Asia-Pacific Children’s Health Symposium

8-9 November 2017, Taipei, Taiwan

Chang Yung-Fa Foundation International Convention Center
Table of Contents

Minister’s Welcome Message ........................................... 02
Preface ............................................................................... 04
About the Symposium ............................................................ 06
Agenda .................................................................................... 08
Speakers .............................................................................. 12
Minister’s Welcome Message

Today we enjoy all the various conveniences modern life has to offer but we also suffer from the pollution that comes with it. Given that low birth rates have become a universal phenomenon in many countries, finding ways to reduce the risk of children’s exposure to harmful substances and ensure their healthy development is a common challenge we all face and one that will allow human civilization to continue.

With the concerted efforts of our international partners, we are honored to invite experts and scholars from the U.S., Japan, Singapore, Korea, along with those from our environmental and health communities, to attend this symposium and share their years of research on environmental influences on children’s health. We hope that through mutual exchanges at this symposium we can formulate policies that adopt even more proactive measures against pollution to ensure children’s health.

Children represent the early-stage of the life and the future continuation of life. They also represent the future hopes of our nations. Therefore protection of children’s environmental health is a challenge we must all face together. As children’s environmental health is an interdisciplinary topic, we hope to promote cooperation between our industries, government and academia so that the results of academic research can be incorporated into government policy or actions and through a mechanism for inter-ministerial cooperation, we can reduce the effects of environmental pollution on children’s health. We also hope that through the International Environmental Partnership (IEP) we can expand international cooperation programs with even more nations and international organizations.

Minister Lee, Ying-Yuan
Environmental Protection Administration, Taiwan
Preface

The goal of the Asia-Pacific Children’s Health Symposium under International Environmental Partnership (IEP) is to raise awareness and the understanding of ‘Preventative Control’ among the public and the government in Taiwan. Taiwan has many children hospitals and hundreds of pediatricians whose jobs are to treat sick children. However, treatment is not the goal why we are here today. We are here to talk about what ‘preventative’ means, preventing children from getting sick.

People always ask me ‘What is Children’s Health Protection?’ ‘What does it protect?’ My answer is the following:

1) Never kiss your babies and children with your dirty and sick lips. To prevent spreading disease, never kiss your babies and children if you are sick. Even casual contact such as a kiss or a hug can transmit disease to a child through passing along the contamination through the mouth.

2) Another preventative method, is to take off your shoes before entering yours or someone else’s home.

Since 2009, Taipei Medical University (TMU) research team, including four scientists from the US Environmental Protection Agency (EPA), and one from the University of Arizona, and four scientists from TMU and National Taiwan University (NTU), found that American children ingest significantly more soil and dust than Taiwanese children at the same age. The higher soil and dust ingestion was linked to the practice that American families do not take off their shoes before entering their home and their pets are not properly cleaned as well. The study found that wearing shoes inside the home can carry a variety of contaminants, including fertilizers, pesticides, weed killers and in some cases, some heavy metals. These contaminants were found on the floors exposing babies and infants who often bring their hand to their mouth. Research results were published in 2017 in the Journal of Exposure Science and Environmental Epidemiology, titled Soil Ingestion Rates for Children under 3 years old in Taiwan.

The children’s Health Protection is striving to give all children the opportunity to live in sustainable environments with access to clean water to drink and clean air to breathe and to support generations by employing preventative control that will help minimize exposure to environmental hazards. With children’s health and the safety is always in my mind as a top priority for me and for the Children’s Health Protection.

Winston Dang, PhD, MPH, Chair Professor, Taipei Medical University

[Signature]
About the Symposium

Background
The International Environmental Partnership (IEP) was launched in 2014 by the Taiwan Environmental Protection Administration and US Environmental Protection Agency to address environmental and public health challenges that impact the environment and human health in Asia and around the globe. IEP programs are helping agencies across the Asia-Pacific address critical environmental challenges such as air pollution, contaminated sites, environmental literacy, and e-waste management.

