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FOCAL POINT ON EARLY HEALTH INTERVENTIONS

PRODUCED IN PARTNERSHIP WITH HOKKAIDO UNIVERSITY

THE LONG-TERM IMPACTS OF EARLY HEALTH

Tackling issues like low birth weight could help reduce the incidence later in life of diseases such as diabetes and cardiovascular disease. SO WHY ISN'T MORE BEING DONE?

There is compelling evidence that a child's environment during periods of developmental plasticity — including *in utero* —is a major risk factor for non-communicable disease in later life. Non-communicable diseases, including cancer, cardiovascular disease, chronic respiratory disease, and diabetes, also account for roughly 71% of mortality, globally. In the early 1990s University of Southampton researcher, David Barker, showed that a limited supply of nutrients resulted in permanent structural and metabolic changes in infants. Barker popularized the idea that this might lead to heart disease, diabetes and hypertension over time — a theory now supported by a slew of evidence — and he seeded a major field of research around the developmental origins of disease.

"Preventative strategies during fetal development and early childhood will undoubtedly be effective in reducing the long-term burden of disease," says Jeffrey Craig, a researcher who studies longitudinal epigenetic changes associated with early development at the Murdoch Children's Research Institute in Australia. "But we struggle with building funding models for widespread interventions, as usually the benefits only become evident decades later. By then we may not be tracking the data, and there are many other complex factors at play."

This sentiment echoes a 2019 essay by researchers at the Centers for Disease Control and Prevention in the United States, who asked why the use of preventive health services is still low in the United States. In interviews with healthcare experts, a recurring theme was the fact that financial incentives don't support preventative healthcare services. The focus is on treating disease, which, although more expensive to health providers and governments in the long run, is easier to justify, says essay co-author, Akaki Lekiachvili.

The respondents, he says, repeatedly stressed that metrics and data need to make the case for preventative strategies, particularly to 'payers', such as health insurers. "Although we're moving towards a system that assesses health value, the focus is still generally short-term," adds Lekiachvili. "Without making a strong case for long-term outcomes, they seem intangible to people who have to engage today."

Nutrition, and exposure to environmental chemicals, drugs, infections, or stress during prenatal development, can lead to functional changes in infant tissues, predisposing those tissues to diseases that manifest later in life.

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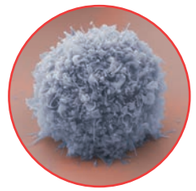
High birth weights might also have negative long-term outcomes. A number of studies have linked high birth weights to an increased risk of **DEVELOPING BREAST CANCER** later in life.



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Breastfeeding has been shown to **DECREASE THE RISK** of type 2 diabetes mellitus and obesity in childhood.

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THE CASE OF JAPAN'S UNDERWEIGHT BABIES

Japan has the second highest low birth-weight rate in the OECD (Organisation for Economic Co-operation and Development), a figure that has been trending in the wrong direction since the 1970s. Low birth weight, a surrogate marker of poor fetal growth and nutrition, is linked to coronary artery disease, hypertension, obesity, and insulin resistance in later life.

Despite the Japanese government expressing concern about the issue for more than a decade, nearly one in ten Japanese women still give birth to babies in the low weight range.

Underweight mothers are certainly a factor. While Japan has been one of the most successful countries in the world at tackling non-communicable diseases, boasting some of the world's lowest figures in premature deaths, its successes have not been replicated for underweight women. Despite incentives and education programmes, the number of underweight women in their 20s and 30s remained about the same between 2006 and 2013. In 2018, roughly one in five Japanese women in their 20s and 30s were considered underweight by body mass index. "Peer pressure and social media may have something to do with it," says Michiko Kido, who is from the Japanese Red Cross Medical Center, the second largest birthing centre in Tokyo. "But today women in their 20s and 30s are often also building careers, and then they are busy mothers. This is a hard group to reach without clear, targeted intervention and compelling evidence."

But early figures on a highly localized, and targeted programme in northern Japan have shown that appropriate interventions can quickly turn the numbers around. The pilot used data collection and education about pre-natal and post-natal diets to lower the percentage of low birth weight babies in one city by more than a third in five years.

Craig, who has put together a number of longitudinal research cohorts of mothers and babies, says mother-baby interventions are time intensive, but fruitful. "It would need to be a focused and co-ordinated effort, but we could be feeling the impact of this type of work for many generations to come."

The World Health Organization's Health 2020 framework for Europe, for example, has moved to focus on key life stages, including *in utero*. But to see a self-supporting system grow, investment is needed to reach mothers and build enough data to underpin ongoing financial support from both public and private sectors, says Craig. ■

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A LOW BIRTH WEIGHT followed by "catch up" growth is associated with increased visceral adiposity later in life, with one American study of almost 2,500 children pointing to marked increases as early as 5–11 years old.

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