Winning hearts and minds: does the family view childhood obesity seriously enough?

Julian Hamilton-Shield
School of Clinical Sciences & NIHR Biomedical Research Unit in Nutrition
‘Less than 15% of the subjects shifted from quartile 4 to quartiles 1 and 2 from childhood to young adulthood.’
Type 2 diabetes
Cardiovascular disease
Depression
Gallstones and liver disease
Cancer (uterus, breast & colon and others)

Hypertension
Orthopaedic problems
Idiopathic intra-cranial hypertension
Sleep disorders
Kidney disease
Idiopathic intracranial hypertension
Sleep apnoea
Asthma
Type 2 diabetes
Joint dysfunction
Liver disease and transaminitis: 16%
Gallstones
20% cases
Deprivation

Source: National Child Measurement Programme
Ethnicity

![Bar chart showing obesity prevalence by ethnicity in boys and girls](chart)

*Source: National Child Measurement Programme*
Obesity risk for adulthood by parental and child obesity

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Subject Obese as a Child</th>
<th>No. of Obese Parents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes vs. No</td>
<td>1 vs. 0</td>
</tr>
<tr>
<td>1–2</td>
<td>1.3 (0.6–3.0)</td>
<td>3.2 (1.8–5.7)</td>
</tr>
<tr>
<td>3–5</td>
<td>4.7 (2.5–8.8)</td>
<td>3.0 (1.7–5.3)</td>
</tr>
<tr>
<td>6–9</td>
<td>8.8 (4.7–16.5)</td>
<td>2.6 (1.4–4.6)</td>
</tr>
<tr>
<td>10–14</td>
<td>22.3 (10.5–47.1)</td>
<td>2.2 (1.2–3.8)</td>
</tr>
<tr>
<td>15–17</td>
<td>17.5 (7.7–39.5)</td>
<td>2.2 (1.1–4.3)</td>
</tr>
</tbody>
</table>

*Young adulthood was defined as 21 to 29 years of age. The variables included in the model were childhood obesity status (obese or not obese) and the number of obese parents (0, 1, or 2). See the Methods section for an explanation of adjustments for siblings.
Eating until full and eating quickly are associated with being overweight in Japanese men and women, and these eating behaviours combined may have a substantial impact on being overweight. BMJ 2008;337:a2002

Although the direction of causality requires confirmation in longitudinal and randomized intervention studies, the results suggest that faster eating is associated with higher BMI in middle-aged women. J Am Diet Assoc. 2011;111:1192-1197.
Satiety Responsiveness/Slowness in Eating and Food Fussiness showed a graded negative association with weight.
Results: Twenty-two studies were eligible for inclusion. Evidence indicated that a slower eating rate was associated with lower energy intake in comparison to a faster eating rate (random-effects SMD: 0.45; 95% CI: 0.25, 0.65; \( P < 0.0001 \)). Subgroup analysis indicated that the effect was consistent regardless of the type of manipulation used to alter eating rate, although there was a large amount of heterogeneity between studies. There was no significant relation between eating rate and hunger at the end of the meal or up to 3.5 h later.

Conclusions: Evidence to date supports the notion that eating rate affects energy intake. Research is needed to identify effective interventions to reduce eating rate that can be adopted in everyday life to help limit excess consumption.
Eating behaviour and obesity

FTO gene rs9939609 obesity-risk allele
Sleep

Sedentary

Advertising
Clinic started in 1999

Referrals: Other specialties, regional and super regional (bariatric surgery consideration), general practitioners, social services
Monogenic obesity screening (~4-5% of clinic positive)

Dietician

6 months: Balance of Good Health
(less snacks, less sugary drinks, less energy dense foodstuffs)

6 months: Calorie restriction
(approx. 200 cal less than daily requirements for sex/age)

Psychologist

Activity specialist – recommends patient specific exercise programmes and runs group exercise sessions

Boxercise®
Lottery Funded

Physician/Nurse Specialist

Pharmacotherapy/surgery in non-responders at 12 months

Regular follow up and support (3 monthly) – maximum length 18 months
• 75% retention over one year in standard clinic
• 70% of children achieved reductions in BMI SDS
• Younger children do better
• Boys did better than girls
• Parental obesity had a negative impact of weight loss
• Socio-economic status did not appear to impact upon the child's level of success
Parents viewed primary care as an appropriate setting in which to treat childhood obesity but were reluctant to consult due to a fear of being blamed for their child’s weight and a concern about their child’s mental well-being.
Is healthy eating for obese children necessarily more costly for families?