Asia-Pacific Children’s Health Symposium
During the Asia-Pacific Children’s Health Symposium, experts from around the region will begin a conversation about how to link the public health, academic, and environmental communities of experts to develop robust strategies for intervention in Asia. Children are often more vulnerable to pollutants than adults because differences in behavior and biology may lead to greater exposure and/or unique windows of susceptibility during development.

- their bodily systems are still developing;
- they eat more, drink more, and breathe more in proportion to their body size; and
- their behavior can expose them more to chemicals and organisms.

Informing healthcare professionals, environmental and public health practitioners and other stakeholders about the link between environmental and public health is an essential step toward improving health in communities in Taiwan and elsewhere in the Asia-Pacific region. The first Asia-Pacific Children’s Health Symposium will help link researchers, the healthcare community, and policymakers with the aim of laying the groundwork for greater collaboration among these stakeholders in Asia.

The two main purposes are to: (1) increase knowledge of how early childhood exposures can affect children’s health and (2) facilitate networking among the healthcare community, environmental experts, policy makers, and other stakeholders in Asia. The first Symposium will be held November 8 & 9 in Taipei, Taiwan. The first day of the conference will focus on introducing global children’s health challenges and current trends. Day 2 will focus on linking policymakers, the healthcare experts, academic community and others. At the conference wrap-up, participants will exchange views on how organizations can institutionalize children’s health into environmental management programs addressing air pollution and other issues. The conference will highlight the importance of both the lifecycle approach to children’s health and highlight ongoing and new collaboration opportunities aimed at intervention, or making policy, to reduce the impacts of pollution on the health of children.
Agenda

Day 1
Conference Room 1101, Chang Yung-Fa Foundation International Convention Center
Wednesday, November 8, 2017

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
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<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Registration</td>
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<tr>
<td>9:30 a.m.</td>
<td>Host Remarks</td>
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<td><em>Minister Ying-Yuan Lee, Environmental Protection Administration, Taiwan</em></td>
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<tr>
<td>9:35 a.m.</td>
<td>Keynote Speech</td>
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<td><em>“Environmental Protection and Children’s Health in Taiwan”</em></td>
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<td><em>Taiwan Vice President Dr. Chien-Jen Chen</em></td>
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<td>10:00 a.m.</td>
<td>Distinguished Guests’ Remarks</td>
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<td><em>Acting Assistant Administrator Jane Nishida, Office of International and</em></td>
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<td><em>Tribal Affairs, United States Environmental Protection Agency, U.S.A.</em></td>
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<td><em>Deputy Director Robert Forden, American Institute in Taiwan, U.S.A.</em></td>
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<td><em>Dr. Winston Dang, Chair Professor, Taipei Medical University, Taiwan</em></td>
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<td><em>President Jiun-Horng Tsai, Institute of Environmental Engineering, Taiwan</em></td>
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<td>10:40 a.m.</td>
<td>Group Photo</td>
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<tr>
<td>10:40 a.m.</td>
<td>2017 Environmental Protection Technology Exhibition (Venue: B1)</td>
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<td><em>Opening Ceremony</em></td>
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<td>10:40 a.m.</td>
<td>2017 Environmental Protection Technology Exhibition</td>
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<td><em>Guided Tour (30 mins)</em></td>
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<td>12:00 p.m.</td>
<td>Luncheon</td>
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<tr>
<td>1:30 p.m.</td>
<td>Nine Months that Last a Lifetime</td>
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<td><em>Dr. Walter J. Rogan, National Institute of Environmental Health</em></td>
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<td><em>Sciences, National Institutes of Health, U.S.A.</em></td>
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<td>2:00 p.m.</td>
<td>Effective Interventions that Prevent Disease</td>
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<td><em>Dr. Ruth Etzel, Office of Children’s Health Protection, United</em></td>
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<td><em>States Environmental Protection Agency, U.S.A.</em></td>
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<td>2:30 p.m.</td>
<td>Panel Discussion - the Nexus between Children’s Health and the*</td>
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<td><em>Environment</em></td>
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<td><em>Panelists:</em></td>
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<td><em>Dr. Ruth Etzel, Office of Children’s Health Protection, United</em></td>
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<td><em>Dr. Winston Dang, Chair Professor, Taipei Medical University, Taiwan</em></td>
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<td><em>Dr. Chien-Tien Su, Taipei Medical University, Taiwan</em></td>
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<td>3:00 p.m.</td>
<td>Coffee Break</td>
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<td>3:20 p.m.</td>
<td>Overview of Child-Specific Exposure Factors in Taiwan</td>
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<td><em>Dr. Ling-Chu Chien, Taipei Medical University, Taiwan</em></td>
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<tr>
<td>3:50 p.m.</td>
<td>Soil Contamination: Human Health and Risk Management Decisions</td>
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<td><em>Dr. Karen D. Bradham, National Exposure Research Laboratory,</em></td>
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<td><em>United States Environmental Protection Agency, U.S.A.</em></td>
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<td>4:20 p.m.</td>
<td>Linking Exposure Science and Community-Engagement: Children’s Arsenic*</td>
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<td><em>Exposures near a Legacy Mine and Potential Health Impacts</em></td>
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<td><em>Dr. Paloma Beamer, University of Arizona, U.S.A.</em></td>
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<td>4:50 p.m.</td>
<td>Children’s Environmental Health Based on Birth Cohort Studies of Taiwan</td>
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<td><em>Dr. Pau-Chung Chen, National Taiwan University, Taiwan</em></td>
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# Agenda

