Towards a strong evidence base - considerations in early life

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How do we end childhood obesity?

Develop guidelines
Randomised trial to generate evidence to inform practice

Understanding potential mechanisms

The childhood obesity plan

Targeted initiatives
1. Childhood obesity health target – BNHC referrals
2. Access to nutrition and physical activity programmes for families eg, Active Families

Increased support
3. KiwiSport will have a greater focus on low participation groups
4. Guidance for weight management in children and young people
5. Guidance for healthy weight gain in pregnancy
6. Gestational diabetes guidelines
7. Referrals to GPs for pregnant women (at risk of gestational diabetes)

Broad population approaches
8. Health star rating promotion
9. Marketing and advertising to children
10. Partnership with industry
11. Information and resources for general public
12. Public awareness campaign
13. PlaySport
14. Physical activity guidelines for under fives
15. Sport in education programme expansion
16. Prime Minister’s Education Excellence Award
17. Teachers’ professional learning and development
18. ERO report on schools
19. Health promoting schools
20. Healthy Families NZ
21. DHB healthy food policies
22. Eating and activity guidelines (adults)
Why target early intervention?

LATER interventions to tackle obesity - less effective

Course of obesity-related conditions

Biological capital sets level of health at conception

HUMAN LIFECYCLE

Plasticity

Detrimental effects of lifestyle challenges
Why target early intervention?

- LATER interventions to tackle obesity - less effective
- COMPROMISED longevity and life-long health
- Biological capital sets level of health at conception
- Course of obesity-related conditions
- CHILD/ADOLESCENT: effective point to intervene
- Plasticity
- Detrimental effects of lifestyle challenges
Why target early intervention?

- **LATER interventions** to tackle obesity - less effective
- **COMPROMISED** longevity and life-long health
- **IMPROVED** longevity and life-long health

**Why target early intervention?**

- **Course of obesity-related conditions**
  - **MOTHER & INFANT:** biomarkers of risk
  - **CHILD/ ADOLESCENT:** effective point to intervene

**HUMAN LIFECYCLE**

- Biological capital sets level of health at conception
- Life course

**Plasticity**

**Detrimental effects of lifestyle challenges**

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**The University of Auckland**

**Liggins Institute**
Times of opportunity in early life

- Future mothers
  - women of child-bearing age
  - ideally well before pregnancy (adolescents)
- During pregnancy
  - limited evidence for effectiveness
- Infancy
  - breast-feeding
  - at-risk groups (e.g. 10% born preterm)
  - accelerated infant growth
- Weaning and post-weaning
  - unpredictable food supply / food insecurity
Pre-pregnancy and pregnancy

- Southampton Women’s Study:
  - majority of women’s nutritional intake not meeting recommendations
  - minimal change in diet when pregnant
  - applies even to women planning on becoming pregnant
- Institute of Medicine Guidelines for Gestational Weight Gain:
  - no data on long-term outcomes for the offspring
  - animal data suggest that altering plane of nutrition in early pregnancy increases risk of obesity in the offspring

![Graph showing change in nutritional plane](image)

Jaquiery *et al.* J Nutr Metab 2012

* P<0.05 vs control
2015: Commission on Ending Childhood Obesity:
As teenagers are the next generation of parents, the importance of health and nutrition literacy in the teenage years cannot be overestimated – indeed the school years and the mainstream curricula offer important opportunities for
Teenagers as the next generation of parents
Improving health literacy of future mothers

(A) The food a woman eats when she is pregnant affects the health of her baby

(B) The food a woman eats when she is pregnant affects the health of her baby when it is grown up

* p<0.05
** p<0.01
*** p<0.001
Infancy - at-risk populations

- Preterm birth affects ~10% of pregnancies world-wide
- Increasing evidence for long-term NCD risk following preterm birth, including obesity

- Even moderate-late preterm babies have a 2-fold increased risk of obesity by adolescence
  - account for ~14% of obese people

- Preterm babies have a 30% increased risk of diabetes by 25-35 years
  - account for ~9% of diabetics

- By the time preterm babies reach term, they have 185% the fat mass of babies born at term - WHY?

There is no high-quality evidence on nutritional support for preterm babies to optimise long-term health outcomes
Growth in the first four months and the trade-off between development and metabolic risk

- 20% decreased risk of IQ <85
- 27% increased risk of overweight / obesity per z-score weight change from birth to 4 months

Belfort J Pediatr 2013
Insulin AUC

*pdx1* epigenetic marks in the pancreas

Jaquiery et al
Pediatr Res 2016
Unpredictable nutrition / food insecurity

- Survey in 2015 in central North Island, New Zealand
- Mean age of child = 3.5 years
- Detailed food frequency questionnaire cross-checked with cellphone photos of meals

- Over a 12-month period:
  - 11% used food banks
  - 43% forced to buy cheaper food to pay for other essential items
  - 11% went without fruit and vegetables to pay for other essential items
  - ~40% experienced uncertainty relating to meal times

Six weeks of unpredictable food supply in growing post-weaning lambs results in impaired glucose tolerance
- average daily calorie intake identical in the two groups
Maternal perception of own and child’s weight

<table>
<thead>
<tr>
<th>MOTHER</th>
<th>Child</th>
<th>Adolescence</th>
<th>in 20s</th>
<th>Now</th>
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<tbody>
<tr>
<td>Overweight</td>
<td>9 %</td>
<td>15 %</td>
<td>28 %</td>
<td>55 %</td>
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<tr>
<td>Normal</td>
<td>80 %</td>
<td>78 %</td>
<td>65 %</td>
<td>43 %</td>
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<tr>
<td>Underweight</td>
<td>11 %</td>
<td>7 %</td>
<td>7</td>
<td>2 %</td>
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</table>

<table>
<thead>
<tr>
<th>HER CHILD</th>
<th>First Year</th>
<th>1-2 Years</th>
<th>Now (3.5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight</td>
<td>11 %</td>
<td>0 %</td>
<td>2 %</td>
</tr>
<tr>
<td>Normal</td>
<td>78 %</td>
<td>98 %</td>
<td>91 %</td>
</tr>
<tr>
<td>Underweight</td>
<td>9 %</td>
<td>2 %</td>
<td>14</td>
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</table>
Conclusions

• Guidelines used as part of a package may not have had childhood obesity as their focus

• Communicating information to families / children has to be culturally appropriate and empowering for behaviour change

• There may be target groups at increased risk where intervention may be of benefit
  - Preterm / LBW / SGA babies: almost an evidence-free zone

• Need more evidence on targeted approach - e.g. by sex; precision medicine

• Importance of feeding behaviour, not just nutritional intakes, needs further evidence