

Persistent Environmental Toxicants in Breast Milk and Infant Growth

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Background: Many environmental toxicants are passed to infants through breast milk, and exposure to toxicants during the perinatal period can alter growth patterns, impairing growth or increasing obesity risk. Most previous studies have evaluated toxicant levels in maternal serum or cord blood, whereas breast milk is a better measure of postnatal exposure. Further, previous studies have focused on only a few toxicants at a time. We explored levels of 27 toxicants in breast milk and their association with rapid infant growth, a marker for later obesity.

Methods: We utilized the Norwegian HUMIS cohort, a multi-center cohort of 2,606 mothers and newborns enrolled between 2002–2006. Milk samples from a subset of women were analyzed for toxicants including persistent organic pollutants, heavy metals, and pesticides; overweight women were oversampled. Growth was defined as change in weight-for-age z-score between 0–6 months. We used a Bayesian variable selection method to determine exposures that most explained variation in outcome. These were included in adjusted logistic and linear regression models to determine associations with growth, controlling for appropriate confounders.

Findings: Of 789 infants, 19.2% displayed rapid growth. The median maternal age was 29.6 years (SD +/- 4.76), and the median pre-pregnancy BMI was 24.0 kg/m² (IQR 21.6, 27.5). 45.3% of mothers were overweight or obese. Rapid growers were more likely to be firstborn. Hexachlorobenzene (HCB), β-hexachlorocyclohexane (β-HCH), and polychlorinated biphenyl (PCB)-74 were most strongly associated with growth. Of these, β-HCH showed a significant inverse association with rapid growth, with an odds ratio of 0.87 (CI: 0.77 – 0.98, p = 0.025) and of 0.63 (CI: 0.42 – 0.94, p = 0.025) when adjusted for the inter-quartile range. We found a significant inverse relationship between increasing β-HCH exposure and growth as a continuous outcome with a β-coefficient of -0.0091 (CI: -0.016 – -0.0023, p = 0.009).

Interpretation: Exposure to β-HCH in breast milk is associated with a decreased odds of rapid growth and possibly stunting in this Norwegian cohort. Further research is warranted on the longer-term metabolic effects of perinatal β-HCH exposure.

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A Sustainable Departure: Examining Exit Strategies of a Multi-sector NGO in Zambia

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Background: Living and working alongside the people of Zambia in the summer of 2016, the author was exposed to the efforts,

struggles, and rewards of a sub-Saharan NGO endeavoring to make an impact in the region. In particular, he noticed the exit strategies as critical components of the international development agenda.

An exit refers to the complete withdrawal of all NGO resources from a target area. An Exit Strategy is a plan describing how the organization intends to withdraw while ensuring that the fruits of its labor do not suffer or deteriorate. Exit Strategies, when planned carefully and deliberately can result in continued community involvement and ensure sustainable program outcomes [1].

Yet the topic of Exit Strategy continues to confound and elude development and aid practitioners alike. To date, little has been written on Exit Strategies, specifically as to methods that work. International NGOs can stand to learn tremendously on how to ensure their aid and efforts remain upon their withdrawal from the communities they serve. In the dynamic context of sub-Saharan Africa, the mere mention of ‘an exit’ when discussing food and water programming can cause panic among communities, NGO staff, government and other stakeholders.

Methods: Therefore, this paper focuses on the various exit strategies employed by World Vision in Zambia. Their methods are examined analytically and presented as a case study in order to promote a greater understanding of exit strategies. The goal of this investigation is to offer insight into an aspect of organizational planning critical to nearly all foreign aid projects.

Findings: World Vision Zambia employs a comprehensive and practical approach to Exit Strategy in Zambia. Its strengths lie in its inclusiveness and multidimensional scope. However, it stands to benefit from earlier implementation and retroactive validation.

Interpretation: As a result, the author would recommend assessment of transitioning potential of activities and PMCs throughout lifetime of ADPs as well as some method of following CBOs down the line after withdrawing to properly ensure transition.

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The Water Use of Diets in India

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Background: India’s fresh water use is dominated by agriculture, but diminishing groundwater supply and potential changes to rainfall threaten future food production. Quantifying the water use of food can inform policy makers and help plan for future water scenarios. This includes investigating water use of food types, diets and differences between socio-demographic groups. This research aims to provide an initial insight into the water use of diets in India using the water footprint (WF) assessment method.

