

What is complementary feeding?

*A philosophical reflection
to help a policy process*



A discussion paper developed for the
International Baby Food Action Network (IBFAN)

by **Gabrielle Palmer**

September 2009



About the author

Gabrielle Palmer is a nutritionist and is the author of the book *The Politics of Breastfeeding*¹. A breastfeeding counsellor in the 1970s, she later went on to help establish the UK IBFAN group, Baby Milk Action. In the early 1980s she worked as a volunteer in Mozambique. She has written and campaigned on infant feeding issues, particularly the unethical marketing of baby foods. In the 1990s she co-directed the International Breastfeeding: Practice and Policy Course at the Institute of Child Health in London, until she went to live in China for two years.

She has worked independently for various health and development agencies, including serving as HIV and Infant Feeding Officer for UNICEF New York. She recently worked at the London School of Hygiene and Tropical Medicine where she originally studied nutrition. She is a mother and a grandmother.

Acknowledgements

I warmly thank Adriano Cattaneo, Joanne Csete, Yasmin Hosny, Alison Jones, Lida Lhotska, Alison Linnecar, Rebecca Norton and Judith Richter, for their comments, information, suggestions and encouragement.

We thank the children/parents/grandparents/photographers and colleagues for their photos. We thank UNICEF for the photos on pages 10 and 19 and WABA for the drawing.

© IBFAN-GIFA, 2009



¹ Pinter&Martin, 2009

What is complementary feeding?

A philosophical reflection to help a policy process

Contents

| | |
|---|-----------|
| Executive Summary | 4 |
| Foreword. | 5 |
| Section 1: The Big Picture | 6 |
| 1.1 Entitlement to food | 6 |
| 1.2 Entitlement to water | 6 |
| 1.3 Medicalising undernutrition and poverty. | 7 |
| 1.4 Fair distribution | 8 |
| 1.5 Why complementary feeding?. | 9 |
| 1.6 Politics | 10 |
| 1.7 Nutrition | 11 |
| Section 2: A Closer Look | 14 |
| 2.1 Food and nutrition: an historical perspective | 14 |
| 2.2 Evolution and food systems | 14 |
| 2.3 Salty, sweet and fat: the human drives for taste | 16 |
| 2.4 Human plumpness | 16 |
| 2.5 The timing of complementary feeding. | 17 |
| 2.6 What did prehistoric young children eat? | 18 |
| 2.7 Are cereals appropriate foods for babies?. | 19 |
| 2.8 A word about animal milk | 22 |
| 2.9 Why don't we give our babies molluscs and insects? | 23 |
| 2.10 Cultural and religious beliefs | 24 |
| Section 3: Processes for change | 27 |
| 3.1 The language of food | 27 |
| 3.2 Is a 'local' diet possible and good enough for infants and young children? | 29 |
| 3.3 A lesson from history: the example of wartime UK. | 30 |
| 3.4 A contemporary lesson: the US Special Supplemental Nutrition Program for Women, Infants and Children (WIC) | 31 |
| 3.5 The majority world | 32 |
| Afterword: Health for all? | 36 |
| Appendices 1-4 | 37 |

NOTE: Key messages and statements are highlighted in red

Executive Summary

This paper is designed to stimulate thinking and discussion and is not prescriptive. The current, widespread problem of inadequate feeding of older infants and young children is complex. Throughout human existence families have successfully fed children without expert advice. Nutrition is an inexact science and theoretical mistakes have done harm. Food production systems influence food security and nutrient availability. It is likely that early human diets were more nutrient dense and appropriate for young children. Vitamin A, iodine, zinc and iron deficiency are the major deficiencies of older infants and young children. Successful human diets vary widely. While children may not be physiologically ready to digest cereals until around two years of age, they can digest flesh foods. A diverse diet is a healthier diet. Humans have innate drives to favour certain food tastes and a unique capacity for body fat storage which have favoured survival. Both traits cause problems in the modern world.