Jonathan Banks, Jessica Williams, Tina Cumberlidge, Tânia Cimonetti, Deborah J Sharp and Julian PH Shield

- Chocolate spread with toast
- 1 pack ready made lasagne
- Cheesecake with cream
- ½ pint fruit squash
- Low fat butter with toast
- ½ pack lasagne + carrots + apple
- Fruit ice pop
- ½ pint no sugar fruit squash

Cost - daily meal

<table>
<thead>
<tr>
<th></th>
<th>Supermarket</th>
<th>Budget Supermarket</th>
<th>Local shops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing diary</td>
<td>£3.58</td>
<td>£2.71</td>
<td>£4.04</td>
</tr>
<tr>
<td>Healthy diary</td>
<td>£3.53</td>
<td>£2.95</td>
<td>£3.73</td>
</tr>
</tbody>
</table>

British Journal of General Practice, January 2012
Mandolean

- Small computer device to slow down eating
- Hypothesis is that patient develops greater awareness of satiety i.e. fullness so eats less and this becomes learned behaviour
- Patient gets set an eating speed line to follow which is reinforced by a vocal instruction from the device if eating too fast
- Eating speed gets altered to optimal level over a few weeks
Flow chart of RCT

ClinicalTrials.gov NCT00407420

Analysis of ‘last recorded BMI SDS’

<table>
<thead>
<tr>
<th>BMI SDS</th>
<th>Mandometer</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed 12m assessment (n=45)</td>
<td>Drop out before 12m (n=9)</td>
<td>Both groups combined (n=54)</td>
</tr>
<tr>
<td>Baseline</td>
<td>3.26 (0.55)</td>
<td>3.43 (0.40)</td>
</tr>
<tr>
<td>Last recorded</td>
<td>2.86 (0.72)</td>
<td>3.28 (0.63)</td>
</tr>
<tr>
<td>Mean change [95%CI]</td>
<td>0.40 [0.30 to 0.51]</td>
<td>0.15 [-0.07 to 0.36]</td>
</tr>
</tbody>
</table>

Baseline adjusted mean difference at 12m
0.27 [95%CI 0.14 to 0.41]; P<0.001 (Analysis of Covariance)
## Analysis of changes in eating behaviours

