



Food and Behaviour Research warmly welcomes you to
Church House Conference Centre, Westminster, London

SUGAR, FAT AND THE PUBLIC HEALTH CRISIS
A SYMPOSIUM WITH PROFESSOR ROBERT LUSTIG MD
Tuesday, 12th March 2013

1.30pm – 1.50pm	Registration
1.50pm – 2.00pm	Chairman's Introduction – Why we have an Obesity Crisis <i>Professor Jason Halford (Professor in Appetite and Obesity, University of Liverpool)</i>
2.00pm – 2.15pm	'Pure, White and Deadly' – A legacy remembered <i>Professor Michael Yudkin (Professor Emeritus of Biochemistry, University of Oxford)</i>
2.15pm – 2.30pm	Diet and the Obesity Crisis – A Medical Perspective <i>Professor David Haslam (Chair of the National Obesity Forum)</i>
2.30pm – 2.45pm	Sugar, Fat and the Mental Health Crisis <i>Dr Alex Richardson (Founder/Trustee of FAB Research; Senior Research Fellow, University of Oxford; Author of 'They Are What You Feed Them')</i>
2.45pm – 3.05pm	Refreshment Break
3.05pm – 4.05pm	The Key Role of Sugar in Obesity and Metabolic Syndrome <i>Professor Robert Lustig MD (Professor of Pediatrics, UC San Francisco; Author of 'Fat Chance: The bitter truth about sugar')</i>
4.05pm – 4.20pm	Sugar, Fat and Obesity – Time for a New Food Policy? <i>Professor Jack Winkler (Former Professor of Nutrition Policy, London Metropolitan University, Director of Food & Health Research)</i>
4.20pm – 4.45pm	Speakers' Panel – Q & A and Discussion
4.45pm – 5.00pm	Closing comments and Networking

Why we have an Obesity Crisis

by Professor Jason Halford, Professor in Appetite and Obesity, University of Liverpool

Levels of childhood overweight and obesity have risen to 32% and 29% in boys and girls respectively in England, with a marked increase from 2006/7 to 2011/12 in 6 year olds (HSE 2012, NOO 2012); and in adults, the prevalence of overweight and obesity was estimated at 58% in women and 66% in men in 2010. Obesity is determined by energy balance – i.e. the relationship between energy intake and energy expenditure - and the solution to the obesity crisis can be said to lie therein. However, the energy balance equation can be misinterpreted or misused to suggest that weight control is (or should be) straightforward and undemanding.

Eating and activity are behaviours that are learnt and reinforced over a considerable period of time. As such, they are not as tractable as the energy balance equation may suggest. The Foresight systems map (2007) demonstrated that individual food consumption and activity are determined by a complex interaction of individual psychological factors and the operation of complex underlying biological systems. These in turn are shaped at the population level by food production, societal and cultural influences and the active environment. Obese individuals demonstrate weaker regulation control of eating behaviour, which in turn leaves them vulnerable to environmental cues to over-consume.

Obesity can be conceptualised as a mismatch between environment, biology and behaviour (Blundell, 1993). The general food environment and specific branding and promotion influence food choice (encouraging active overconsumption), and food formulation and portion size determine the nutritional consequences (passive overconsumption). Excess energy intake in turn weakens the inhibitory feedback within the body that should control appetite. With weaker homeostatic feedback, hedonic systems - driven by the palatability and attractiveness of food - increase and drive appetite irrespective of physiological need.

While we can try and correct biological deficits via diets, functional foods, drugs and/or surgery, without concerted and effective action on food policy and agricultural economics, the obesity crisis will remain unresolved.

About Jason Halford

Professor Jason Halford is a research specialist in appetite and obesity at the University of Liverpool, and Director of the Human Ingestive Behaviour laboratory there. He is a chartered Health Psychologist and currently the Convenor of the Liverpool Obesity Research Network – LORN. He is also Chair Elect of the UK Association for the Study of Obesity - ASO, Europe's largest and the World's oldest National Obesity Science organisation. Over the past 10 years, his research has focused on drug induced weight gain, the effects of nutrients and fibre on appetite and hormone release, the effects of stress on eating behaviour, and on lean obese differences in the expression of appetite. More recently, he has focused on the effects of branding and food promotion on children's food preferences and diet.