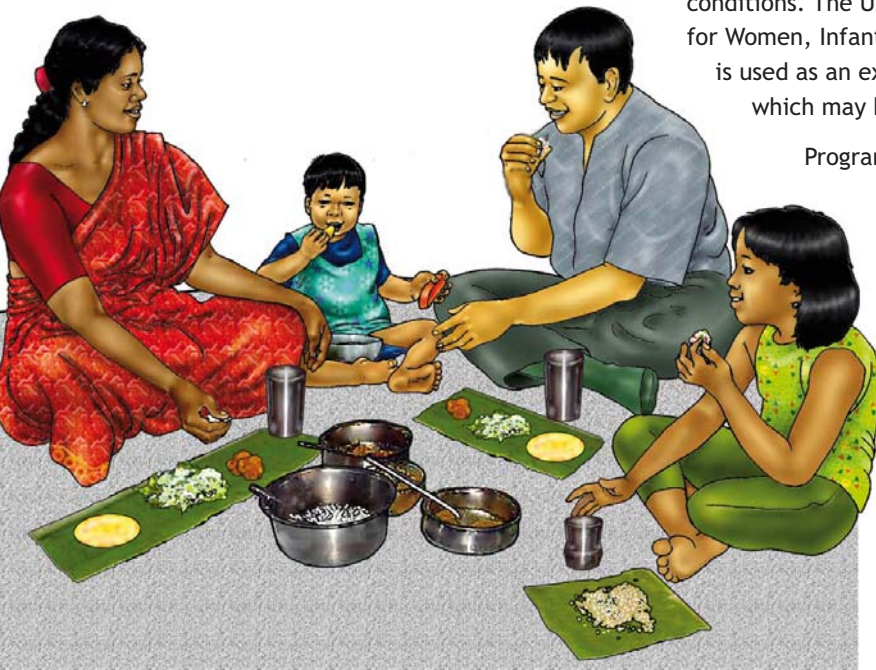
Children can be fed adequately with family foods but food and water entitlement and availability are crucial for this to happen. A reliable water supply for hygiene is as important for young child feeding and health as drinking water. Poverty is a key factor of undernutrition but also rich children may be inappropriately fed. The creation of dependency on industrialised foods and destruction of food skills is of concern. Many complementary foods replace breastmilk. Using age as a marker for the introduction of foods is a clumsy public health tool. Food culture is important and early feeding has important psychological and social effects as well as health and nutritional consequences. The use of ready-to-use therapeutic foods designed for treatment of severe malnutrition in the context of emergencies, may have negative consequences in normal circumstances. Some industrialised foods or processes are useful and some 'natural' foods are harmful. Historically the introduction of non-indigenous foods has both helped and hindered nutrition.

Terms used for complementary feeding and foods are inexact and can cause misunderstanding. The process of the establishment of agreed definitions could assist discussion and achieve a much needed clarity.

The UK food and nutrition policy and experience during the Second World War is used as an example of a strategy which improved infant and young child and maternal health in adverse conditions. The US Special Supplemental Nutrition Program for Women, Infants and Children (WIC) policy and experience is used as an example of a food and nutrition strategy which may have led to some negative consequences.

Programmes to tackle specific nutrient deficiencies can be successful. Attention must be paid to women's right to adequate nutrition. Women cannot attend to their child's needs in addition to their economic work burdens if their own nutrition is neglected. There is also an intergenerational nutritional factor.

Some current global public-private initiatives may damage skills and autonomy at household level. Complacency about global economic differentials both within and between countries restricts progress in older infant and young child nutrition.



What is complementary feeding?

A philosophical reflection to help a policy process

“All that area was wooded. There were small farms, full of maize, millet, sorghum. The rivers were huge and clean. There was no tea. Today we see tea, tea, tea. Mother never planted tea. Tea has become slave labour”

Environmentalist and Nobel Prize Winner, Wangari Maathai, describing changes in the area in Kenya where she grew up (2009)².

