

### Undernutrition should be the first priority

Madam,

*Public Health Nutrition* is now established as an international journal, and you are to be congratulated for that. But as a regular reader I am disappointed and even somewhat dismayed to find so little coverage of undernutrition, as an issue that is at the heart of public health nutrition.

My view, which may be unpopular, is that we who have lived on the fat of the land should face with resignation and dignity the results of our ways of life, which evidently include an increased chance of heart disease and various cancers. We should not selfishly promote the spending of huge sums of money in attempts to prevent or alleviate such diseases that we bring upon ourselves, as well as making immense demands on the services of younger people in the medical, nursing and other professions to look after us. Meanwhile, as everybody knows, hundreds of millions go short.

If the Declaration of Human Rights means anything, it means that children, who were not consulted about being born, have a right to healthy development. I realise that the best policies for achieving this goal are an enormous and controversial subject.

One of the principles of the 'new nutrition science', as published in your pages<sup>(1)</sup>, is as follows: 'The only rational food and nutrition policies are those that take account of global renewable and non-renewable resources'. With this admirable while not entirely new precept in mind, here is just one example of a subject that I believe deserves to be better known and investigated, and whose benefits for undernourished children – and adults – are potentially immense. This is leaf concentrate, at first known as leaf protein.

The development of this product was at first the work of N.W. Pirie, a founding member of the Nutrition Society. He was a Cambridge scientist, elected to the Royal Society for his work on ribonucleic acid in the tobacco mosaic virus. He devoted much of his life thereafter to promoting leaf concentrate as a potentially important contribution to the reduction of undernutrition. A vital part of his work was the design of simple machinery that enabled any community, almost however impoverished, to manufacture their own concentrate from whatever suitable leaves that grew in their fields<sup>(2)</sup>. His work and now that of others gives rise to three questions.

First, should supplementary feeding play any part in a public health strategy? My answer is 'yes', because this can easily be done through mother and child clinics, which are needed for all sorts of other reasons. UNICEF once had a huge programme of distributing dried skimmed milk, but this is an environmentally expensive product.

Second, if the answer to the first question is yes, should leaf concentrate be produced industrially, like the old protein supplements such as Incaparina<sup>(3)</sup>, or should it be produced at the village level?<sup>(4)</sup> There have been many

village-level trials, using very simple machinery, but on the whole they seem not to have been very successful because of problems such as continuity of production. However, there is now available a product made industrially in France from lucerne (alfalfa) which is extremely cheap<sup>(4)</sup>.

Third, does leaf concentrate work? Does it have any value in practice? It was first introduced as a source of protein, but in quite small amounts also supplies significant amounts of vitamin A, Fe and other micronutrients. It has been tested in field trials in Central America, Africa and I believe also India, with promising results. I remember seeing the results of one trial in Burundi I think, in children who were HIV-positive, with remarkable results. But such trials are small and done without much statistical back-up, so they don't make the scientific journals.

I offer leaf concentrate as just one example of an initiative that is plausible, simple and sustainable, and which, like undernutrition itself, is neglected. In either case I can think of a number of reasons why this is so, but I cannot think of a good reason.

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doi: 10.1017/S1368980008002231

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### Editor's note

Professor Waterlow's letter coincides with our coverage<sup>(1–3)</sup> this month of the *Lancet* undernutrition series, published earlier this year, and its implications. He is right, and we will aim to do better, both in our editorial pages and in the original papers we select.

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## Letters to the Editor

### *Leaf concentrate. Undernutrition. UN food aid policies* **The greatest untapped food resource on earth?**

Madam

You recently published a letter from John Waterlow FRS on leaf concentrate, ‘whose benefits for undernourished children – and adults – are potentially immense’<sup>(1)</sup>. Leaf concentrate is rightly known as ‘the greatest untapped food resource on earth’. With many colleagues throughout the world, I attest to its efficacy: I have seen for myself its impact particularly on child health in Africa, Asia and Latin America.

The purpose of this letter is to ask why the United Nations agencies whose duty is to treat and prevent undernutrition, continue to ignore leaf concentrate.

Here is the testimony of the nutritionist Sister Luci Morren, who works with impoverished communities in Nicaragua. The French charity L’Association Pour La Promotion des Extraits Foliaires en Nutrition (APEF), with whom I work, has many other testimonials, together with results from professionally supervised small field trials.

