Early Childhood Development and the Primary Prevention of Chronic Disease

Donna Ah Chee,
CEO
Central Australian Aboriginal Congress Aboriginal Corporation
The shape of things to come
<table>
<thead>
<tr>
<th>Main clinic</th>
<th>Alukura</th>
<th>Ingkintja</th>
<th>Children’s services</th>
<th>SEWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute care</td>
<td>Maternity Care</td>
<td>Clinical Services</td>
<td>Child Care</td>
<td>Community Wellbeing Program</td>
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<tr>
<td>Renal Program</td>
<td>Women’s Health</td>
<td>Men’s Shed</td>
<td>Healthy Kids Clinic</td>
<td>Youth Outreach Program</td>
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<tr>
<td>Hearing Program</td>
<td>Family Partnership Program</td>
<td>Violence Intervention Program</td>
<td>Child Health Services</td>
<td>Safe &amp; Sober Support Service</td>
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<tr>
<td>Chronic Disease Program</td>
<td>Congress Community Health Education Program</td>
<td>Preschool Readiness Program</td>
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<td>Targeted Family Support Service</td>
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<tr>
<td>Dentist</td>
<td>Transport</td>
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<td>Intensive Family Support Service</td>
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<tr>
<td>Communicable Disease</td>
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<td>Headspace (Youth Service)</td>
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<td>Allied Health</td>
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<td>Frail Aged and Disabled Program</td>
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<td>Transport</td>
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<td>Pharmacy</td>
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Congress Clients by Locality and Reporting Period

The chart shows the number of clients over different reporting periods from 2007 to 2013-14. The bars are divided into two sections: red for Health Service Area and blue for Visitors. The number of clients generally increases over time, with a significant increase from 2012-2013 onwards.
Early Childhood
For many obese adults, the die was cast by the time they were 5 years old. A major new study of more than 7,000 children has found that a third of children who were overweight in kindergarten were obese by eighth grade. And almost every child who was very obese remained that way.
A gradient of childhood self-control predicts health, wealth, and public safety

Terrie E. Moffitt\textsuperscript{a,b}, Louise Arseneault\textsuperscript{b}, Daniel Belsky\textsuperscript{a}, Nigel Dickson\textsuperscript{c}, Robert J. Hancox\textsuperscript{c}, Honalee Harrington\textsuperscript{a}, Renate Houts\textsuperscript{a}, Richie Poulton\textsuperscript{c}, Brent W. Roberts\textsuperscript{d}, Stephen Ross\textsuperscript{a}, Malcolm R. Sears\textsuperscript{e,f}, W. Murray Thomson\textsuperscript{g}, and Avshalom Caspi\textsuperscript{a,b,1}

\textsuperscript{a}Departments of Psychology and Neuroscience and Psychiatry and Behavioral Sciences, and Institute for Genome Sciences and Policy, Duke University, Durham, NC 27705; \textsuperscript{b}Social, Genetic, and Developmental Psychiatry Research Centre, Institute of Psychiatry, King’s College London, London SE5 8AF, United Kingdom; \textsuperscript{c}Dunedin Multidisciplinary Health and Development Research Unit, Department of Preventive and Social Medicine, School of Medicine, and \textsuperscript{d}Department of Oral Sciences and Orthodontics, School of Dentistry, University of Otago, Dunedin, New Zealand; \textsuperscript{e}Department of Psychology, University of Illinois, Urbana-Champaign, Champaign, IL 61820; \textsuperscript{f}Department of Medicine, McMaster University, Hamilton, ON, L8S4L8 Canada; and \textsuperscript{1}Firestone Institute for Respiratory Health, Hamilton, ON, Canada L8N 4A6

Followed a cohort of 1000 children from birth to age 32
96% retention, Dunedin, New Zealand
Healthy development
Child has experiences in early life that enable development of regulation. Child becomes less dependent of external figure (i.e., parent) to regular emotions and is able to manage challenges without emotional breakdown or physical outburst.

Unhealthy development
Child does not have experiences in early life that enable self-regulation in adulthood. Functioning is never developed to the extend that emotions and impulses can be managed. Individuals who do not have regulation display problems in later life such as alcohol abuse, mental health problems, impulse control that require control by external systems including legislation and agencies such as police and mental health services.
The Abecedarian Approach

- **Learning Games**: Teachers daily engage in short interactive sessions (adult/child interaction games) with individual children or very small groups (e.g., 2 children).
- **Conversational Reading**: Teachers use a 3S strategy to read a book individually every day to every child.
- **Language Priority**: Teachers use a 3N strategy to surround spontaneous events with adult language.
- **Enriched Caregiving**: Teachers encourage children to practice skills (e.g., cooperating, listening, counting, colour recognition) during care routines.