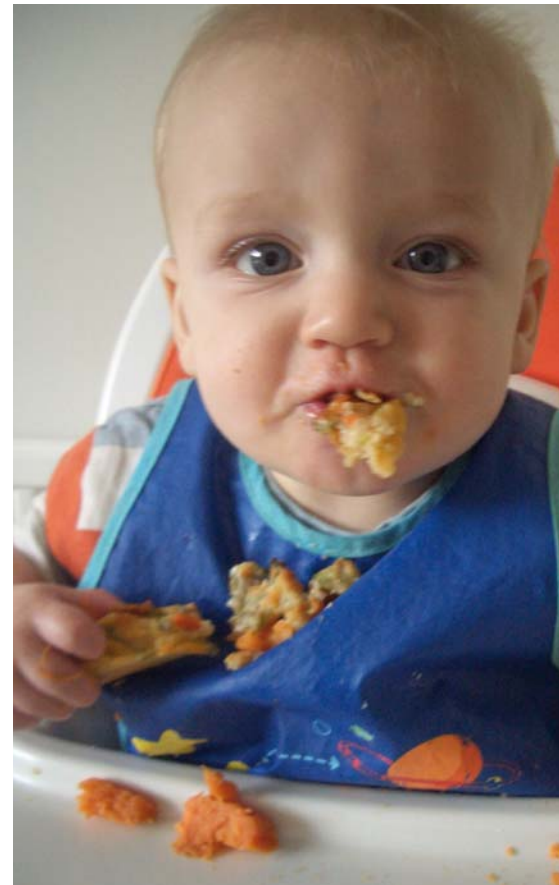
Foreword

Almost thirty years ago in Mozambique, I was teaching mothers of malnourished infants and young children how to improve complementary feeding. We were in the garden of a health post under some shade trees. Two incidents haunt me to this day. The first was that a woman stood up and said: “Thank you for this information, please could you tell us how we can get the food.” The second was that, as I was turning the flip chart of Ministry of Health teaching materials, out of the corner of my eye I saw a woman pick up a dead bird from the undergrowth, brush the dust off its feathers and pop it into her shopping basket. I should have used that opportunity to point out that small wild animals could provide some of the nutrients that the staple maize meal lacked³. Indecision, and fear of embarrassing her, inhibited me and I let the moment go.

The important lessons that these women taught me were that, **firstly, food availability is more important than knowledge and that the reverse is cruel; secondly, that millions of mothers have been able to feed their children for thousands of years without input from experts.**

Having read many academic and official documents on complementary feeding, I long to tear them into shreds and throw them out of the window. Around the world in both rich and poor regions, are numerous human beings who are alive and healthy. They are the evidence that mothers (and other family members) have been able to feed their children successfully. Recent press reports proclaim the world’s oldest man to be 113 year old Henry Allingham⁴. He was born in 1896 in a poor area of London and during his second year, his father died of tuberculosis. Whatever his mother did can only be judged to have been the right thing.

This paper does not set out to draw conclusions, make prescriptions or give practical guidance or recommendations; its purpose is to stimulate thought and debate about the subject of complementary feeding. In order to do this I will present a range of topics, facts and comments which I hope will achieve this purpose and help the necessary discussion by moving beyond the confinement of deference to donor expectations, political constraints and cultural inhibition.



² Quoted in ‘Way out of the woods is into Kenya’s trees’ by John Vidal Guardian Weekly 05.06.09.

³ There is a risk of hand to mouth pathogenic contamination from touching a dead bird, but thorough cooking (which was the norm in that area) would render it safe for eating. Hand washing after handling the bird would be desirable as infection would be through touch rather than consumption. In parts of Europe, game birds are suspended for two or three weeks to facilitate breakdown of the flesh by intrinsic bacteria. This process is favoured by gourmets for improving flavour and texture of the meat. Game meat is customarily well-cooked.

⁴ At 113 years old, Henry Allingham was been proclaimed the oldest man in the world by Guinness World Records. The Guardian 20.06.09 He died on the 18th July 2009.

Section 1: THE BIG PICTURE

1.1 Entitlement to food

We have to reclaim and proclaim Nobel Prize winning economist Amartya Sen's theory of entitlement. In his seminal book *Poverty and Famines*, Sen introduced the simple and compelling concept that people die, not from lack of food, but from lack of entitlement to food. For example during the 19th century famines in Ireland, grain was exported to England. The Irish died because they depended on potatoes (which rotted with blight disease) and had no entitlement to the grain-crops which they grew as land-rent for the English landowners⁵. Today a traveller from a rich country might trek in a remote, drought-ridden area of the world. The traveller carries credit cards, cash and mobile phone (to call family, colleagues or bank) so that should he lose his food supplies, he has entitlement to food when he reaches a store or eating place. An East African pastoralist family whose animals have died in a drought and who trek to seek help have no money or credit to buy food. They have no entitlement. During famines, you do not see TV journalists, politicians or aid workers fainting with hunger. Their children are unlikely to become undernourished, even if their parents are working in the famine zone, because they have entitlement to food.

