The Guelph Family Health Study (GFHS) is a family-based study that is designed to help identify how early life exposures and lifestyle factors may contribute to disease outcomes later in life. The study includes families with young children, aged 2 to 5 years and aims to follow these families over the next several years, collecting data on dietary intake, blood samples, anthropometric measurements, activity levels and many other lifestyle and health factors.

### Research Findings

**Omega-3 and omega-6 consumption:**
- Consumption of ALA was low when compared to other populations.
- The recommended daily allowance for ALA (from plants) is 700-900mg from plant sources and 70-90 mg/day from EPA and DHA (from fish) for children aged 1-3.
- A growing body of research suggests that these amounts may be insufficient and that EPA plus DHA (combined) should make up 0.3% of daily energy consumption. This corresponds to 433mg of omega-3's from fish for children aged 1-3 years and 600mg in children aged 4-8 years (8,9).
- Children in this study may only be consuming enough omega-3's to meet one sixth of their needs.

**Blood omega-3 and omega-6 levels:**
- Children in the GFHS have very high blood levels of omega-6 fatty acids, when compared to omega-3 fatty acids.
- High omega-6 to omega-3 ratios may lead to chronic inflammation, which is known to lead to many metabolic disorders and cancers.
- Omega-6 fatty acids are thought to contribute to inflammation, while omega-3's may be anti-inflammatory, countering the potentially negative effects of omega-6's (10).
- The ratio seen in these children is likely reflective of a low intake of fish and seafood containing n-3 PUFA, which is typical of a Western diet.

**Blood omega-3 levels and BMI z-score:**
- While none of the children in this study are classified as overweight or obese, there was a correlation between the omega-3 fatty acid, ALA and BMI z-score.
- In adults, decreased BMI has been linked to omega-3 consumption though obesity prevention and treatment (8,9).
- Because high BMI, overweight, and obesity are major risk factors for metabolic diseases and cancer, elevating blood omega-3 levels in children may have implications for the attenuating obesity-related disease risk later in life.

### Conclusions

- This study analyzes dietary consumption and blood omega-3 and omega-6 levels of preschool aged children, contributing to the identification of potential modifiable biomarkers of cancer risk in early life.
- Children in the Guelph Family Health Study (GFHS) are not consuming enough omega-3 fatty acids from marine sources (EPA and DHA).
- Children are consuming significantly more omega-6 fatty acids than omega-3 fatty acids. These dietary patterns are reflected in the blood omega-6 and omega-3 levels of these children.
- Higher levels of ALA in the blood correlated to lower BMI z-score.

### Limitations

This study currently involves a small number of participants. However, the number of participants in this study is growing, allowing for a larger sample size for future analyses.