<table>
<thead>
<tr>
<th></th>
<th>Standard Care (n=23**)</th>
<th>Mandometer® (n=44)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Portion Size:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Baseline</td>
<td>310 (SD 128)</td>
<td>326 (SD 106)</td>
</tr>
<tr>
<td>At 12m</td>
<td>291 (SD 122)</td>
<td>280 (SD 76)</td>
</tr>
<tr>
<td><strong>Mean fall</strong></td>
<td>14 [95%CI -46 to 74]</td>
<td>45 [95%CI 7 to 84]</td>
</tr>
<tr>
<td>At 18m</td>
<td>308 (SD 109; n=22)</td>
<td>296 (SD 84; n=43)</td>
</tr>
<tr>
<td><strong>Mean fall from baseline</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 [95%CI -54 to 60; n=21]</td>
<td>31 [95%CI -2 to 64; n=43] ***</td>
</tr>
<tr>
<td><strong>Eating Speed:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grams/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Baseline</td>
<td>*29.3 (range 12.5-63.9)</td>
<td>*29.8 (range 13.4-90.4)</td>
</tr>
<tr>
<td>At 12m</td>
<td>30.6 (range 12.3-54.7)</td>
<td>26.4 (range 10.2-54.8)</td>
</tr>
<tr>
<td><strong>Mean ratio</strong></td>
<td>1.04 [95%CI 0.86 to 1.25]</td>
<td>0.89 [95%CI 0.77 to 1.02]</td>
</tr>
<tr>
<td><strong>Satiety at end of meal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arbitrary units (0-100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Baseline</td>
<td>65.4 (SD 20.3)</td>
<td>67.4 (SD 17.5)</td>
</tr>
<tr>
<td>At 12m</td>
<td>59.7 (SD 20.1)</td>
<td>62.2 (SD 19.4)</td>
</tr>
<tr>
<td><strong>Mean change</strong></td>
<td>-4.8 (95%CI -6.7 to 16.3)</td>
<td>-5.4 (95% CI -2.0 to 12.7)</td>
</tr>
<tr>
<td>At 18 months</td>
<td>60.4 (SD 21)</td>
<td>64.2 (SD 20)</td>
</tr>
<tr>
<td><strong>Mean Change from baseline</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-4.1 (CI -18.6 to 9.5)</td>
<td>-3.7 (CI -11.2 to 3.8)</td>
</tr>
</tbody>
</table>
Normalizing Eating Behavior Reduces Body Weight and Improves Gastrointestinal Hormonal Secretion in Obese Adolescents

J. Galhardo, L. P. Hunt, S. L. Lightman, M. A. Sabin, C. Bergh, P. Sodersten, and J. P. H. Shield
We know:

Extent of the problem

Co-morbidities are important

We and others have shown efficacy in hospital setting

Where is the problem?
Recruitment

Commando: Community Mandolean study

Julian Hamilton-Shield on behalf of Commando team

Aims

Primary aim
Determine if Mandolean therapy can be delivered in primary care by trained practice nurses in order to obtain a BMI SDS improvement at least 0.25 greater than standard care in obese children aged 5-11 years.

<table>
<thead>
<tr>
<th>Hubs</th>
<th>To date</th>
<th>Spokes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>March 2013</td>
<td>29</td>
</tr>
<tr>
<td>9</td>
<td>April 2013</td>
<td>41</td>
</tr>
</tbody>
</table>
General practitioner-initiated recruitment
Health-care professional-initiated recruitment
Recruitment through advertisements
Record screening in general practice and mass mail outs for suitable ages
Recruitment through schools (using school nursing staff)
I was too busy

I do not want my child to know they are overweight

Because my child is very sensitive and I don't want him to worry about this and get a complex. He is only a child.

All my life I have seen many doctors about my weight, now I have depression because of it. I don't want my son to have the same

Both of my children eat very health. My eldest was slightly heavy at a young age and at 9 she grew tall and is now at the 'light' end of the scale. This is now happening to me 2nd child who you class as 'overweight'

Doesn't eat many things, so what he does eat might be fattening for him. I have tried many things, can't handle him being sick with food.
A Randomized Controlled Trial to Improve Primary Care to Prevent and Manage Childhood Obesity: The High Five for Kids Study

Elsie M. Taveras, MD, MPH, Steven L. Gortmaker, PhD, [...], and Matthew W. Gillman, MD, SM
Table 2  Parental report of reasons for refusing to participate in the High Five for Kids Study

<table>
<thead>
<tr>
<th>Reasons for refusal to participate</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study will take too much time</td>
<td>196 (60)</td>
</tr>
<tr>
<td>Believe child does not have a weight problem</td>
<td>89 (27)</td>
</tr>
<tr>
<td>Things too difficult in the family at the moment</td>
<td>30 (9)</td>
</tr>
<tr>
<td>(e.g. illness, divorce, new baby, etc.)</td>
<td></td>
</tr>
<tr>
<td>Clinical site is too far</td>
<td>15 (5)</td>
</tr>
<tr>
<td>Concerns about harm or negative effects on child</td>
<td>11 (3)</td>
</tr>
<tr>
<td>Already involved in another research study</td>
<td>8 (2)</td>
</tr>
<tr>
<td>Pediatrician did not say child’s weight was a problem</td>
<td>7 (2)</td>
</tr>
<tr>
<td>Spouse’s decision</td>
<td>5 (2)</td>
</tr>
<tr>
<td>Lack of trust in research</td>
<td>3 (1)</td>
</tr>
<tr>
<td>Other or don’t know</td>
<td>38 (12)</td>
</tr>
</tbody>
</table>