This situation is echoed in conditions of entrenched poverty where a mother may have to choose between paying an older child's school fees or buying something nutritious for her toddler; or giving the best food to the male family members to whom she is obliged by custom. **Children are inadequately fed for many reasons, but families' lack of entitlement through poverty, which impedes access to sufficient food of quality to meet nutritional needs, is a significant cause.** The political failure to address the issue of the right to food⁶ affects young children more than any other group.

Entitlement to food is also impeded by misinformation about infant and young child feeding. This is widespread both through cultural attitudes and marketing. The former may endorse entrenched beliefs, taboos and restrictions which can deprive children of a diverse and nutrient-dense diet. The latter may do the same through the marketing of unsuitable or unnecessary foods. The two often interact and modern marketing methods may both exploit and shape misguided cultural attitudes.

One harmful factor is that available, inexpensive local foods may be disregarded because persuasive promotional tactics convince families that, for example, a pureed banana in a jar is nutritionally superior to one in the market. This bleeds the family food budget leading to restricted access to foods. Other children may be deprived because scarce cash is squandered on the costly industrially-processed product. This confidence trick obliterates a family's entitlement to sufficient, suitable foods.

1.2 Entitlement to water

The world seems now to be in a flurry of activity to provide technical solutions to human problems whilst side-stepping the causes of these problems. An article about public-private partnerships states that: "Preparation of Ready-to-Use Therapeutic Foods (RUTFs)⁷ does not

⁵ Sen A. *Poverty and Famines: an essay on entitlement and deprivation*. OUP 1981. Also Kent G (ed). *Global Obligations for the right to food*. Rowman & Littlefield Publishers Inc. 2008.

⁶ See: Kent G (ed). *Global obligations for the right to food*. Rowman and Littlefield Publishers Inc. 2008.

⁷ Ready-to-use therapeutic foods are pastes, designed for treatment of severe malnutrition in the context of emergencies.

require water. This means that bacteria cannot grow in them and they can be used safely in people's homes⁸". The article addresses the fact of 3.5 million child deaths due to undernutrition and is referring to a product for the treatment of severe, acute malnutrition. Nevertheless, this statement brings home the sad fact that lack of access to water is a norm. However scientifically sophisticated a foodstuff, safe feeding cannot be achieved if handwashing and other aspects of food hygiene are constrained through inadequate water provision.

A reliable water supply is a key component of good complementary feeding. This is not merely because a non-breastfed child needs drinking water but because consistent supplies of water are essential for hygienic food-preparation, hand washing after defecation or cleaning a child's bottom and bathing. These practices are essential to reduce the infection risks which exacerbate undernutrition.

A key difference in the experience of daily life between industrialised and developing countries is water provision. Widespread, public provision of water (and sanitation) transformed the lives of families in industrialised nations during the 20th century and contributed to declines in disease before modern healthcare strategies were developed. In the 21st century a poor mother in North America, Europe or Australasia can take a water tap in her home for granted. In rural Africa less than 6% have even a communal pump or tap⁹. The Convention on the Rights of the Child claims as a right '*the provision of adequate nutritious foods and clean drinking water*'¹⁰. The Global Strategy for Infant and Young Child Feeding only refers to water in statements on '*exceptionally difficult circumstances*'¹¹. However lack of access to water is not exceptional but normal for over a billion people. A target of Goal 7 of the Millennium Development Goals is to halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015¹². This implies an acceptance of the fact that by 2015 around 500 million people will not have this access.

Safe drinking water is not as important a factor in health as water quantity and access. Placing a water tap close to a home nearly doubles the odds of a mother cleaning her hands after contact with her child's faeces. For drinking water, home disinfection is feasible through boiling or exposing plastic containers to sunlight. Water provision can also make a huge difference to women's time allocation. However the definition of 'improved access' to water used for the Millennium Development Goals is a water source less than half a mile (0.8km) away. So even 'good' water access can use an hour a day of women's time. Many spend longer, time they might spend 'actively' feeding their children as they are urged to do¹³.

1.3 Medicalising undernutrition and poverty

The article cited above continues, "Also health staff can prescribe Ready-to-Use Therapeutic Foods, decreasing the pressure on in-patient health facilities"¹⁴. Many child health agencies and centres of academic research in this approach to child feeding. This reflects the sad state of affairs in the 21st century where undernutrition in poor countries has come to be viewed as a matter of medical prescription through healthcare systems rather than an issue of food security. This approach disregards the fact that the families of the most vulnerable children have inadequate access to healthcare facilities.