**Day 2**  
Conference Room 1101, Chang Yung-Fa Foundation International Convention Center  
Thursday, November 9, 2017

<table>
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<tr>
<th>Time</th>
<th>Content</th>
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| **9:30 a.m.** | Effects of Air Pollution on the Health of Children: The GUSTO Cohort  
*Dr. Yap Seng Chong, Executive Director, Singapore Institute for Clinical Sciences, Agency for Science, Technology and Research, Singapore* |
| **10:00 a.m.** | Japan Environment and Children’s Study: What Can International Collaboration Bring to a Large-scale Birth Cohort Study  
*Dr. Shoji Nakayama, Exposure Dynamics Research Section, Center for Health and Environmental Risk Research, National Institute for Environmental Studies, Japan* |
| **10:30 a.m.** | Coffee Break                                                             |
| **11:00 a.m.** | Indoor Air Pollution and Child Health  
*Dr. Atsuko Araki, Center for Environmental and Health Science, Hokkaido University, Japan* |
| **11:30 a.m.** | Introduction of Korean Children’s Environmental Health Study  
*Dr. Suejin Kim, National Institute of Environmental Research, Ministry of Environment, Republic of Korea* |
| **12:00 p.m.** | Luncheon                                                                |

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**Session III**  
Collaboration and Research on Children’s Health in the Asia-Pacific Region  
Moderator: Dr. Pau-Chung Chen

**Session IV**  
Moving from Knowledge to Action / Interventions that Work  
Moderator: Dr. Walter J. Rogan

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<th>Time</th>
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| 1:30 p.m. | Proposed Strategy for Children’s Environmental Health  
*Dr. Yue Leon Guo, National Institute of Environmental Health Sciences, National Health Research Institutes, Taiwan*  
Coauthor:  
*Dr. Pin-Pin Lin, Dr. Shu-Li Wang* |
| 2:00 p.m. | On-going Activities and Progress for Children’s Environmental Health in the Republic of Korea  
*Dr. Kyunghee Choi, National Institute of Environmental Research, Ministry of Environment, Republic of Korea* |
| 2:30 p.m. | US EPA’s Office of Children’s Health and America’s Children and the Environment (ACE): What we do and How we work  
*Dr. Ruth Etzel, Office of Children’s Health Protection, United States Environmental Protection Agency, U.S.A.* |
| 3:00 p.m. | Coffee Break                                                            |
| 3:20 p.m. | Wrap-up Discussion  
**Stakeholders share views/suggestions on how to work together to contribute to the global conversation on children’s health and institutionalize children’s health programs at the policymaking level**  
Panelists:  
| 4:00 p.m. | Closing Remarks  
*Acting Assistant Administrator Jane Nishida, Office of International and Tribal Affairs, United States Environmental Protection Agency, U.S.A.*  
Minister Ying-Yuan Lee, Environmental Protection Administration, Taiwan |
KEYNOTE SPEECH