Sister Luci reports that with leaf concentrate, ‘appetite improves, people are less tired, more energetic, iron-deficiency anaemia is resolved, skin problems subside, sometimes vision improves, coughs clear up, as do headaches and insomnia. Respiratory infections become less severe and less frequent, as do other ailments. Mothers are less fatigued in pregnancy, give birth to bigger, heavier babies, and recover more quickly after their confinement. Those who breastfeed have more milk and so are able adequately to feed until weaning, while their children gain weight normally’.

My own association with leaf concentrate goes back half a century. As an engineer, in 1958 I joined the team formed by Norman Pirie FRS in the UK at the Rothamsted agriculture research centre, and for the next 14 years developed the process for extracting leaf concentrate (then known as leaf protein) as a cheap, available and effective food supplement<sup>(2)</sup>. Ever since then, I have been involved in efforts to introduce and popularise leaf concentrate.

For the last 15 years APEF has been distributing leaf concentrate in twenty countries within four continents. Up to now, more than 60 million 10-gram daily portions of concentrate have been extracted from alfalfa, also known as lucerne (*Medicago sativa*). Many other leaves that are rich in protein, carotenoids, iron, and many other micronutrients and bioactive compounds, are also excellent bases for concentrate.

Just over three years ago, at a meeting in Geneva, the head of the department of Child and Adolescent

Health and Development pledged that she would send a representative to investigate the claims made. She asked for details of some current projects to choose from and was given five in three continents. She chose Burkina Faso, where for several years the French charity Enfants du Monde had been giving leaf concentrate to thousands of children in a community where gangrene of the mouth (*Cancrum oris*) is endemic. They observe that this awful affliction is eliminated in the treated population.

The WHO regional representative’s office is in Ougadougou, about 200 kilometres from the project site. His arrival is still awaited. We have kept WHO informed of our work since that meeting three years ago. We sometimes receive acknowledgements, but never substantive replies. Why?

Sister Luci Morren says: ‘But who in authority takes any notice? Nobody. Maybe for the politicians the improvement of public health by including leaf concentrate in the food supply seems too easy, too simple by far. Such a solution scarcely fits in with the vast food programmes financed by millions of dollars from the World Bank or International Monetary Fund. No, it is not worth bothering about!’

‘Meanwhile, the number suffering brain damage, the weakening of their faculties and inability to help in their country’s development goes on growing, here in Nicaragua, and also in more than a third of the world’.

Our own witness, and the many testimonies we and other civil society organisations have received, are anecdotal accounts. They should prompt controlled trials whose expense is far beyond the resources of small charities. But it seems that no funding body is interested. Meanwhile we work on.

In John Waterlow’s words, leaf concentrate is ‘one example of an initiative that is plausible, simple and sustainable, and which, like undernutrition itself, is neglected. In either case I can think of a number of reasons why this is so, but I cannot think of a good reason’.

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doi:10.1017/S136898000800414X

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public health nutrition that seems very consistent with the New Nutrition Science<sup>(2)</sup>.

'Public health nutrition is the art and science of promoting population health status via sustainable improvements in the food and nutrition system. Based upon public health principles, it is a set of comprehensive and collaborative activities, ecological in perspective and inter-sectoral in scope, including environmental, educational, economic, technical and legislative measures'<sup>(3)</sup>.

The 'newness' of the New Nutrition Science is not so important as the underlying principles. How we view and describe our discipline is important, but not more important than what we do under this disciplinary banner. Action speaks more than words.

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*Leaf concentrate. Undernutrition. AIDS*

#### The elimination of NOMA (*Cancrum oris*)?

Madam

In support of the letters you have published from Glyn Davys and Professor John Waterlow<sup>(1,2)</sup>, I testify as follows. I am a medical doctor, and a member of the charity Enfants du Monde, with whom I work regularly in the province of Yatenga in Burkina Faso.

My clinical observation is that when children in bush villages and schools, malnourished in the first, second or third degree, take daily leaf concentrate made from lucerne, their general state of health quickly improves, as evidenced for example by weight gain, liveliness, correction of pre-existing anaemia, and better attention span at school.