All 4 elements of the Abecedarian Approach are shared with parents through home visits and through carers in day care Centre's from 1 to 3 years.
### Abecedarian studies

<table>
<thead>
<tr>
<th>Randomized Controlled Trials</th>
<th>Location</th>
<th>Duration of Program</th>
<th>Type of Program</th>
<th>Oldest Age of follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abecedarian Study 1</td>
<td>Chapel Hill, NC</td>
<td>Birth to 5 years</td>
<td>Center + social work home visits</td>
<td>30 years</td>
</tr>
<tr>
<td>(The Abecedarian Project)</td>
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<tr>
<td>Abecedarian Study 2</td>
<td>Chapel Hill, NC</td>
<td>Birth to 5 years</td>
<td>Center + educational home visits</td>
<td>20 years</td>
</tr>
<tr>
<td>(CARE)</td>
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<tr>
<td>Abecedarian Study 3</td>
<td>Boston, MA</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
</tr>
<tr>
<td>Abecedarian Study 4</td>
<td>New Haven, CT</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
</tr>
<tr>
<td>Abecedarian Study 5</td>
<td>Bronx, NY</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
</tr>
<tr>
<td>Abecedarian Study 6</td>
<td>Philadelphia, PA</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
</tr>
<tr>
<td>Abecedarian Study 7</td>
<td>Miami, FL</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
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<tr>
<td>Abecedarian Study 8</td>
<td>Little Rock, AK</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
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<tr>
<td>Abecedarian Study 9</td>
<td>Dallas, TX</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
</tr>
<tr>
<td>Abecedarian Study 10</td>
<td>Seattle, WA</td>
<td>Birth to 3 years</td>
<td>Center + educational home visits</td>
<td>18 years</td>
</tr>
<tr>
<td>Abecedarian Study 11</td>
<td>Baltimore, MD</td>
<td>Age 1 year to age 2 years</td>
<td>Parent training for home intervention</td>
<td>2 years</td>
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<tr>
<td>(Cerebral Palsy Study)</td>
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<tr>
<td>Abecedarian Study 12</td>
<td>Iași, Romania</td>
<td>Age 1 year to age 2 years</td>
<td>Home (small group in orphanage)</td>
<td>2 years</td>
</tr>
<tr>
<td>(Orphanage Study 1)</td>
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<tr>
<td>Abecedarian Study 13</td>
<td>Iași, Romania</td>
<td>Age 2 years to age 3 years</td>
<td>Home (small group in orphanage)</td>
<td>3 years</td>
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<tr>
<td>(Orphanage Study 2)</td>
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</tbody>
</table>
% of children in Normal IQ Range (>84) by Age (longitudinal analysis)

Martin, Ramey, & Ramey. 1990. *American Journal of Public Health*
Stanford-Binet X Maternal Education

Long-term health outcomes for Abecedarian children

- Fewer risky behaviors (on the Youth Risk Behavior Surveillance System) at 18 years of age ($p < .05$)
- Fewer symptoms of depression ($p < .03$) at age 21
- Healthier lifestyles. The odds of reporting an active lifestyle in young adulthood were 3.92 times greater compared to the control groups
- A significant treatment-related reduction in reports of recently using marijuana (18% vs. 39% for the controls, $p < .05$)
- A significant reduction in teen parenthood (26% compared with 45% of controls, $p < .05$)

McLaughlin et al. (2007). *Child Development.*
Early Childhood Investments Substantially Boost Adult Health

Frances Campbell\textsuperscript{1}, Gabriella Conti\textsuperscript{2}, James J. Heckman\textsuperscript{3,4,5,*}, Seong Hyeok Moon\textsuperscript{3}, Rodrigo Pinto\textsuperscript{3}, Elizabeth Pungello\textsuperscript{1}, Yi Pan\textsuperscript{1}
## Long-term health outcomes for Abecedarian treatment and control children