⁸ Alipui N. Strong public-private sector partnerships can help reduce undernutrition. www.id21.org Institute of Development Studies July 2008.

⁹ Palmer G. *The politics of breastfeeding*. Pinter & Martin, 2009: p.114-116

¹⁰ UN. *The Convention on the Rights of the Child* (Article 24 (c)). 1989.

¹¹ WHO/UNICEF. *The Global Strategy for Infant and Young Child Feeding*. 2003, p.18

¹² UN. *The Millennium Development Goals*. Report 2007.

¹³ Cairncross S & Valdmanis V. Water Supply, Sanitation, and Hygiene Promotion. In: *Disease Control Priorities for Developing Countries*. The World Bank Group, 2006: p.771-792. Also: Fry K. MSc Dissertation, LSHTM 2008. Also: Personal Communication, Sandy Cairncross, Professor of Environmental Health, LSHTM, 2009.

¹⁴ UNICEF op. cit.

Governments, UN agencies and NGOs sometimes unwittingly convey in their messages an acceptance that poverty is inevitable. The proportional reduction targets of the Millennium Development Goals do not even dare present the vision of poverty eradication. Yes, the majority of human beings are poor but they need not be¹⁵. Certainly, access to water and nutritious food for all should come before any other economic measure of prosperity. The current reality shames human society.

The use of a ready-made food designed for emergencies should not become the norm just because public authorities neglect their basic duty to provide water and support locally sustainable food systems. **The other danger of the use of such foods is that this crushes a central value of human relationships and cultures which is a family's skill to feed itself and include its youngest members in food sharing.**

1.4 Fair distribution

In early 20th century UK, a politician was advising a crowd of poor workers that a family could make a nourishing meal out of a cod's head. A man in the crowd shouted out: "Who ate the cod?" This situation is now echoed globally. Countries with unacceptable levels of childhood undernutrition export food to rich countries. It takes 3000 litres of water to produce a kilo of rice and 16,000 litres to produce a kilo of beef¹⁶. Who is eating the beef? News reports from the UN and analysts in India, Washington and London estimate that 30 million hectares of farmland is being 'acquired' from the world's poor to grow food for rich countries¹⁷. **The food systems and eating practices of the industrialised nations do indeed take food 'out of the mouths of babes and sucklings'.**

Such products as ready-to-use therapeutic foods, designed to treat severe malnutrition in the context of emergencies, are useful tools among a range of life-saving strategies; promoting their use for normal life must be challenged. Addressing nutrition problems through the mass provision of pills and products is to treat humans like farm animals. Most humans are poor and by 2050, eight out of nine billion will live in developing countries. If such emergency provision is 'brought up to scale' it will lead to a world where most small humans are fed with an industrialised mass-produced food in the same way that battery chickens are fed with pellets. Someone will be profiting from this degradation. This will shame humankind. We have to meet the root causes head on.

This quotation from the great writer Leo Tolstoy in 1886¹⁸ describes the stance of the powerful and mimics the current state of such attitudes to complementary feeding:

"I sit on a man's back, choking him and making him carry me, and yet assure myself and others that I am very sorry for him and wish to ease his lot by all possible means except by getting off his back."

¹⁵ According to the NGO Christian Aid, ending poverty is a 'big task but no bigger than ending slavery or putting man on the moon'. The UN Secretary General has categorically stated that it can happen. See christianaid.org.uk

¹⁶ Virtual Water. WEM The Environment Magazine 14 (6) June 2009.

¹⁷ Vidal, John. *Fears for the world's poor countries as the rich grab land to grow food*. Guardian, 4 July 2009.

¹⁸ Tolstoy L (1886). Chapter 16 in: *What then must we do*. The Russian Leo Tolstoy (1828-1910) is famous for major novels such as 'War and Peace' and 'Anna Karenina'.

1.5 Why complementary feeding?

Older babies and young children need foods other than breastmilk for two reasons: firstly for nutrition to grow and develop healthily; secondly to accustom them to the eating habits of the family and community. These two goals do not always harmonise. Spoon-feeding a baby a nutritionally-programmed pre-packaged food whilst she sits alone in her high chair excludes her from the social and emotional interaction and the taste and texture experiences of sharing the family meal. However, in some societies, the shared family meal may not deliver appropriate nutrients to the young child and she may miss out nutritionally if parents and caregivers are unaware of the importance of active feeding¹⁹ and do not know which foods are the most appropriate.