Today 6000 children are taking 10 grams of leaf concentrate daily. Tolerance is excellent. Among children with AIDS the results are particularly spectacular, and also those who are wounded or infected and cared for by our travelling ambulance recover more rapidly. Finally, Enfants du Monde pursues a determined campaign against NOMA (oral gangrene). The children taking leaf concentrate are unscathed by this awful affliction.

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USAID. UN SCN. Food aid

#### Tom Marchione

Madam

The relatively early death of Tom Marchione<sup>(1)</sup> has come as a shock for his friends and colleagues, in addition to his family. He is remembered as a passionate advocate for the poor, hungry and malnourished, bringing a rare range of skills and insights in anthropology, nutrition and statistical analysis to his work.

His research for his dissertation in social anthropology was done in Jamaica where he found that families growing their own food were less likely to have malnourished children than those growing bananas for export. Local food increased in price following local inflation but the price of bananas did not. Since then, we have seen that poor countries have been pressured into increased import dependency for food. He predicted the impact the current meteoric price rise in food would have, and published a substantial number of influential papers and contributions to books<sup>(2,3)</sup>.

For many years Tom worked at the US Agency for International Development (USAID). Within the limitations of his job description, his achievements were impressive. He helped ensure the nutritional quality of food aid, and adequate food control, and also supported breast-feeding throughout his career.

I knew and admired Tom since 1981. Particularly the last ten years or so we worked together within the UN Standing Committee for Nutrition. His enthusiasm for the work of the SCN helped to generate the support it received from USAID.

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## Letters to the Editor

*Height, Cancer, Longevity, Centenarians*

### **We are too tall**

Madam

One of the general ideas that sustains biological scientists is that it is better to be tall than to be short. However, most relevant evidence shows that this idea is wrong<sup>(1)</sup>. It was also challenged recently in an authoritative report showing that being tall increases the risk of colorectal and post-menopausal breast cancers and (probably) pancreatic, pre-menopausal breast and ovarian cancers<sup>(2)</sup>. Your Out of the Box columnist has commented on the issue of height and health<sup>(3)</sup>. This letter reports some new findings.

Within generally healthy environments, shorter people live longer<sup>(4)</sup>. Six relatively short populations, those of Andorra, Macao, Japan, San Marino, Singapore and Hong Kong, are at the top of the life expectancy charts. Another study, based on 1.3 million 21–30-year-old men tracked for 70 years, shows that shorter men live longer<sup>(5)</sup>. Many other studies support these findings<sup>(1,4)</sup>.

Okinawans have the world's highest percentage of centenarians. Centenarian men average 1.48 m and women 1.39 m<sup>(1,4)</sup>. A new study in Sardinia has found longevity is greater for short men<sup>(6)</sup>. The percentage of centenarians in Italy increases with decreasing height from mainland Italy, to Sardinia, to Nuoro (a province in Sardinia).

Biological factors support epidemiological findings. For example, longevity is related to the replicative capacity of cells, and shorter elderly people have a higher remaining replicative capacity than taller elderly people<sup>(7)</sup>. It also takes more cells to build and maintain a bigger body, and more cells increase the risk of cancer in taller people<sup>(4)</sup>.

We are all accustomed to the fact that women live longer than men. Why? I suggest one reason is clear. Women are shorter than men.

Let us hope that the scientific community thinks again about the implications of increasing height, before genetic engineers are set loose on further increasing the heights of future generations.

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*Leaf concentrate. Undernutrition*

### **Nourishing child and adult patients in Congolese hospitals**

Madam

In support of the letter you have published from Glyn Davys<sup>(1)</sup> following that from Professor John Waterlow<sup>(2)</sup>, I wish to testify as follows. I am Surgeon to the Diocesan Health Service in Bukavu, in which capacity I have clinical experience of the use of leaf concentrate in many sorts of situation.

For four years the Service studied the effects of leaf concentrate made from lucerne, which was distributed widely in seven hospitals, three referral health centres and a dozen health clinics in South Kivu, where childhood malnutrition is particularly high due to war, pillage and the whole assortment of accompanying miseries.