Sample size = 329 participants who actively declined but completed a refusal interview.
Parents’ ability to identify when their child was overweight according to standard criteria was limited. Parents did not understand, use or trust clinical measures and used alternative approaches primarily reliant on extreme cases.

**Generational Shift in Parental Perceptions of Overweight Among School-Aged Children**

Andrew R. Hansen, Dustin T. Duncan, Yelena N. Tarasenko, Fei Yan and Jian Zhang

*Pediatrics*; originally published online August 25, 2014;
DOI: 10.1542/peds.2014-0012

**NHANES 1988-1994 compared to 2005-2010**

The probability of overweight/obese children being correctly perceived as overweight by the parents declined by 24% between surveys (probability ratio = 0.76 [95% confidence interval: 0.67–0.87]).
Retention

- Assessed for eligibility (n = 152)
  - Excluded (n = 76): Declined study (n = 45) Screened out (n = 31)
  - Allocated to primary care clinic (n = 45)
    - Entered study (n = 42)
      - Lost to follow-up (n = 13)
      - Analysed (n = 29) Includes 6 patients who withdrew from treatment and provided outcome measures
  - Allocated to BRHC CCOO clinic (n = 31)
    - Entered study (n = 26)
      - Lost to follow-up (n = 3)
      - Analysed (n = 23) Includes 7 patients who withdrew from treatment but provided outcome measures

55% retention  62% retention
Non engagers

- Felt GP had talked them into referral
- Non agreement in family caused friction
- Expectations not met – eg lack of drugs and/or counselling
- Some families wanted more structured advice
- Some families felt advice over ambitious
- Adolescents uncomfortable in clinics with younger children
Outcomes and costs of primary care surveillance and intervention for overweight or obese children: the LEAP 2 randomised controlled trial

*BMJ* 2009;339 doi: http://dx.doi.org/10.1136/bmj.b3308 (Published 03 September 2009)
Cite this as: *BMJ* 2009;339:b3308

- Primary care screening followed by brief counselling did not improve body mass index, physical activity, or nutrition in overweight or mildly obese 5-10 year olds, and the approach would be very costly if universally implemented

Shared care obesity management in 3-10 year old children: 12 month outcomes of HopSCOTCH randomised trial

*BMJ* 2013;346 doi: http://dx.doi.org/10.1136/bmj.f3092 (Published 10 June 2013)
Cite this as: *BMJ* 2013;346:f3092

- A 12 month, shared care obesity management programme for 3-10 year olds was feasible, not harmful, and acceptable to healthcare providers and families but did not improve children’s body mass index relative to untreated controls
Randomized Controlled Trial to Improve Primary Care to Prevent and Manage Childhood Obesity

The High Five for Kids Study

Elsie M. Taveras, MD, MPH; Steven L. Gortmaker, PhD; Katherine H. Hohman, MPH; Christine M. Horan, MPH; Ken P. Kleinman, ScD; Kathleen Mitchell, MD; Sarah Price, MPH; Lisa A. Prosser, PhD; Sheryl L. Rifas-Shiman, MPH; Matthew W. Gillman, MD, SM

Conclusion: After 1 year, the High Five for Kids intervention was effective in reducing television viewing but did not significantly reduce BMI.
zBMI reduced by mean 0.18 (s.e. = 0.0038, Po0.0001), self-esteem score increased by 3.53 U (s.e. = 0.13, Po0.0001) and psychological distress score decreased by 2.65 U (s.e. = 0.31, Po0.0001)
A decrease in BMI SDS of >0.25 (which is similar to a reduction of 1 kg/m² BMI or a stable weight over 1 year in a growing child) is associated with a reduction in cardiovascular risk factors, the risk of NAFLD, a decrease in androgen excess in individuals with polycystic ovary syndrome and an improvement in intima–media thickness.
Is BMI Alone a Sufficient Outcome To Evaluate Interventions for Child Obesity?