Pure, White and Deadly – A legacy remembered

by Professor Michael Yudkin, Professor Emeritus of Biochemistry, University of Oxford

In *Pure, White and Deadly* (1972), John Yudkin summarised the research that he and his colleagues had carried out since the publication in the Lancet (1957) of his paper 'Diet and coronary thrombosis: Hypothesis and fact'. The Lancet paper had studied the alarming rise in the number of deaths from coronary thrombosis since the 1920's, and had sought to establish a relationship between that rise and changes in diet. It concluded that there was no good evidence that any single dietary factor was the cause of coronary thrombosis, refuted the suggestion that the consumption of fat, or of a particular sort of fat, was to blame, and proposed that the aetiology of coronary heart disease was multi-factorial.

A few years after publishing his Lancet paper, John Yudkin started to suspect that over-consumption of sugar was in fact one of the causes not only of coronary heart disease but also of obesity and diabetes. This suspicion was derived in part from his work in devising a reducing diet for overweight people, in part by thinking carefully about the diet that was probably eaten by our pre-agricultural ancestors, and in part by the demonstration that when groups of people increased the amount of sugar in their diet (for example when they moved to another country) their incidence of diabetes greatly increased. He also noted that modern methods of food manufacture allowed sweetness (the factor responsible for the palatability of fruit) to be separated from the factors that give fruit its nutritional value (Vitamin C and certain minerals). Sugar could be easily and cheaply purified and added to a whole range of manufactured foods to make them attractive.

There are several critical questions which, in 1972, it would have been reasonable to ask about the conclusions of *Pure, White and Deadly*. If such questions had been asked in good faith they would have generated support for further research, and this would have either confirmed or disproved the book's contention that sugar is partly responsible for the increased incidence of several serious conditions. Instead, the book was disparaged and its author ridiculed. It seems possible that this reaction, in the years following the book's publication, is in part to blame for today's epidemics of diabetes and obesity.

- In *Pure, White and Deadly* (1972) John Yudkin set out the evidence for his belief that excessive consumption of sugar was a factor in the high incidence of obesity, diabetes and coronary thrombosis.
- This belief was not based on long-standing prejudice. In 1957 Yudkin had reviewed the epidemiology of coronary thrombosis and had not then concluded that sugar was an important cause of the disease.
- His later work on treating obese patients, his studies of the probable diet of our pre-agricultural ancestors, and epidemiological and laboratory work by others caused him to suspect sugar as an important factor in the aetiology of several diseases.
- The conclusions of *Pure, White and Deadly* were disparaged when the book was published. Had they been taken seriously, today's epidemics of diabetes and obesity might well have been mitigated.

About Michael Yudkin

Professor Michael Yudkin is an Emeritus Fellow of Kellogg College, University of Oxford, where he held a Fellowship from 1993 to 2005. He was appointed a University Lecturer in Biochemistry at Oxford in 1966, and was made a Professor in 1997. He is also the son of the British scientist, John Yudkin, author of 'Pure, White and Deadly – How sugar is killing us and what we can do to stop it'. First published in 1972, this well-researched book put forward a compelling argument that sugar was bad for our health. At the time, however, policymakers and the medical establishment essentially ignored its message, choosing instead to 'demonise' dietary fats as the main cause of heart disease and (by implication) obesity and related conditions. This ground-breaking book was recently re-published, with a foreword by Robert Lustig.

Diet and the Obesity Crisis – A Medical Perspective
by Professor David Haslam, Chair, National Obesity Forum

Obesity, diabetes, heart disease and related conditions are *'the greatest health problem facing the UK'* according to a recent report by the Academy of Medical Royal Colleges, representing the nation's 220,000 doctors. Almost one in four adults in England is obese, and by 2050 the figures are predicted to rise to 60% of men, 50% of women and 25% of children.

Obesity is already estimated to cost the NHS £5.1bn each year, and on current trends these costs will double by 2050. The AMRC warn that urgent action is needed *'starting right now, before the problem becomes worse and the NHS can no longer cope'*. Recognising that there is no single solution, they have set out a 10-point action plan, including an experimental tax on sugary soft drinks, improvements in hospital food, and more effective support for obese patients to help them lose weight. They maintain that these and other changes - involving government, the food industry, health professionals and the public - are now essential, emphasising that *'Changing how we eat and exercise is now a matter of necessity.'*

The National Obesity Forum has been urging similar action for some time. However, current dietary recommendations also need to change, because at present these effectively encourage a high-carbohydrate (low fat) diet, whereas the scientific evidence shows that effective weight loss, and prevention or good control of diabetes, actually requires the opposite – namely a diet low in sugar and other refined carbohydrates.