Environmental Protection and Children’s Health in Taiwan

presented by Dr. Chien-Jen Chen
Exposure of a fetus, infant, or young child to a toxic substance may produce different results than the same exposure to an adult, or even the same child at a different age. The result may also be delayed until the child is required to perform in school or in athletics. For these reasons and others, the natural way to determine whether toxic substances affect children is to follow them over time from a young age, documenting exposure and noting outcomes. Historically, this method was used to study frankly poisoned children. Starting (in the US) in the 1970s, however, cohorts of children were formed to study ambient levels of PCBs. Other such studies in the US and Europe followed; in the 1990s, NIEHS and EPA began funding the modern cohorts, looking at a broad range of exposures and outcomes. This led to the planning of a US National Children’s Study. It was abandoned, but consortium studies remain, and the national cohort approach has been successful elsewhere, notably Scandinavia and the UK. There are relatively young, exciting cohorts now in Asia. The field is still tiny, though, as an academic discipline, and will need special treatment if it is to mature and grow enough to meet the need for rational policy and clinical guidelines.
Environmental risk factors often act in concert, and their effects are exacerbated by adverse social and economic conditions, particularly poverty and malnutrition. There is new knowledge about the special susceptibility of children to environmental risks: action needs to be taken to allow them to grow up and develop in good health, and to contribute to economic and social development. Actions are needed to achieve healthier, safer and cleaner environments in the places where children live, learn, work and play. This requires using strategies that are available, building on existing programs and partnerships, translating research and knowledge into protective policies. It requires a focus on prevention, tackling the causes of disease at their environmental source. Preventive environmental interventions have proven to be effective in protecting children from adverse exposures, and provide a wealth of knowledge and experience from which we can build a strong foundation for informed and effective action, building on tools and mechanisms already available. Policies targeting protection of children can be a key component within packages of interventions that address health and environment problems in an integrated manner.

US EPA’s Office of Children’s Health and America’s Children and the Environment (ACE): What we do and How we work

presented by Dr. Ruth A. Etzel

Abstract

Children are more vulnerable than adults to environmental risks because of a number of factors. First, they are constantly growing. They breathe more air, consume more food, and drink more water than adults do, in proportion to their weight. Second, the central nervous, immune, reproductive, and digestive systems of a child are still developing. During certain critical windows of vulnerability, exposure to environmental toxicants can lead to irreversible damage. Third, children behave differently from adults and have different patterns of exposure to environmental hazards. Unlike adults, they may be both unaware of risks and unable to make choices to protect their health. Because of these unique vulnerabilities, children need special protection from environmental hazards. In recognition of these susceptibilities, in 1995 EPA released its Policy on Evaluating Risk to Children which directs the agency to explicitly and consistently take into account environmental risks to infants and children in all risk characterizations and public health standards set for the United States. In 1997, Executive Order 13045 was signed. The Executive Order required all federal agencies to assign a high priority to addressing health and safety risks to children. Soon thereafter in 1997, EPA established the Office of Children’s Health Protection to help the Agency implement Executive Order 13045 and EPA’s Policy on Evaluating Risk to Children and make the protection of children’s environmental health a fundamental goal of public health and environmental protection in the United States. The Office’s work is accomplished by providing leadership to identify critical Agency actions to protect children’s environmental health; collaborating with and supporting other EPA offices to ensure that children’s health protection is considered in Agency actions; building partnerships with Federal, state and tribal agencies and non-governmental organizations to expand and establish programs that improve the environments in which children live, learn and play, and communicating information to the public about steps that communities and individuals can take to protect children’s health.
Overview of Child-Specific Exposure Factors in Taiwan