<table>
<thead>
<tr>
<th></th>
<th>Treatment Mean</th>
<th>Control Mean</th>
<th>Treatment p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic Blood Pressure</td>
<td>125.79</td>
<td>143.33</td>
<td>0.018</td>
</tr>
<tr>
<td>Diastolic Blood Pressure</td>
<td>78.53</td>
<td>92.00</td>
<td>0.024</td>
</tr>
<tr>
<td>Pre-Hypertension</td>
<td>0.68</td>
<td>0.79</td>
<td>0.235</td>
</tr>
<tr>
<td>Hypertension</td>
<td>0.10</td>
<td>0.44</td>
<td>0.011</td>
</tr>
<tr>
<td>HDL Cholesterol</td>
<td>53.21</td>
<td>42.00</td>
<td>0.067</td>
</tr>
<tr>
<td>Cholesterol/ HDL-C</td>
<td>3.89</td>
<td>4.69</td>
<td>0.57</td>
</tr>
<tr>
<td>Abdominal Obesity</td>
<td>0.65</td>
<td>0.87</td>
<td>0.136</td>
</tr>
<tr>
<td>Metabolic Syndrome</td>
<td>0.00</td>
<td>0.25</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Campbell, Conti, Heckman, Moon, Pinto, & Pungello, Submitted to JAMA.
Outcome for vulnerable children with 7 week Abecedarian pre-school intervention
Child Weight Status

<table>
<thead>
<tr>
<th>Weight Status</th>
<th>Number of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Low</td>
</tr>
<tr>
<td>Normal</td>
<td>High</td>
</tr>
<tr>
<td>Overweight</td>
<td>Moderate</td>
</tr>
<tr>
<td>Obese</td>
<td>Low</td>
</tr>
</tbody>
</table>
Original Investigation | September 29, 2014

Association of Antibiotics in Infancy With Early Childhood Obesity

L. Charles Bailey, MD, PhD¹,²; Christopher B. Forrest, MD, PhD¹,²; Peixin Zhang, PhD¹; Thomas M. Richards, MS¹,³; Alice Livshits, BS¹; Patricia A. DeRusso, MD, MS¹,²

[+] Author Affiliations

The Political Economy of Food

1. Subsidise fresh fruit and vegies
2. Market gardens and community gardens
3. Tax saturated fat
4. Reduce access to sugar drinks: glucose tax
Economic globalization, inequality and body mass index: a cross-national analysis of 127 countries

DOI: 10.1080/09581596.2013.768331

Roberto De Vogli⁎ab, Anne Kouvonencd, Marko Elovainioe & Michael Marmotb

pages 7-21

Publishing models and article dates explained

Received: 19 Jun 2012
Accepted: 11 Jan 2013
Published online: 20 Feb 2013
The influence of market deregulation on fast food consumption and body mass index: a cross-national time series analysis

Roberto De Vogli, Anne Kouvonen & David Gimeno

WE CONCLUDED UNEQUIVOCALLY THAT THE FREER AN ECONOMY IS, THE FATTER ITS PEOPLE ARE.
'The global food system is causing a public health disaster'

The UN rapporteur on the right to food says governments in rich and poor countries must bring in tough measures to combat the unhealthy products being marketed.

More than 1.3 billion people around the world are overweight or obese.
Photograph: Finbarr O'Reilly/Reuters

Olivier de Schutter
UN Special Rapporteur on the Right to Food
March 2012

Felicity Lawrence, The Guardian, 9 March 2012
Ultra-processed products

INGREDIENTS: SUGAR; WHOLE GRAIN CORN FLOUR; WHEAT FLOUR; WHOLE GRAIN OAT FLOUR; OAT FIBER; SOLUBLE CORN FIBER; PARTIALLY HYDROGENATED VEGETABLE OIL (ONE OR MORE OF: COCONUT, SOYBEAN AND/OR COTTONSEED OILS)†; SALT; SODIUM ASCORBATE AND ASCORBIC ACID (VITAMIN C); NIACINAMIDE; REDUCED IRON; NATURAL ORANGE, LEMON, CHERRY, RASPBERRY, BLUEBERRY, LIME AND OTHER NATURAL FLAVORS; RED #40; BLUE #2; TURMERIC COLOR; YELLOW #6; ZINC OXIDE; ANNATTO COLOR; BLUE #1; PYRIDOXINE HYDROCHLORIDE (VITAMIN B₆); RIBOFLAVIN (VITAMIN B₂); THIAMIN HYDROCHLORIDE (VITAMIN B₁); VITAMIN A PALMITATE; BHT (PRESERVATIVE); FOLIC ACID; VITAMIN D; VITAMIN B₁₂.
† LESS THAN 0.5g TRANS FAT PER SERVING.
Ultra-processed products
What is wrong with ultra-processed products (UPP)?
Overall, when compared to whole or minimally processed foods plus culinary ingredients, UPP have:

- less protein
- less fiber
- more free sugar
- more total, saturated and trans fats
- more sodium
- and, for solid products, more energy per volume