Methods: Dietary data from the Indian Migration Study were linked to state level WF data in India to quantify the water use of diets. Variations in the WFs of food items were explored, and

associations between diet's blue WF (i.e. irrigation) and socio-demographic characteristics were assessed.

Findings: The food items with the highest blue WF (per tonne) in India are nuts and seeds, vegetable oils and meat products, whereas the foods with the lowest blue WF in India are mostly fruits and vegetables. However, there are wide spatial variations in the food and animal product WFs. The average total WF of diets was roughly 20% blue WF, and the rest consisting of green water consumption (i.e. rainfall). Wheat is the highest contributor to the average dietary blue WF, followed by rice. The dietary blue water footprint was associated with a number of factors, with region being the greatest predictor of dietary blue WF. Blue WFs of diets of was highest in northern participants and lowest in southern, largely due to greater wheat consumption in the north. The WF of urban diets was greater than that of rural diets, even after adjusting for total calories. Higher standard of living was also associated with more blue water demanding diets, in both calories and composition.

Interpretation: The WF of diets in India varies between social and geographical groups. Further study should consider local impact by combining WFs with data on water availability and scarcity. Optimisation techniques can be used to establish trade-offs and co-benefits for sustainable diet recommendations.

Source of Funding: This study forms part of the Sustainable and Healthy Diets in India (SAHDI) project supported by the Wellcome Trust Our Planet, Our Health programme (Grant number 103932).

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A Novel Approach to One Health Education and Collaboration across Academic Institutions and the Public/Private Sector

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Program/Project Purpose: The interinstitutional One Health course introduces the concept of One Health as an important approach to a holistic understanding of the prevention of disease and the maintenance of human, animal and environmental health.

The goal of the course is to create a platform that brings together students, faculty and professionals from varied disciplines, whilst fostering transdisciplinary discussion and out of the box thinking to address health at the human, animal and environmental interface. The overriding focus of the course includes the bi-directional impact of animal health on human health, environmental impacts on the health of animals and people, and the mutual benefits of comparative medicine.

Course objectives include: (1) understanding how different disciplines contribute to the discipline of One Health, (2) creatively designing interdisciplinary interventions to improve local/global health using a One Health model, and (3) establishing one health relevant networks among professionals in North Carolina and beyond.

Structure/Method/Design: The One Health course is cross-listed at three academic institutions namely: Duke University, UNC Chapel Hill and North Carolina State University. The inter-institutional course includes a weekly multi-campus discussion-based seminar and networking sessions (for students, faculty and professionals), held off-site at the private non-profit North Carolina Biotechnology Center (NC Biotech), followed by a weekly student-centered but instructor guided, focused discussion via video conferencing from each of the three participating campuses. Partnership with NC Biotech ensures diverse high quality professional engagement whilst providing a neutral platform for collaborative discussions and networking. Expert professional speakers are selected from across North Carolina, the United States and internationally.

Outcome & Evaluation: Course evaluations demonstrate an increased interest for one health education amongst students in addition to the growing desire for practical one health engagement opportunities. Students mention a revolutionized perspective towards health and their long-term academic, career and professional choices. Others incorporate in their course work holistic approaches to health, whilst others upon graduation, have enrolled in graduate level institutions offering certification or degrees in one health.

Going Forward: Increasing intra and inter university dialogue for one health education approaches in curricular design, training and service opportunities. Increasing student opportunities for practical engagement in one health oriented programs. Increasing dialogue for one health education and systems thinking approaches.

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GEOHealth - The Caribbean Consortium for Research in Environmental and Occupational Health: Environmental Health Science Research Training in Suriname

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Program/Project Purpose: Suriname and other Caribbean Region countries suffer a triple public health burden: high perinatal mortality, environmental contamination, and a lack of environmental policies. *The Caribbean Consortium for Research in Environmental and Occupational Health* (CCREOH) is designed to examine the impact of exposures to neurotoxicants on maternal and child health and increase research capability. Tulane University (TU), the Academic Hospital Paramaribo Scientific Research Center Suriname and Anton de Kom University of Suriname (AdeKUS) are collaborating to strengthen global environmental and occupational health (EOH) research capacity specifically in Suriname and the Caribbean Region.

Structure/Method/Design: CCREOH features a portfolio of short-, intermediate – and long-term training. CCREOH has as