presented by Dr. Ling-Chu Chien

Abstract

The presentation will provide an overview of a study of the exposure factors of Taiwanese children related to dietary and non-dietary exposure pathways. Next, we will provide a description of the study design and early findings from soil ingestion rate and adherence factor for children. This presentation will also cover the critical data needs and suggested field studies to improve the available information base on exposure factors for children living in Taiwan.
Soil Contamination: Human Health and Risk Management Decisions

presented by Dr. Karen D. Bradham

Abstract

Accurate assessment of human health risks from exposure to contaminated soils depends on estimating its bioavailability. U.S. Environmental Protection Agency (USEPA) guidance describes the need for development of soil bioavailability methods and data to improve the accuracy of human exposure and risk calculations at contaminated sites. Even small adjustments in soil bioavailability estimates can significantly affect estimated risk and cleanup goals, and methods are needed to provide inexpensive, accurate, and reliable data that can be applied to cleanups of contaminated sites. As part of our study, we validated the predictive capability of an in vitro bioaccessibility method using an independent set of contaminated soils. Validation of model performance using data independent to those used to construct the model is imperative for bioaccessibility data to be used routinely for incorporation into human health risk assessments. The in vivo-in vitro correlation and independent data validation presented provide critical verification necessary for regulatory acceptance in human health risk assessment.
Paloma Beamer

Associate Professor
Community, Environment & Policy Division, Mel and Enid Zuckerberg College of Public Health, University of Arizona, U.S.A.

Education
- B.S. Civil & Environmental Engineering, U.C. Berkeley
- M.S. Civil & Environmental Engineering, Stanford University
- Ph.D. Civil & Environmental Engineering, Stanford University
- Grad. Certificate Clinical & Translational Research, University of Arizona

Experience
- 2015– Associate Scientist, Asthma and Airways Disease Research Center
- 2014– Associate Professor, College of Public Health, University of Arizona
- 2014– Associate Professor, Bio5 Institute, University of Arizona
- 2014– Associate Professor, Chem. & Environ. Engineering, University of Arizona
- 2007-2014 Assistant Professor, College of Public Health, University of Arizona
- 2009-2014 Assistant Professor, Chem. & Environ. Engineering, University of Arizona

Expertise
Border Health, Disease Prevention, Environmental Health, Hispanic Health, Maternal and Child Health, Occupational Health, Public Health Interventions, and Rural Health

Honors
- 2015-2016 Public Voices Fellow, Women’s Foundation of Southern Arizona & the OpEd Project
- 2014 Emerging Investigator, Environmental Science: Processes & Impacts, Vol 16 (6)
- 2014 Tucson “40 under 40” Award
- 2012 Award for Excellence in Research, College of Public Health, University of Arizona
- 2011 2010 Scientific Technological Achievement Award, Level I, US EPA
- 2011-2016 Mentored Quantitative Research Development Award (K25), NHLBI/NIH
- 2004 Student Poster Competition, 1st Place, International Society of Exposure Analysis
- 2002-2004 Fellow, NIH Training Grant in Biotechnology (T32), Stanford University
- 2000-2002 Alfred Sloan Scholar, Stanford University
- 1995-2000 Regent Scholar, University of California, Berkeley

