Co-leads Drs Patricia Parkin, Catherine Birken and Jonathon Maguire discuss their reasons for establishing TARGet Kids! and their hopes to improve the health of Canadian children

Could you explain why you developed The Applied Research Group for Kids (TARGet Kids!) programme?

Firstly, it is important to develop science that identifies the importance of early human development to lifelong health. Secondly, there is a unique opportunity to leverage the existing healthcare system. Children will be seen by a primary care practitioner (family physicians and paediatricians) multiple times during their first few years of life, enabling families to build trusted relationships with medical professionals. Thirdly, there are significant gaps in the data available for early childhood in Canada. The Canadian Health Measures Survey, which is intended to monitor the health of Canadians, excludes children under three years of age and has limited data on children aged three-to-five. Finally, TARGet Kids! will serve as a platform to conduct randomised controlled trials (RCTs) to better inform practices in primary care.

Could you explain the difficulties in maintaining funding for longitudinal study?

Most of our funding is obtained through peer-reviewed grant sources. Although we have been very successful in obtaining these grants, we need sustained funding to support our core infrastructure, including research personnel and sophisticated IT. We are grateful for funding provided by the Hospital for Sick Children Foundation and the St Michael’s Foundation, both in Toronto, Canada, and we are actively seeking opportunities to partner with governments and the private sector.

TARGet Kids! is the first network of its kind. How will it improve the health of Canada’s children?

TARGet Kids! can serve as a sentinel site surveillance platform, to provide rich data at a regional level regarding young children. These data cannot be obtained in any other way. They can also act as a longitudinal study to provide information about trajectories of healthy growth and development and the factors associated with unhealthy trajectories. Finally, TARGet Kids! will serve as a platform to conduct randomised controlled trials (RCTs) to better inform practices in primary care.

The goals of this study are to determine whether wintertime ‘high dose’ vitamin D supplementation of preschoolers can prevent colds and asthma attacks. We also aim to calculate how much money would be saved by the healthcare system and society if preschoolers were routinely supplemented with vitamin D during the winter. We believe that preschoolers receiving ‘high dose’ vitamin D supplementation during the wintertime will be less likely to suffer colds and asthma attacks, reducing their use of the medical system and the amount of time parents need to take off from work.

Ethical issues surrounding clinical trials on children used to be a barrier to developing treatments suitable for smaller bodies. Has this changed in recent years?

The ethical principles for conducting trials in children are now well established. To ensure health equity for individuals across the life course, it is important that children are included in research.

TARGet Kids! is also studying cardiometabolic risk (CMR) in children. Are CMR factors synonymous with obesity? What do you hope to find out?

The American Diabetes Association defines CMR as a construct that comprises a cluster of risk factors that are good indicators of a patient’s overall risk for Type 2 diabetes and cardiovascular disease (CVD). In adults these include: obesity, high blood glucose, physical
The beginnings of good health

A collaborative project coordinated by The Hospital for Sick Children and St Michael’s Hospital in Ontario, Canada, is advancing understanding of child health, particularly in the first five years of life. By conducting controlled trials and cohort studies, researchers hope to give children the best chance of a healthy and long life like this, it is not recommended by Canadian guidelines, primarily due to a lack of evidence regarding its effectiveness.

A PIONEERING RESEARCH PLATFORM

The TARGet Kids! research initiative is intelligent, resourceful and innovative. Children typically make seven or more primary care visits between birth and five years of age, making it the ideal setting to conduct research and test interventions, as Parkin explains: “Primary care doctors are in a unique position to identify children with health or developmental problems”.

By partnering with trusted primary care physicians, TARGet Kids! is able to gather data about healthy preschool-aged children (up to five years old) at their regular health surveillance visits. Height, weight and waist circumference are measured, and questionnaires are used to obtain information about lifestyle factors. A blood sample is also taken and the results of the comprehensive blood analysis are shared with community physicians, who would not previously have had access to such information. This novel arrangement enables physicians to detect and treat abnormalities earlier.

THE BENEFITS OF SCREENING

Previous studies have shown that children with late stage iron deficiency suffer serious developmental delays. These delays often persist into adulthood and can be accompanied by a decline in intelligence – making it imperative to identify iron deficiency as early as possible. However, early stage iron deficiency is difficult to detect, even by doctors, and a blood test is required to confirm diagnosis. Despite the clear benefits of screening in a situation...
INTELLIGENCE
TARGet Kids!

