student | Student poster | shamshpervez@gmail.com |
| 7 | Mithlesh | Chourase | IIPS | Mumbai, India | Does Night Shelters make a difference in hygiene and sanitation practices among homeless women living in Delhi, India | Student | Student oral | mithlesh.1303@gmail.com |
| 8 | Iffath Zamani | Neha | Indian Institute of Public Health | Hyderabad | Detrimental Effects of Microplastics on Marine Life | Student | Student poster | neha.mph2016@iiph.org |
| 9 | Nidhi | Gupta | GSSDGS Khalsa College | Punjab, India | High Levels of HCH and its derivatives in blood of women in Punjab, India | Researcher | Poster | nidhigupta0508@gmail.com |
| 10 | Prachi | Dhole | Indian Institute of Public Health, Hyderabad | Hyderabad, India | Coal, Climate and The Public Health - A Global and National Issue | Student | Student poster | prachidhole19@gmail.com |
| 11 | Prashika Rajendra | Kurlikar | International Institute for | Mumbai, India | Does menstruation hygiene matter in the workplace? | Student | Symposium 16. Women's environmental health | prash.kurlikar@gmail.com |
| 12 | Priyanka | Agarwal | Ambedkar University | Agra, India | Determination of polycyclic aromatic hydrocarbons in placenta of North Indian women and its association with birth weight | Researcher | Poster | priyankagrwl960@gmail.com |
| 13 | Rakesh Kumar | Sahu | Pt. Ravishankar Shukla University, | Raipur, Chhattisgarh 492010, India | Spatial and temporal variation of atmospheric carbonaceous aerosols during a year-long measurement in Raipur, India | Student | Student oral | rikkusahu7@gmail.com |
| 14 | Shahina | Bano | Pt. Ravishankar Shukla University, | Raipur, Chhattisgarh 492010, India | Chemical source profiling for PM _{10-2.5} emissions from vehicular exhaust in India | Student | Student poster | vermamadhuri20@gmail.com |
| 15 | Sunila | Dixit | K S Hegde Medical | Mangalore, India | Climate change and its health risks on developing countries | Student | Student oral | sunila.dixit@gmail.com |

Appendix 1: List of WHO Travel Awardees