Linking Exposure Science and Community-Engagement: Children’s Arsenic Exposures near a Legacy Mine and Potential Health Impacts

presented by Dr. Paloma Beamer

Abstract

Across the arid Southwest, there are thousands of inactive and abandoned mines, with approximately 80,000 sites in Arizona alone. Mine tailings and smelter ash at these sites can be resuspended by wind and blown for hundreds of miles, and may be an important source of metal exposure in rural communities. Located in Northern Arizona, the Iron King Mine and Humboldt Smelter Superfund Site has soil concentrations of arsenic and lead reaching 12,000 and 10,400 mg/kg respectively. The goal of the Metals Exposure Study in Homes was to assess exposures and potential exposure pathways in children living within 5 miles of the Site. Children in this community have higher arsenic exposures than the general US population, and these exposures are associated with arsenic concentrations in their yard soil, house dust, and tap water. Children in this community did not have elevated lead exposures. Study results were reported to participants using a tailored community-engagement process. Given the importance of early-life arsenic exposures on long-term adverse health outcomes, more studies are needed to understand the contributions of multiple exposure pathways so that more targeted interventions can be designed specifically for children.
Children's Environmental Health Based on Birth Cohort Studies of Taiwan

presented by Dr. Pau-Chung Chen

Abstract

Environmental health among susceptible populations is widely recognized as a global public health issue of great importance, especially the role of prenatal and postnatal exposures to environmental and genetic factors in the etiology of adverse child health. We started to conduct Taiwan birth panel study to investigate prenatal and postnatal factors on infant and early childhood health. Through this prospective birth cohort, the main health outcomes focused on child growth and development, atopic diseases, and neurocognitive and language development. We investigated the main prenatal and postnatal factors including infection, herb use in pregnancy, breastfeeding, allergens and other pollutants such as environmental tobacco smoke, heavy metals, non-persistent pesticides, endocrine disrupting chemicals, and psychosocial stress under the consideration of interaction of the environment and genes. These studies bridge knowledge gaps and answer unsolved issues in the low-level, prenatal or postnatal, and multiple exposures, genetic effect modification, and the initiation and progression of “environmentally-related childhood diseases.” In addition, we play an active role in education, research, and services in the field of “pediatric environmental health” via integrating multi-disciplines.
 Effects of Air Pollution on the Health of Children: The GUSTO Cohort

presented by Dr. Yap Seng Chong

Abstract

The Growing Up in Singapore Towards healthy Outcomes (GUSTO) study recruited 1247 Chinese, Malay and Indian pregnant women aged 18 years and above, attending their first trimester antenatal dating ultrasound scan clinic at Singapore’s two major public maternity units between June 2009 and September 2010. Detailed interviews were conducted in the clinic at recruitment and at 26–28 weeks gestation. During infancy, the babies were examined at home at 3 weeks, 3 months and 3-monthly thereafter until 15 months of age. The children were then seen at the study clinic at 18 months onwards at 6-monthly intervals. The oldest child will be 8 years old in November 2017. The GUSTO study aims to define the developmental pathways and mechanisms of the origins of metabolic disease, and neurodevelopmental disorders that have major public health and economic importance in Asia and globally.

Over the past few years, haze due to forest fires in neighboring countries has blanketed Singapore for several months each year. Singapore was hit by the worst condition in 2013, when the PSI was at 401 and PM2.5 concentration reached 232-292 μg/m³. Other domestic sources such as vehicles and industries could contribute to pollution. In addition to that, the air quality can deteriorate during the Hungry Ghost Festival, which is celebrated by some Chinese in Singapore. During the festival month, large quantity of joss paper and incense are burn openly.

We obtained environmental pollutant data, including Pollutant Standards Index (PSI) levels and data on particulate matter with a diameter of less than 2.5 mm (PM2.5), from the National Environment Agency of Singapore (NEA). The effects of air pollution during each trimester of pregnancy on growth and adiposity, child health and allergy, and neurodevelopmental outcomes were examined.
**Shoji Nakayama**

**Section Head**
Center for Health and Environmental Risk Research, National Institute for Environmental Studies, Japan

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<tr>
<th>Education</th>
<th>Experience</th>
<th>Expertise</th>
<th>Honors</th>
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<tr>
<td>Board Certified Public Health Specialist 2017</td>
<td>2017–  Associate Editor, Journal of Exposure Science and Environmental Epidemiology</td>
<td>Public health, Environmental Health, Exposure Science</td>
<td>2013 US EPA Level III Scientific and Technological Achievement Awards (STAA)</td>
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**Japan Environment and Children’s Study: What Can International Collaboration Bring to a Large-scale Birth Cohort Study**