The low carbohydrate diet was invented in 1797, following the previously ubiquitous regime of feeding sugar to diabetic patients (the idea being to replace the sugar they lost because of their 'defective kidneys'). Although feeding sugar to diabetic individuals seems ludicrous today, most 'food plates' and pyramids as well as National guidelines promote a very similar regimen.

Recently the scientific evidence has once again become in favour of low sugar and low carbohydrate regimes, but the broad scientific community has so far failed to embrace the latest research. It is common practice for both academics and clinical practitioners to hold certain scientific beliefs so strongly that any new evidence to the contrary 'must be wrong'. In fact, the advent of strong new scientific material, and a genuine evidence base should instead be leading us to a major revision of current practice, before it is too late.

- UK obesity rates are the highest in Europe, and continue to rise in both adults and children – clearly showing that current policies are not working.
- The cost burden of obesity, diabetes and related disorders is already huge, and will soon become unaffordable unless effective action is taken now.
- Doctors agree that urgent and meaningful changes to tackle this crisis are needed, involving government, the food industry, health professionals and the public.
- Current National Dietary Guidelines and recommendations must also be revised, as these effectively encourage high sugar and high carbohydrate diets – whereas both new and longstanding scientific evidence supports low sugar and low carbohydrate diets for the prevention and management of obesity and diabetes.
- Urgent action is needed, and this needs to be based on the actual scientific evidence, not on the failed approaches that have now prevailed for 40 years.

About David Haslam

Professor David Haslam is a GP with a special interest in obesity and cardiometabolic disease, Physician in Obesity Medicine at the Centre for Obesity Research at Luton & Dunstable Hospital, and Chair of the National Obesity Forum (NOF) in the UK. David took charge of formulating the guidelines for adult obesity management in primary care and produced the first Primary Care guidelines for management of childhood obesity with the Royal College of Paediatrics and Child Health. He is a Board Member of ESCO (Experts in Severe and Complex Obesity), and a member of the Counterweight Board. David has articles widely published in journals and papers and speaks internationally on obesity and related diseases. His books include 'The Obesity Epidemic and its Management' with Terry Maguire, and 'Fat, Gluttony and Sloth, Obesity in Art, Literature and Medicine' a cultural history of obesity, published in 2009.

Sugar, Fat and the Mental Health Crisis

**by Dr Alex Richardson, Senior Research Fellow at the Centre for Evidence Based Intervention,
University of Oxford; and Founder Director of the UK charity, Food and Behaviour Research**

The increasing prevalence of obesity, Type 2 diabetes and related physical health disorders is already placing such a burden on health services in the US, UK and other developed countries that a public health crisis is now recognised as inevitable if current trends are not rapidly reversed. Abundant evidence shows that modern, western-type diets – rich in highly processed and refined foods – contribute to risks for these and many other systemic physical health disorders, including cardiovascular disease (CVD), immune system disorders, and cancer. Public health advice for the last forty years has prioritised the reduction of dietary fat to combat CVD and obesity, effectively encouraging diets high in sugar and other refined carbohydrates; but accumulating evidence indicates that this may well be counterproductive.

Modern western-type diets are also associated with many mental health disorders, and in this domain the public health crisis has already arrived. In developed countries, the burden of mental ill-health has overtaken that of physical ill-health, according to W.H.O. predictions. Each year, over 1/3 of the European population suffers from a diagnosable neurological or psychiatric disorder (mostly untreated); and UK government figures show that from 2007-10, the annual cost of mental health disorders rose from £77bn-£105bn, exceeding that of heart disease and cancer combined. In children, the most prevalent mental health conditions are ADHD, autism and related neurodevelopmental disorders of behaviour and learning; in adults, stress-related conditions including sleep problems, anxiety, depression, and substance use disorders; and in older adults, age-related cognitive decline and dementia.

Most research linking diet with mental health and wellbeing remains correlational, but nutrition is as important for the proper functioning of the brain as it is for the body. Systemic physical diseases like Type 2 diabetes and CVD are highly comorbid with many mental health conditions (notably depression, schizophrenia and dementia), and medical and neuroscientific evidence points to common underlying mechanisms that are diet-related.

