



STOP POLLUTING OUR CHILDREN'S FUTURE

UQ researchers are working at the intersection of science, education and policy to better understand and reduce pollution's impact on children's health.

The impact of pollution on health often goes unseen, particularly in developing countries. Children are one of the most vulnerable populations, at high risk to a range of health conditions and disease, which can result from exposure to pollution – toxic waste, air pollution, second-hand smoke, and contaminated water sources, which are lifelines in some communities.

Not only is there a gap in public awareness around the prevalence of pollution, there's also little funding for children's environmental health research or remediation of polluted sites.

Professor Peter Sly, Director of the Children's Health and Environment Program (CHEP) at UQ and Director of the World Health Organization (WHO) Collaborating Centre for Children's Health and Environment, is passionate about addressing this, through a holistic approach to environmental health research and policy reform.

The Centre was UQ's first WHO-collaborating centre – that is, an institution designated by WHO to carry out supporting activities for their programs – as part of WHO's network of centres for children's environmental health.

Professor Sly hopes to change the way Australian and international governments approach the health impact of pollution, particularly for children, and see funding for global environmental health planning, policy and reform prioritised as a result of research into the environmental exposure on children's health.

"When I arrived in Queensland, there was very little environmental health research activity, and very little in relation to children's health," Professor Sly says.

"Australians typically don't perceive Australia as having a pollution problem, but we do – just ask people living in Oakey."

– Professor Peter Sly

"If countries can plan for preventing pollution and exposure and work with development assistance agencies to implement programs that reduce pollution, we can build healthier environments in Australia and around the world that will result in healthier children – and I believe that by doing this, we can make a dent in preventing all chronic disease."

Why this focus on children?

Professor Sly, CHEP Coordinator Fiona Goldizen and the team advocate that by reducing childhood exposure to negative environmental factors, they can also lower children's risk of developing chronic diseases later-in-life, such as obesity, type two diabetes, cardiovascular disease, respiratory disease and neurodevelopmental disorders.

Pollution's contribution to these diseases is staggering. Pollution is the greatest environmental cause of disease and death in the world today, responsible for an estimated 9 million premature deaths, particularly in children.

Recent estimates published by WHO – in collaboration with CHEP – in the second edition of 'Inheriting a sustainable world: The atlas on children's health and the

environment', provide a comprehensive outline of the impact of the environment on children's health.

CHEP's research focuses on understanding early life mechanisms of disease and improving exposure assessment – the process of estimating or measuring the magnitude, frequency and duration of environmental exposures – in children.

"Conventional risk assessment models are based on either high-dose exposures in animals or occupational exposures in adults, with results then extrapolated down to children," Professor Sly says.

"This is completely invalid. A child's physiology is different to an adult's – in any given environment, they get a higher dose of whatever the contaminant might be, whether it be in the air, water, food or soil."

– Professor Sly

Conventional tests also aren't adequate for understanding the risk of disease for a population or an individual child.

"We're interested in ecological exposures – that's exposures to contaminated environments – which give population-level risk of disease," Professor Sly says.

"We look at individual environmental exposures as well, which give individual risk of chronic disease. We can then analyse the cellular and molecular mechanisms by which those exposures translate into disease outcomes."

It's also harder to obtain test samples from children, given that they are smaller than

conventional study subjects – and so are sample sizes – which creates technical difficulties during standard testing.

The CHEP team is finding novel ways to design, test and implement disease intervention strategies and exposure assessment methods in children.

“For example, one of our PhD students looked at optimising methods for measuring bisphenols – chemicals used to make plastics, which can readily cross the placenta and adversely affect the developing fetus – in children using small volume urine samples.”

“We’re now using her measuring method in one of our cohort studies, which looks at neurodevelopmental outcomes in children based on levels of plastics and plasticizers in mothers during pregnancy.”

Other CHEP studies are looking at alternative ways to more accurately test children – another student developed a new measuring technique for lipophilic pollutants in faeces instead of blood.

“This is much more effective than the current method using blood samples, as these are typically challenging to get from young children,” Professor Sly says.