OBJECTIVES
• To build partnerships between child health researchers, community-based practitioners, public health researchers and practitioners, policy makers and families.
• To link early life exposures to lifelong health and risk factors, and to establish a community and practice-based primary healthcare network.
• To leverage Canada’s existing healthcare system and fill the gaps regarding the evidence-base for primary care practice.

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FUNDING
The Hospital for Sick Children Foundation • St. Michael’s Foundation • Canadian Institutes of Health Research.

It will establish whether high-dose vitamin D supplementation can prevent respiratory infection and asthma in preschool-aged children, two of the most common and expensive illnesses of early childhood. The outcomes of this trial could reduce population-wide illness and save the Canadian healthcare system huge sums of money.

Alongside this, the Health Outcomes from Low vitamin D In Toddlers (HOLD IT) study will follow a cohort of children for four years. Using well established study methodology, HOLD IT is the first large, prospective study to assess the relationship between vitamin D and common childhood ailments. This study will launch Canada as a leader in childhood vitamin D research, as Maguire explains: “Information from this study will assist parents, clinicians and policy makers in determining practice recommendations and health policy for Canadian children.”

THE OTHER SIDE OF THE STORY: OVER NUTRITION
As the obesity epidemic shows no sign of slowing down, over nutrition is perhaps the biggest health burden facing Canadian children. Obesity contributes to metabolic syndrome, which comprises a cluster of abnormalities including high blood pressure and insulin resistance. In adults, it has been linked to heart disease and more recently, its presence in adolescence has been shown to increase the risk of developing Type 2 diabetes. However, data are severely lacking for one group – preschool children.

The preschoolers at Risk-Obesity and Cardiometabolic Risk Factors: Towards Early Identification (PROMOTE) study will tackle this by characterising cardiometabolic factors in preschool-aged children. The researchers will use this information to better understand the relationship between these factors and obesity, as well as the influence of familial and lifestyle factors on these relationships. Using the established research network of TARGet Kids!, PROMOTE will recruit 1,500 healthy children over a three-year period. The children will be monitored into adolescence, enabling a comprehensive understanding of how these factors change over time. Birken explains: “Ultimately, our team hopes to identify key risk factors that will in turn enable directed early identification of metabolic syndrome and its associated conditions.”

Causes for concern
It is estimated that by the end of childhood, 40 per cent of Canadian children will be struggling with obesity, asthma or learning difficulties – problems which could plague them for the rest of their lives. TARGet! Kids will address these problems, using the following trials and longitudinal studies:

• OptEC: Iron is important for healthy brain development, but deficiency can be difficult to detect.

• DO IT and HOLD IT: Vitamin D levels are alarmingly low in almost 70 per cent of North American children over the age of one. Low vitamin D levels are associated with an increased risk of respiratory tract infection and asthma.

• PROMOTE: Healthy weight is important to prevent heart disease and diabetes in adulthood, yet over 25 per cent of preschool aged children in Canada are overweight or obese.

PLANS FOR EXPANSION
TARGet Kids! represents the largest cohort of children under six recruited from primary care in Canada. By co-leading the cohort, Parkin has made great strides towards increasing scientific understanding of health in the very earliest stages of childhood.Uniting routine primary care with data collection has led to high levels of patient recruitment and retention as Parkin expounds: “We have recruited 5,000 children. Of these, more than 3,000 (over 75 per cent) have agreed to at least one return visit - this demonstrates a very high level of commitment.”

A powerful mine of data has begun to be generated and as the cohort progresses, it will provide evidence to prevent some of the most frequent and damaging chronic illnesses of adulthood. The next step for TARGet Kids! is expanding the network to new geographical regions and new disorders of child development, including autism. Although there are challenges along the way, the biggest of which is obtaining the funding necessary to maintain the cohort, TARGet Kids! could become one of the largest child health studies in the world.

Preliminary results
Since the TARGet Kids! cohort was established in 2008:

• Over 5,000 children have been enrolled, with 75 per cent having at least one repeat visit.

• Blood samples have been collected from over half of participants.

• The prevalence of common early childhood nutritional disorders is consistent with existing Canadian data – suggesting the cohort is representative. Within the cohort:
  - 10 per cent of children are iron deficient.
  - 30 per cent have low vitamin D levels.
  - 25 per cent are overweight.