Industrialisation has changed the nutritional composition of human diets in many ways, but two particularly stand out as pathological for both brain and body: (1) dramatic increases in sugar and other refined carbohydrates (and a corresponding lack of fibre and essential micronutrients); and (2) substantial changes in the type and balance of dietary fats – with a particular increase in the ratio of omega-6/omega-3 polyunsaturated fatty acids (PUFA). Evidence for direct causal connections between sugar consumption and mental health remains limited, but relative deficiencies of omega-3 PUFA are implicated in both systemic physical diseases like CVD and some mental health conditions, notably ADHD and depression. Emerging evidence also suggests that omega-3 deficiency may exacerbate the adverse effects of sugar consumption on brain function.

Effective action is needed on many fronts, as all of these systemic diseases have complex and multi-factorial origins. All start in early life, when the effects of nutrition on future health are most profound – but ignoring the role of diet in mental as well as physical health at any age is a recipe for disaster, and dietary guidelines as well as current food policy merit urgent revision in the light of current scientific evidence.

SUMMARY OF KEY POINTS:

- Mental health disorders have reached crisis levels in developed countries, and are already costing more than degenerative physical illnesses such as heart disease and cancer.
- Depression, schizophrenia and dementia are all associated with systemic physical health disorders including Type 2 diabetes and cardiovascular disease. Diet-related mechanisms that can help to explain these links include relative deficiencies of omega-3 fatty acids (for which causal evidence is accumulating), and excessive sugar consumption (for which current evidence is largely circumstantial).
- Official promotion of 'low fat' diets for cardiovascular health and weight control has been counterproductive, encouraging excessive consumption of sugar (which has adverse metabolic effects on body and brain), and failing to distinguish between 'bad fats' (such as toxic 'trans fats' from hydrogenation of vegetable oils) and 'good fats' (such as omega-3, essential for normal brain development and function as well as physical health).
- Effective action to correct these dietary trends is needed if a public health crisis is to be averted. This must include better education and training of health professionals and the public on the importance of diet, not only for physical health but for mental health. Changes in food policy are also essential to help make healthier eating the default option and to protect vulnerable groups such as children, hospital patients and mental health service users.

About Alex Richardson

Dr Alex Richardson is a Founder/Trustee of FAB Research and a Senior Research Fellow at the Centre for Evidence Based Intervention, University of Oxford, having previously been based at Oxford's Dept of Physiology, Anatomy and Genetics from 1987-2007. She is internationally known for her work on the role of nutrition in behaviour, learning and mood, and is one of the world's leading researchers on the influence of omega-3 and other dietary fats on mental health and performance, particularly in relation to developmental conditions such as ADHD, dyslexia, depression and schizophrenia. Her research has always been multi-disciplinary, and currently involves both experimental studies and nutritional treatment trials. Alex is much sought after as a speaker for public, professional and academic audiences both nationally and internationally. She has over 80 research publications to date, and is also author of 'They Are What You Feed Them'.

**The Key Role of Sugar in Obesity and Metabolic Syndrome
by Professor Robert H Lustig, MD, Division of Pediatric Endocrinology,
University of California, San Francisco**

Obesity has been blamed for the host of chronic metabolic diseases plaguing the world. However, 20% of obese people have normal metabolic function, while up to 40% of normal weight people manifest the same metabolic dysfunction as do the obese. Thus, obesity is not a cause of metabolic disease, but rather a marker for it, and everyone is at risk.

The Western diet has become a primary focus of the etiology of the current pandemic of metabolic syndrome. Various aspects of our diet have been promoted (or demoted) as culprits. Although dietary fat, esp. trans-fats, are implicated, neither one has the correct temporal or mechanistic relationship with these diseases. One particularly egregious component of our diet is fructose. Average daily fructose consumption from all its sources (high fructose corn syrup, sucrose, juice) has doubled over the past 30 years. There is abundant correlative evidence that the growing dependence on fructose in the Western diet is fuelling these epidemics. In addition, mechanistic models in both animals and humans demonstrate that high-fructose diets lead to increased energy intake, decreased resting energy expenditure, excess fat deposition, non-alcoholic fatty liver disease, insulin resistance, hyperglycemia, and cardiovascular disease; suggesting that fructose consumption is playing a direct role in the pathogenesis of metabolic syndrome in humans.

