

The importance of Developmental Origins of Health and Disease research for Africa

In November 2015, the 9th World Congress of Developmental Origins of Health and Disease (DOHaD) took place in Cape Town, the first time the congress was held in Africa. DOHaD research has substantial implications for all transitioning societies and for global health policy. With support from the South African DST-NRF Centre of Excellence in Human Development based at the University of the Witwatersrand, a series of papers were assembled to highlight the relevance and importance of DOHaD research in Africa.

Africa is undergoing dramatic demographic, nutrition and economic transitions. By 2010, the population of Africa had hit the one billion mark, and in 2013, it was estimated that Africa had a population of over 1.1 billion people.¹ Sub-Saharan Africa is the only continent where the adolescent and youth populations are increasing.² This ‘youth bulge’ is often quoted as the population change that could lead to a demographic dividend of accelerated economic growth as youth enter labour markets and become consumers.³ The United Nations Development Programme, Regional Bureau for Africa reported that between 1990 and 2010 the gross domestic product per capita of Sub-Saharan African countries increased on average by 4%, which was greater than the global average for that period.⁴

Unfortunately, persisting and possibly widening inequality ensures that not all segments of the African population, in particular the most vulnerable, benefit equally from economic growth. Stunting in under-5-year-old children remains high and has not decreased as expected in line with concomitant improvements in economic development over the past decade. Also of concern is the association between increasing economic progress across Africa and rising child and adult obesity, especially amongst females. More and more African countries are now afflicted with the double burden of malnutrition (undernutrition and obesity),⁵ which occurs against a backdrop of infectious diseases such as HIV and malaria. All of these sum up to burdens that significantly impact the health of men and women, maternal health during pregnancy, and child survival, health and development. Together, they increase the risk for poorer human capital and metabolic disease outcomes across generations. For example, in this issue, Moore, using decades of detailed population data in rural Gambia against a backdrop of a pronounced annual seasonal patterns, argues that communicable disease risk may also have origins during the early-life period and that this may be epigenetically programmed. The paper by Musa *et al.* presents data from an urban African population, demonstrating that excessive weight gain during infancy and early childhood, independent of linear growth, are related to late adolescent fat mass and greater adiposity.

In the review conducted by Wrottesley *et al.*, they found that macro- and micro-nutrient supplementation in African studies during pregnancy were associated with increased gestational weight gain and birth weight, and reduced mortality risk. The review revealed the lack of longitudinal African data with detailed maternal nutritional status during pregnancy and follow-up data on the infant beyond birth. Drawing on data from the longest running birth cohort study in Africa (Birth to Twenty Plus, Soweto, South Africa), Casale and Desmond show that stunting peaked by age 2 years, and children who demonstrated recovery from stunting by 5 years of age still performed significantly worse on cognitive tests than children who do not experience early malnutrition, and almost as poorly as children who had remained stunted. This analysis highlights the persisting effects of poor nutrition during the first 1000 days. Improved breastfeeding would reduce stunting and improve child development.^{6,7} In the paper by Kimani-Murage *et al.*, trial data from the urban slums of Nairobi in Kenya suggests that strategies using community health workers are able to significantly increase exclusive breastfeeding among lactating mothers.

In Mitchell *et al.*'s paper, research from rural KwaZulu-Natal in South Africa illustrates that girls of mothers living with HIV are two times more likely to repeat grades in school. Ford and Stein, in their paper, cite the sobering fact that over 200 million children worldwide fail to meet their development potential due to poverty and stunting.⁸ Using various data sources from 2000 to 2014, they conclude that each country faces specific challenges in addressing risk factors for poor child development, but universally there is a need to improve routine collection of high-quality, country-level indicators of child development to assess risk and track progress.

What this collection of papers and presentations at the 9th World Congress illustrate is that DOHaD has the power to ‘call to action’ a multi-disciplinary perspective to better understand and formulate solutions to improving maternal and child health in Africa, setting up healthier trajectories into adolescence and adulthood, and across generations.

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