*presented by Dr. Shoji Nakayama*

**Abstract**

A number of epidemiologic studies have revealed the environment can affect children’s health and development. Exposure to specific chemical substances during foetal and early childhood may cause health problems in later life. Japan Environment and Children’s Study (JECS) started in 2011 is a nationwide longitudinal birth cohort study aiming to evaluate the effect of prenatal environmental exposures on children’s health. JECS especially focuses on chemical exposures. From January 2011 to March 2014, JECS registered over 103,000 pregnant women. Children born to those women will be followed until they reach 13 years of age.

For characterising children’s health and development, standardised questionnaires are mainly used in addition to medical record transcription and face-to-face interviews/examinations. Diagnosis and symptom information are collected mostly based on international standards.

As for environmental exposure measurements, JECS employs self-administered questionnaires, biomonitoring, environmental measurements and computer simulation models. Many of them are in-house developed since there are few standardised instruments and techniques available. For example, JECS has collected biological samples from mothers, fathers and children for the analyses of chemical exposure markers. To process tens of thousands of samples in one or two years, we have to develop new analytical methods using automated sample treatment techniques.

Even though JECS has over 100,000 subjects, it may not sufficient to evaluate the environmental effect on rare diseases such as cancers, congenital anomalies, child diabetes and sudden infant death syndrome (SIDS). When investigating the impact of multiple environmental factors all together, such as chemical mixtures, we need much bigger size of cohort studies. In order to achieve it, international collaboration is essential. Especially, harmonising measurements of health outcomes and exposure metrics is extremely important for pooled analyses of multiple cohort studies.

Introduced in this presentation are recent activities that are trying to harmonise exposure measurement tools among multiple projects.
Indoor Air Pollution and Child Health

presented by Dr. Atsuko Araki

Abstract

In modern days, people spend more than 90% of their time in indoors. Thus, the indoor air quality is important. We have conducted nationwide indoor air quality and inhabitants’ health study since 2001. We have measured aldehydes, VOCs, microbial VOCs (MVOCs), fungi, and mite allergens, semi-volatile organic compounds (SVOCs) including phthalates and phosphorus flame retardants (PFRs) in the air and dust. Urine samples were also collected to measure phthalate metabolites. We have also conducted questionnaires to examine inhabitants’ prevalence of Sick House Syndrome (SHS) and asthma and allergies. In this presentation, I will focus on phthalates and PFRs in house dust and urine and their association with children’s allergic symptoms. Levels of phthalates in floor dust had linear associations with the prevalence of allergic symptoms. Furthermore, clearer associations were seen in children compared to adults. The associations between prevalence of atopic dermatitis and the presence of TCIPP and TDCIPP, were found. Not like phthalate, studies of PFRs and their association with health is limited. For phthalates, the most detected compound is DEHP followed by DiNP, and their levels were higher in Japan than other countries in Europe and the USA. PVC wallpapers and sealing papers, which contained phthalates, are common in Japanese dwellings. For PFRs, the most detected compound was TBOEP. TBOEP is used in floor wax. Indoor materials could be major emitting sources of these chemicals. Correlations between phthalate concentrations in floor dust and their metabolites in children’s urine suggesting that floor dust is potential exposure source of phthalates. Our results suggested that children are more vulnerable to SVOCs exposure via house dust than adults.
Introduction of Korean Children’s Environmental Health Study

presented by Dr. Suejin Kim

Abstract

Since May 2015, it has launched the Korean Children’s Environmental Health Study (Ko-CHENS), the national birth cohort study. The object of Ko-CHENS is to develop the list of environmental hazardous factors for each stages of growth from fetus to adolescents. And another mission is to provide scientific evidences between hazardous chemicals and health outcomes. From the results of this study, it will provide the guidelines for environmentally healthy life.