The metabolism of fructose differs significantly from that of glucose, the carbohydrate found in starch; but rather is similar to ethanol, a known hepatotoxin. Fructose is absorbed in the intestine and enters the liver without insulin regulation. Once there, fructose enters the glycolytic (energy breakdown) pathway without regulation. Phosphorylation to fructose-1-phosphate and loss of inorganic phosphate stimulates AMP deaminase-1, leading to accumulation of the waste product uric acid, which blocks endothelial nitric oxide synthase (eNOS) and promotes hypertension. Non-aerobic metabolism of F-1-P leads to an excess accumulation of citrate outside the mitochondria (the fuel burning factories in cells), which then undergoes *de novo* lipogenesis (fat buildup) and is reassembled into free fatty acids (which promote insulin resistance), very low density lipoproteins (which promote atherosclerosis and serve as a substrate for obesity), and triglycerides (some of which precipitate in the liver, and cause hepatic steatosis). Lastly, fructose is 7 times more likely than glucose to form advanced glycosylation endproducts (AGE's) with superoxide formation, and which promote both atherosclerosis and non-alcoholic steatohepatitis. In sum, fructose consumption has metabolic and hormonal consequences that facilitate development of obesity and the metabolic syndrome. Altering fructose consumption will take physician and patient education, school participation, community will, food industry regulation, and a new global agricultural policy.

- Obesity is not the cause of metabolic syndrome, but rather a marker for the metabolic dysfunction.
- A calorie is *not* a calorie, and fructose is not glucose.
- Sugar alone explains the worldwide rise in diabetes over the past decade.
- Fructose is metabolized by liver mitochondria to liver fat, driving insulin resistance and metabolic syndrome.
- Fructose binds to proteins and causes cell aging.

About Robert Lustig

Professor Robert Lustig MD is Professor of Pediatrics in the Division of Endocrinology at the University of California, San Francisco, and Director of the Weight Assessment for Teen and Child Health (WATCH) Program at UCSF. He is a noted neuro-endocrinologist, with extensive basic and clinical training involving hypothalamic development, anatomy and function. In recent years he has developed a strong following in the nutrition and health world with his warnings about the dangers of consuming too much sugar. Professor Lustig's work has shown how and why the effects on mood and behaviour of a high sugar intake will undermine conventional approaches to the reduction of obesity, ie why attempts to 'eat less and exercise more' simply do not work. His work has helped the scientific community to make progress in the fight against both obesity and the related development of chronic diseases. He is also leading the public relations fight in the US against the use of high fructose corn syrup that is prevalent in so many packaged foods today. He has just released his new book, 'Fat Chance: The bitter truth about sugar'.

Sugar, Fat and Obesity - Time for a New Food Policy?
by Professor Jack Winkler, Former Professor of Nutrition Policy, London Metropolitan
University, Director of Food & Health Research

What is to be done? The problems are obvious, the solutions are not.

Diets do not work. Education is ineffective. For 30 years, Britain and most other developed countries have, overwhelmingly, concentrated on education strategies to help consumers make “informed healthy choices”. That approach has failed. We keep getting fatter and fatter.

How long do we have to go on failing before we decide to do something different?

Begin by analysing the structural situation we find ourselves in. The vast majority of the food eaten in the UK, US, and most other developed societies is processed products. For many, processed foods are the problem, along with the greedy companies that make them, and the cowardly governments that fail to control them. There is much evidence to support this analysis.

One response then is to go back to buying and cooking our food from fresh, raw ingredients. But that is what governments have been trying for decades – to get people to choose different foods. It has not worked. Wisely or unwisely, people prefer processed foods and are unlikely to change. That is the hard fact from which any food policy must begin.

So, the alternative strategy is to start with the foods that most people eat most of the time, then improve their nutrient profiles. Try changing foods as well as changing people.

The strategy is to reformulate mass market popular foods. There are two types of reformulation: taking “bad” ingredients out (like sugar) and putting “good” ingredients in (like essential omega-3 fats).

Reformulation has a very mixed history as a public health strategy. In the initial phase of concern about obesity and heart disease, many companies tried to produce “low fat” products. They tasted awful and did not solve the problems. Other companies tried marketing trickery, like putting anti-oxidant vitamins into colas and fruit gums.