Initially kept for infants with kwashiorkor and marasmus, leaf concentrate was then also given to pregnant women who though more or less well-nourished were anaemic, and especially to those who, having given birth, presented with absence of breastmilk or difficulty in providing it. We went on to give leaf concentrate to patients in a poor general state because of chronic infections of many kinds; and we used it post-operatively, and also for malnourished diabetics and for debilitated convalescents. The doses were 5–6 g/d for children and 10–12 g/d for adults.

Results were very rapid, spectacular even. There was no intolerance or allergic reaction recorded and consumption of the concentrate was readily accepted by all. We noted:

- Curing in a week or two of asthenia and apathy.
- Rapid recovery of appetite and improvement in general condition.
- Regain of weight, even able to catch up in 4–6 weeks.

- Curing in a few days of diarrhoea and oedema with no other treatment.
- Correction in 4–5 weeks of anaemia.
- Correction also in 4–5 weeks of other deficiency symptoms (such as skin lesions, lack of strength and spirit) including in cases of severe malnutrition.
- Fast recovery after surgery with less asthenia during convalescence.
- Likewise with HIV-positive or tuberculous children.
- Agalactia lasted only 2–3 d and then milk secretion often became abundant.

The Ministry of Health of the Democratic Republic of the Congo has recognised all these positive effects and has recommended the use of lucerne leaf concentrate.

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#### Leaf concentrate. Undernutrition

##### Nourishing inmates in Malagasy prisons

Madam

The letters you have recently published from John Waterlow<sup>(1)</sup> and Glyn Davys<sup>(2)</sup> prompt me to acquaint you with my own experience. I am Chief Medical Officer and Director of the Charity Medicap, whose priority is alleviation of chronic malnutrition in prisoners in the prisons of Madagascar. Since we received our first tonne of leaf concentrate late in 2003 we have been using it as an optional dietary supplement as follows.

Inclusion criteria were BMI < 18.5 kg/m<sup>2</sup> for adults or weight-for-height < 90% median weight for youths.

These calculations were made monthly and listed. When an individual reached BMI > 19 kg/m<sup>2</sup> he or she left the programme.

In June 2008, out of the total 4373 prison population, 677 were receiving concentrate. The nurse knew from the list which of the prisoners should take it. The dose is 10 g/d. The concentrate is given with a glass of water in some prisons or, in others, mixed into their meals. The daily ration for prisoners consists of 500–700 g (dry weight) of cassava (manioc) supplying about 8400 kJ/d (2000 kcal/d).

Results when leaf concentrate was added to the minimum of 500 g cassava/d:

- Weight gains of 0.5–4.0 kg for prisoners in 1–3 months, provided that the concentrate was accompanied by the minimum of 500 g of starchy staple (if the ration fell to 400 g there was failure to gain weight).
- The concentrate stimulated the appetite: the prisoners often searched for something to eat during the day.
- The mortality rate fell.
- The supplemented prisoners become more energetic and active.
- Several have ceased to suffer from vertigo.
- Disappearance of 'night blindness'.
- Disappearance of oedema.

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#### Editor's note

*We will be pleased to hear also from readers who have experience of the effects of concentrate made from leaves of local plants other than lucerne.*

## Letters to the Editor

### *Leaf concentrate. Undernutrition* **Testimony from a clinic in Senegal**

Madam

I have been in charge of the clinic at Djilas in Senegal for several years. I know the benefits of leaf concentrate<sup>(1)</sup> extracted from lucerne.

*Pregnant women:* Taking leaf concentrate during the later months of pregnancy, without Fe supplements, improves their general physical condition; no more vertigo, wasting or anaemia. They carry on with their normal activities. They bring into the world beautiful babies weighing on average 3·8 kg instead of the former 2·3 kg. They have easy deliveries, nothing like what we had been accustomed to, and their milk flows quickly.

*Lactation:* For women who are dry the effect is spectacular; two days after starting to take leaf concentrate their milk flows. It is good milk. The baby cries no more.

*Healing:* For patients with serious and deep wounds (boils, carbuncles, abscesses, varicose ulcers) taking leaf concentrate promotes rapid healing of the wound and general improvement.

*Children:* I also supervise the distribution of leaf concentrate to day nurseries and primary schools, to about 600 children. After a few months the teachers observed that the children were putting on weight and were in better health with less absence, more attentive in class and taking greater part in sports. They also have fewer episodes of malaria. Leaf concentrate really helps them grow up well.