Ko-CHENS is consisted of Main study, Core study and big-data study. It consists of the headquarters, the 13 regional centers and the research support center. The total study period is 22 years, and the pregnant women be recruited 65,000 pregnant women for the Main study and 5,000 pregnant women for the Core study. Biological samples such as blood, urine and cord blood are collected and hazardous chemicals and their metabolites are analyzed. Follow-up methods of the Core study include regular visit to regional center for physical and laboratory test and interview. On the other hand, in case of the Main study, the follow-up methods include mobile or on-line questionnaire and data link with National Registry data from National Health Insurance Service, Statistics Korea, etc.

It was recruited about 35,000 pregnant women until now, and is going to continue the recruitment by 2019. And it is necessary to develop an international collaboration network with other large scale birth cohort study for success and contribution of this study.
Fetuses and Children are among the most vulnerable populations to environmental challenges. In the past decades, a few important changes pertaining to children’s environmental health have emerged, including:

1. Measuring human biomarkers are becoming more relevant than measuring environmental media. Human biomarkers include internal doses or early detection of health effects. Among the goals of environmental protection, human health protection is probably most important. In addition, multiple exposure pathways are frequently found in humans, especially in children. Therefore, development of regulation and technologies to early detect human exposure and early markers of health outcomes are crucial.

2. Burden of diseases are shifted from traditional communicable diseases to non-communicable diseases, most of which are relevant to the environment. Emerging conditions such as obesity and allergies not only affect life quality of the children and family but also pose costly chronic diseases in their future lives, including diabetes, cardiovascular diseases (CVD), lung and kidney conditions, etc.

3. The importance of early intervention versus treating clinical diseases. Irreversible conditions such as central precocious puberty, short stature, autism spectrum disorders, and infertility have to be prevented by avoiding exposure to the causal agents.

To answer the above needs in protecting children’s environmental health, the following strategies are proposed:

1. “Environmental health act” to be established which addresses children’s environmental health.
2. Think-tank on human health to be established for the Environmental Protection Agency.
3. Studies on environmental burden of diseases, and causal relationship between environmental exposure and health to be conducted for children.
4. Disaster- or urgency-related research strategy to be formed (including IRB panel).
5. Exposure to environmental agents and modifiable causes of ailments to be monitored and controlled during in various fast developmental stages including prenatal, infant, childhood, early adolescent, and adolescent stages.
6. Prevention strategy for environmental impact on children health to be constantly updated and implemented.

International exchanges to be enhanced by research collaboration, long distance education, and data pooling and sharing.
On-going Activities and Progress for Children’s Environmental Health in the Republic of Korea
presented by Dr. Kyunghee Choi

Abstract

According to a recent WHO report, 5.9 million children under five years of age die every year worldwide, and up to 26% of the death could have been prevented by addressing environmental risks such as air pollution, water pollution and chemicals exposure. WHO has proposed the protection of children's health as a key policy goal in the field of environmental health for a long time, and actively encourages each country to adhere to it. Similarly recognizing the importance of children’s environmental health, the Korean government also has taken the lead in children’s environmental health research and policies with enormous efforts at national and regional level. As part of this, the Korean Environmental Health Survey has been conducted since 2009 by a nationwide monitoring. The results have been published as national statistics. In addition, a large-scale birth cohort study has been launched to monitor and track the path and extent of exposure and health impacts of environmental hazards from fetus to adolescents for 22 years (2015-2036). With regards to chemicals and its risk assessment, we have conducted the hazard and risk assessment of harmful substances contained in children’s goods and activity zones. As the WHO Collaborating Centre for Vulnerable Population and Environmental Health, we have actively established international cooperation with other countries and global organizations, which includes international symposiums, forums and training programs and collaborative research. To achieve the sustainable development goals, we will continue our cooperative works for improving children’s environmental health and creating a better environment for all through strengthening more robust research and cooperation at the national, regional and global level.
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