On the other hand, the fortification of staple foods (usually flour, bread, milk and salt) has been an important means of overcoming deficiency problems in many countries. In the UK, breakfast cereals are a major source of vitamins and minerals. And the most successful nutrition policy in Britain since WW2 has been the salt reduction programme in processed foods. It has cut average salt consumption by 16% in the first six years.

The salt programme provides lessons for sugar reduction. To avoid shocking consumers, it is being done unobtrusively – incrementally, imperceptibly, invisibly.

Reducing sugar in processed foods is a more difficult problem. But there is also one important advantage. There are substitute ingredients for sugar that are acceptable to both scientists and consumers, that do not exist for fat or salt.

Sweeteners, especially aspartame, are contentious ingredients, surrounded in controversy for decades. But there are now many to choose from, and they have much scientific support. On the evidence currently available, the proven harms of sugar are vastly greater than any potential risks of sweeteners. So using sweeteners as sugar substitutes is one option, among several, in public health strategy.

- Education strategies to get people to choose different foods have been the most common food policy. They have failed.
- The majority of foods consumed are processed products. That is the hard fact from which we must begin.
- Reformulating the foods most people eat most of the time is the most important food policy option.
- Reformulating sweet foods is a difficult challenge, but with an important advantage – substitute ingredients are acceptable to both scientists and consumers.

About Jack Winkler

Professor Jack Winkler is a former Professor of Nutrition Policy at London Metropolitan University, and is currently a Director of Food & Health Research, an independent consultancy on nutrition that works primarily with public interest organisations. In this role, he acts as a specialist researcher, policy analyst, writer, lecturer and consumer advocate on food, nutrition, and health. Jack is also a founder, officer and/or member of most UK voluntary groups concerned with diet and health, including London Food Commission, National Food Alliance, Coronary Prevention Group, Consensus Action on Salt and Health, Joint Health Claims Initiative, Baby Drinks Campaign, Action and Information on Sugars, and Sustain, as well as being a member of the Scientific Advisory Board of FAB Research.



Sugar, Fat and the Public Health Crisis
A Symposium with Professor Robert Lustig MD
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Speakers and Chair

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Professor Michael Yudkin is an Emeritus Fellow of Kellogg College, University of Oxford, where he held a Fellowship from 1993 to 2005. He was appointed a University Lecturer in Biochemistry at Oxford in 1966, and was made a Professor in 1997. He is the son of the British scientist, John Yudkin, author of 'Pure, White and Deadly – How sugar is killing us and what we can do to stop it'. First published in 1972, this well-researched book put forward a compelling argument that sugar was bad for our health. At the time, however, policymakers and the medical establishment essentially ignored its message, choosing instead to 'demonise' dietary fats as the main cause of heart disease and (by implication) obesity and related conditions. This ground-breaking book was recently re-published, with a foreword by Robert Lustig.

Professor Jason Halford is a research specialist in appetite and obesity at the University of Liverpool, and Director of the Human Ingestive Behaviour laboratory there. He is a chartered Health Psychologist and currently the Convenor of the Liverpool Obesity Research Network – LORN. He is also Chair Elect of the UK Association for the Study of Obesity - ASO, Europe's largest and the World's oldest National Obesity Science organisation. Over the past 10 years, his research has focused on drug induced weight gain, the effects of nutrients and fibre on appetite and hormone release, the effects of stress on eating behaviour, and on lean obese differences in the expression of appetite. More recently, he has focused on the effects of branding and food promotion on children's food preferences and diet.



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Professor David Haslam is a GP with a special interest in obesity and cardiometabolic disease, Physician in Obesity Medicine at the Centre for Obesity Research at Luton & Dunstable Hospital, and Chair of the National Obesity Forum (NOF) in the UK. David took charge of formulating the guidelines for adult obesity management in primary care and produced the first Primary Care guidelines for management of childhood obesity with the Royal College of Paediatrics and Child Health. He is a Board Member of ESCO (Experts in Severe and Complex Obesity), and a member of the Counterweight Board. David has articles widely published in journals and papers and speaks internationally on obesity and related diseases. His books include 'The Obesity Epidemic and its Management' with Terry Maguire, and 'Fat, Gluttony and Sloth, Obesity in Art, Literature and Medicine' a cultural history of obesity, published in 2009.



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