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### *Nutrition as a whole* **The Out of the Box effect**

Madam

I am a medical doctor, currently a postdoctoral fellow at Columbia University, New York, USA. I was introduced

to your Out of the Box column in 2006 as a PhD student in Nutrition, at the University of Chile. Our professors Dr Eva Hertrampf and Dr Daniel Lopez de Romaña had the idea that we could learn English and also Nutrition by reading the column and writing about the topics it covered – topics that are obvious, but often neglected or avoided in academic discussion. The columns were given to us a few days before our weekly meetings, when we were expected to read out our essays about them, and then discuss them. This succeeded, because the author of this column succeeds in the first place. We learned English, and we learned Nutrition.

I kept on reading the column. It has a therapeutic effect on me. It does not depend on the topic itself, or if I agree or disagree with what it says. It puts in words thoughts that are floating in our minds and hence gives them existence. If we disagree this is even better; if you get annoyed with what the writer is saying, you plan your counterarguments, you find out what your opinion is, or you decide on one if you do not have it already. You *think*.

For me nutrition is amazing. Its aspects include ethics, culture, economics, education, evolution, politics, society, health, people, cells, molecules, atoms, flavours, psychology, pleasure – and so on. My research field at the moment is very basic aspects of obesity. I know how complex this condition is, and that all the factors listed above are implicated in its pathogenesis. But sometimes (quite often, to be frank) I lose perspective.

When I am lost what I think about is the protein, the cellular signalling, the experiment that did not work, the publication that did not come out. But then there it is, the column that reminds me about nutrition as a whole; and there it is, the magic therapeutic effect. I am reminded that what I am working on is part of something bigger. Once again I remember that it makes sense to conduct specific research in order to understand, explain and find answers to these various aspects.

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employ this same commitment by engaging global nutrition and international development experts, as well as by involving consortia of corporations, major foundations, UN agencies, leading NGO (such as the International Union of Nutritional Sciences) and government development agencies.

*The Lancet* paper<sup>(2)</sup> states that 'the intricacy of undernutrition as a global problem seems to defy simple, directed and uniform programmes. We will not effectively improve child survival unless we untangle this web [of interactions]'. The authors call for a 'knowledge base on the necessary support and institutional capacity that enables these interventions to work and improve child survival'.

If the global burden of undernutrition is to be combated successfully and in ways that link its solution to avoiding a worsening of the crises in overweight and obesity, the need for strong public-private partnerships to support practical interventions at the population level is not only necessary, but critically urgent.

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### *Leaf concentrate. Undernutrition* **Benefits for children in Mexico**

Madam

I have been following your correspondence on clinical observations of the benefits of leaf concentrate when given to children, pregnant women and nursing mothers and undernourished adults<sup>(1-6)</sup>. I wish to record our experience in Mexico over the last nine years.

My Association was founded in 1841 and is dedicated solely to philanthropic activities. It is certified as an institution of public benefit. One of our activities is the production and distribution, free of charge, of leaf concentrate products.

Our mission here is to find solutions to the poor diets and malnutrition that exist in certain sectors of the population. The leaf concentrate initiative is led by Dr Carlos Gonzalez, nutritionist at the National Autonomous University of Mexico. He is responsible for receiving the concentrate and producing and distributing all the leaf products that we provide free to 25 000 children who attend fifty-four institutions (such as schools, orphanages, community centres) in Mexico City and surrounding states. Most children receive 5 g of concentrate daily, with more being given to those whose health requires it.

Our products are very well accepted by the children. We have numerous testimonials and professional and official data as well as statistics collected by ourselves. These show the remarkable results of our products and that there have never been any negative effects.

We rely on the support of professors and directors of private institutions and official organisations, such as the National Institute of Nutrition and the National Paediatric Institute, who bear witness to the results obtained in combating malnutrition and anaemia together with an improvement in the children's performance at school and in their physical and mental development.

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### Editor's note

*We will be pleased to hear from readers who have experience of the effects of concentrate made from leaves of local plants. We will also be pleased to hear from readers who have doubts about the benefits of leaf concentrate or who believe that other nutritional methods to alleviate malnutrition and address disease are preferable.*