Mechanisms linking UPP to overeating and obesity

✓ High energy density (all UPP)

✓ Liquid calories (all sugared beverages)

✓ Hyper-palatability (all UPP)

✓ Super size servings (several UPP)
  Report of the DGAC on the Dietary Guidelines for Americans 2010

✓ Mindless eating (all UPP)

✓ Aggressive marketing (all UPP)

See also *Public Health Nut* 14(1): 5-13, 2011
and *World Nutrition*, Nov 2010; 1, 6: 237-269 (www.wphna.org)
Aggressive **marketing** strategies (advertisements, discounts etc) change social norms concerning serving sizes of UPP!

The Wall Street Journal, March 18, 2010

McDonald's spokeswoman Danya Proud ... said more than 90% of U.S. restaurants sold drinks for $1 last summer, which "should give you an indication of its success for our business."
... and social norms concerning when, where and how much to eat!
The marketing of UPP targets kids using fun to sell *

* Marketing foods to kids: using fun to sell; the appeal of crazy colors, flavors, and more. Consumer Research Magazine 01 March 2002
Caloric share (%) of ultra-processed products in total household food acquisitions*

* Estimated from national food expenditure surveys: Brazil (HBS), UK (LCF), Canada FOODEX), Chile (EPF), Colombia (ENIG) y Mexico (ENIGH).
Abstract

**Objective:** To describe the nutritional quality of community-level diets in remote northern Australian communities.

**Design, setting and participants:** A multisite 12-month assessment (July 2010 to June 2011) of community-level diet in three remote Aboriginal communities in the Northern Territory, linking data from food outlets and food services to the Australian Food and Nutrient Database.

**Main outcome measures:** Contribution of food groups to total food expenditure; macronutrient contribution to energy and nutrient density relative to requirements; and food sources of key nutrients.

**Results:** One-quarter (24.8%; SD, 1.4%) of total food expenditure was on non-alcoholic beverages; 15.6% (SD, 1.2%) was on sugar-sweetened drinks. 2.2% (SD, 0.2%) was spent on fruit and 5.4% (SD, 0.4%) on vegetables. Sugars contributed 25.7%–34.3% of dietary energy, 71% of which was table sugar and sugar-sweetened beverages. Dietary protein contributed 12.5%–14.1% of energy, lower than the recommended 15%–25% optimum. Furthermore, white bread was a major source of energy and most nutrients in all three communities.
Impact of Energy Intake, Physical Activity, and Population-wide Weight Loss on Cardiovascular Disease and Diabetes Mortality in Cuba, 1980–2005:

• Potential health benefits of reducing calorie intake were demonstrated after the Cuban economy collapsed in the late 1980s.

• Hard-up citizens ate an average of 1000 calories a day less. Within a decade or so, the incidence of obesity halved, with falls of 51 and 35 per cent respectively in diabetes and heart attacks.

(American Journal of Epidemiology, doi.org/bjzg25).
Tax on high glucose drinks

The UK Academy of Medical Royal Colleges is calling for pilots of taxes that hike prices by 20 per cent.

(New Scientist Vol17:46 19 February 2013)

“Hungary introduced a food tax in 2011 and quarterly soft drinks sales dropped from 117 to 69 million litres within six months.”
“Of the different tax instruments available to policy makers, those that apply to a specific category of food or beverage offer greatest control and focus and are likely to be more straightforward to apply and to have fewer unintended effects. Nutrient-based taxes, such as the Danish tax on saturated fat, may shift consumption from one unhealthy nutrient (saturated fat) to another (salt), for example. A tax on sugar-sweetened soft drinks on the other hand is likely to shift consumption towards generally healthier alternatives”
Fighting the flab means fighting makers of fatty foods
(New Scientist 26 Nov 2012)

“One lesson from Denmark is that small countries with open borders cannot raise the prices of food or anything else unless neighbouring countries also do so. But the greater lesson is that any attempt to encourage people to eat less will encounter fierce food-industry opposition. Eating less is bad for business”

Marion Nestle is the author of Food Politics and What to Eat and is the Paulette Goddard professor of nutrition, food studies, and public health at New York University
Conclusion

The primary prevention of obesity and diabetes requires:

1. The implementation of evidence based early childhood programs such as the Abecedarian Educational Day Care program

2. Action to regulate the food market place including a tax on sugar added drinks and a subsidy on fresh fruit and vegies

The secondary prevention of obesity requires an evidence based program targeted at 3 and 4 year old children who are already overweight or obese