Another major part of CHEP’s work aims to enhance global education and facilitate collaborations among scientists, students, regulatory bodies and policy makers who are working in environmental health reform, to increase their collective capacity to influence global policy and develop solutions.

“We don’t always need to reinvent the wheel when we are looking for solutions,” Fiona Goldizen says.

“Environmental health is a broad field, which beckons experts from many different backgrounds, so the CHEP team very deliberately engages in initiatives that bring together a mix of toxicologists, epidemiologists and those focused on health and environmental outcomes, with clinicians, lawyers, policy makers, engineers, and intervention and community engagement specialists.

“Together, this global community of researchers can share and reappropriate ideas from areas already dealing with a certain problem, to address their own.”

- Fiona Goldizen

In 2015, the team helped to deliver capacity-building workshops in Delhi, India, in collaboration with the Public Health Foundation of India (PHFI), which were a catalyst for PHFI to open the Centre for Environmental Health. The centre aims

to promote policy-relevant research, and advocate for communication, education and training programs around environmental health in India.

They also helped to deliver the 16th International Conference of the Pacific Basin Consortium for Environment and Health Conference in Depok, Indonesia, which led to the University of Indonesia and Fiji National University developing a joint Masters of Environmental Health program to educate future students in best-practice for global environmental health reform.

In 2017, CHEP and PHFI staff organised the 17th International Conference of the Pacific Basin Consortium, with the theme of Environmental Health and Sustainable Development, in Delhi, India. The Indian launch of the Lancet Commission on pollution and health, of which Professor Sly is a Commissioner, was held at the conference.

The Commission reveals the severity and underreported contribution of pollution on the global burden of disease and found that reducing pollution represents a key opportunity to save lives and grow economies – information that received wide media coverage and political interest in India and around the world.

Now, Professor Sly and his team have their sights set on leveraging the new measuring techniques and methods they’ve developed, in further longitudinal cohort studies, which will continue to focus on children and exposures in early life, including population-level risks from ecological exposure and individual-level risks from environmental exposures.

The Centre, which was renewed in October 2017 for a second four-year period as a WHO Collaborating Centre, is in the process of securing further grant funding around this initiative.

“Continuing research like CHEP’s and connecting and educating at the intersection between science, education and policy, will give us a real chance of slowing down the negative impacts of environmental exposure on health,” Professor Sly says.

“If we don’t continue this work, our health system is going to fail. We must change the emphasis from treating people with disease to preventing it.”

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(Image credit: iStock/Hung_Chung_Chih)

Progress to date:

2010: Professor Peter Sly receives research funding from UQ’s DVC (Research) to establish the Children’s Health and Environment Program (CHEP)

April 2012: CHEP assisted in organising the International Conference of the Pacific Basin Consortium for Environment and Health hosted by the Society for Environmental Geochemistry and Health in Gwangju, South Korea

September 2013: CHEP assisted in organising the 15th International Conference of the Pacific Basin Consortium for Environment and Health hosted by the East-West Center in Honolulu, Hawaii

October 2013: CHEP designated by WHO as UQ’s first Collaborating Centre for a four-year-period

2014: Development of the Network of WHO Collaborating Centres for Children’s Environmental Health

November 2015: Capacity building workshops held in Delhi, India, hosted by CHEP and the Public Health Foundation of India

August 2015: CHEP assisted in organising the 16th International Conference of the Pacific Basin Consortium for Environment and Health hosted by the University of Indonesia in Depok, Indonesia

May 2016: Centre for Environmental Health is opened in Gurgaon, India (CHEP is a partner)

March 2017: WHO publishes second edition of Inheriting a sustainable world: atlas on children’s health and the environment, which CHEP contributed to

October 2017: CHEP re-designated as a WHO Collaborating Centre for Children’s Health and environment for another four-year-period with plans for greater collaboration with the WHO Western Pacific Region and research in the Pacific Islands

19 October 2017: Launch of the Lancet Commission on Pollution and Health

November 2017: 17th International Conference of the Pacific Basin Consortium for Environment and Health held in Delhi, India, co-hosted by PHFI

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