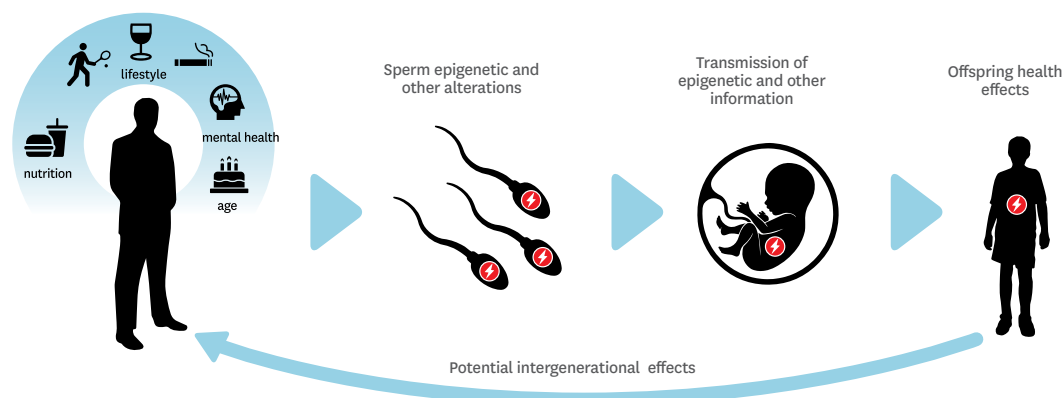


BEYOND GENES: HOW FATHERS PLAY A BIOLOGICAL ROLE IN THE HEALTH OF FUTURE GENERATIONS

Chloe Wilkinson, Dr Felicia Low and Sir Peter Gluckman

- Environmental conditions a person is exposed to before and in the first few years after birth affect health later in life. Although most of this research has focused on pregnant women, studies increasingly show that biological fathers may pass health and disease risks to their children via sperm.
- A man's diet and lifestyle or exposure to stress or chemicals may modify epigenetic markers contained inside sperm. These epigenetic markers can be passed down to children and affect their health.



- Positive health and lifestyle changes such as improved diet or mental health support may also affect sperm epigenetic changes. Additionally, because epigenetic markers can persist across generations, adjusting men's environmental exposures before they conceive a child could potentially interrupt multigenerational cycles of ill health.
- Men's health and lifestyle factors implicated in increased disease risk in their children include:
 - Physical health:** High paternal weight, type 2 diabetes and poor nutrition around the time of conception have been linked with obesity, heart disease and diabetes in children.
 - Mental health:** Depression, anxiety, bipolar disorder and post-traumatic stress disorder in fathers have been linked to worsened behaviours and emotions in their very young children and symptoms of psychiatric disorders in adulthood.
 - Age:** Older fathers are more likely to have children who are born prematurely or with low birth weight and are at increased risk of autism spectrum disorder and schizophrenia.
 - Alcohol, tobacco and drugs:** A man's exposure to alcohol, recreational drugs and smoking prior to conception is associated with birth defects and later behavioural problems in his child.
- These health and lifestyle behaviours are common among New Zealand men, placing a significant proportion of children at risk of poor health outcomes. We therefore recommend:
 1. Public health educational campaigns share information about the role fathers play in their children's health even before conception.
 2. Routine health and lifestyle advice for intending fathers goes beyond guidance for improving fertility.
 3. School learning programmes introduce the concept that a father's health before conception is important for the health of his future children.
- Population-wide approaches aimed at addressing the broader social determinants of health are critical to reinforce the effectiveness of educational strategies.
- Ingrained societal assumptions around women as the sole contributing parent to a child's early growth and development are clearly no longer valid. Wider awareness of the role both biological parents play is needed to help normalise shared responsibility for offspring health. Better integration of these concepts into practice is merited within our medical, education and policy communities.

To read the full evidence brief, visit informedfutures.org/fathers