Maria Kolotourou, MSc,1 Duncan Radley, PhD,1 Paul Chadwick, DClinPsy,1 Lindsey Smith, PhD,1 Stavros Orfanos, BSc,1 Venediktos Kapetanakis, PhD,2 Atul Singhal, PhD,3 Tim J. Cole, PhD,4 and Paul M. Sacher, PhD1,3

North Somerset MEND: 64% total capacity
Ensure family-based, multi-component lifestyle weight management services for children and young people are available as part of a community-wide, multi-agency approach to promoting a healthy weight and preventing and managing obesity.

Ensure all lifestyle weight management programmes are designed and developed with input from a multidisciplinary team and have taken into account the views of children, young people and their families.

They should focus on: diet and healthy eating habits: physical activity. reducing the amount of time spent being sedentary, strategies for changing the behaviour of the child or young person and all close family members.

Develop a tailored plan to meet individual needs: cultural, socio-economic, assessment co-morbidities, self esteem

Encourage adherence to lifestyle weight management programmes: flexibility of timing, groups & individual sessions, locality based

Raise awareness of lifestyle weight management programmes: commissioners, health professionals, other professionals and voluntary organisations
Referrals to lifestyle weight management programmes should use BMI charts, use tact and diplomacy when addressing topic and importantly assess readiness for change.

Providing ongoing support once intervention ended monitoring participants and collecting data at 6 and 12 months on outcomes.

Ensure staff are trained to deliver the weight management programme they will be working on. Ensure the training has been developed with the input of, and is regularly reviewed by, a multi-disciplinary team of professionals.

Recommendation 15 Monitoring and evaluating programmes

Ensure monitoring focuses on sustaining changes in the longer term. Include the following in the data reported:
- numbers recruited, percentage completing the programme and percentage followed up at 6 months and at 1 year after completing the programme for all those recruited, BMI and BMI z score
- a) at recruitment to the programme
- b) at completion of the programme
- c) 6 months after completing the programme and
- d) 1 year after completing the programme.
Commissioners should evaluate the service using data on outcomes and the cost of promotion and delivery.

Commissioners should regularly review monitoring and evaluation data and use it to amend and improve the service.

Through contacting providers of multi-site schemes we were able to estimate that 314 to 375 local programmes were ongoing in England.

We identified evaluation as an area of concern for the majority of intervention models. What is described as 'evaluation' in many scheme reports might better be described as monitoring and the presentation of process data. Evaluations of effectiveness were often weak or, more usually, absent.

A database search for all interventions in children aged 5-11 years contains 11 interventions.
• 2 are reported as being in planning stage with latest submissions being at least 18 months ago.
• 6 are in progress reporting costs per patient/family of £550 to £1,451
• However, none report any outcome data despite the interventions having been in progress from 2008-2011.
Conclusions

Little evidence that community based, RCT, multi-component interventions work

The target group are very hard to reach, persuade as to importance and difficult to retain

For those electing to take part there is success for some families but interventions are expensive

Many interventions have been commissioned but very few have been evaluated formally or within RCTs
Primary prevention is better than cure

Increased support for the National Child Measurement Programme.
Improved investment in data-gathering IT programmes for weight management.
More training in mainnutrition and obesity for GPs and other health professionals.
Outreach projects to educate families about the dangers of obesity.
UK Congress on Obesity 2014

University of Birmingham, Edgbaston Campus
Tuesday 16th September and Wednesday 17th September 2014