Food distribution within the family does not always favour children, even in richer societies. Almost 70 years ago, the British government ran an advertising campaign called 'Don't let Dad get all the meat' (see Appendix 3). Today, even well-educated families may deprive their children of a diverse diet because marketing and misinformation leads them to believe that children need special foods in jars and packets. How infants and young children are introduced to foods is crucial for child survival and lifelong health. The process also has emotional and psychological effects and is part of acculturation²⁰; that is one of several learning processes which help a child to become part of his group, whether family or community.

Dietary practices not only influence the development of the older baby and young child but also lifelong eating practices. In the poor world many children who are beautifully breastfed beyond two years become malnourished or die for lack of nutritious complementary foods. In the rich world many children's early feeding experiences programme them for lifelong harmful eating practices. **Taste preferences are formed in early life and the content and manner of feeding may establish lifelong cravings for overly sweet, salty or energy-dense/nutrient-poor foods and drinks.** Family and health worker pressures to eat too much may override innate appetite control and lead to overweight and obesity. Anorexia nervosa, bulimia and other eating disorders might have their origins in early childhood.

There is also a confusing overlap between what are termed 'complementary foods' and what are in reality breastmilk substitutes. Even after six months, many foods do not complement breastfeeding but replace it when it should ideally continue to be the principal food. For example a baby may be fed a starchy staple, mashed fruits, juices, soups and gruels, which fill the baby's stomach, reduce appetite at the breast and therefore breastmilk supply. Thus these products are de facto breastmilk substitutes. If access to the breast is unrestricted, babies can stimulate the quantity of breastmilk they need which can furnish sufficient energy and protein into the second year. The 'nutrient gap' of concern²¹ is that of micronutrients iron and zinc. Breastmilk provides some but total supply depends on the individual baby's birth stores and as these run out, the baby needs exogenous sources.

If the mother's diet is low in certain vitamins, levels of certain micronutrients in breastmilk (eg vitamin A) might be lower. The safer solution would be to amend the mother's diet rather than feed the baby other foods. Many foods given to older infants and young children replace a nutritionally superior food, which has additional disease protection benefits, breastmilk, with an inferior product. **A true complementary food would add to the diet nutrients such as iron and zinc, which breastmilk has not evolved to provide for older infants as the child gradually outgrows her birth stores. Many so-called complementary foods do not fulfil this function.**

¹⁹ By 'active feeding' I do not mean forcing a child to eat food, but offering the best bits of the family meal and encouraging a child to feed herself.

²⁰ Acculturation is the process of assimilation of the cultural traits of a group.

²¹ Vitamin D is also low in breastmilk and is not influenced by the mother's diet. Vitamin D is a hormone triggered by sunlight on the skin. This is a geographical and cultural issue.



There is also the important issue of accustoming²² the child to a wide range of foods. Strictly speaking this is not 'complementary' feeding (because it does not 'complete' the breastfed child's diet) but is merely the process of learning to eat. But for the purposes of this paper the process can be included within our understanding of complementary feeding.

1.6 Politics

The very concept that one group of human beings should impose their food customs and beliefs on others, or dismiss their child-feeding practices as inadequate, is questionable and can lead to unforeseen consequences. In the early and mid 20th century, before commercial promotion reached its current sophistication, European colonisers discouraged women from breastfeeding into the second year. Health professionals also frowned upon fermented foods, thinking them unhygienic when in fact the process suppressed pathogens and enhanced nutritional content, including iron availability. These messages undermined beneficial traditional practices.

In recent decades the power and influence of the food industry has increased dramatically²³. Today, even many privileged human beings seem to believe that they cannot prepare their own children's food, that it must be made in a factory and that a health professional must tell them how to feed their children. This is astounding if you consider that other higher primates select appropriate foods for their young²⁴. The need for 'scientific' authority to intrude into our personal eating decisions has arisen because food environments have changed rapidly and drastically during the 20th century. This statement is not to glorify the past; bouts of hunger or nutrient deficiency have been part of the human condition for centuries, often caused by political decisions and inequity²⁵. Nevertheless in order to reflect on our topic we must take the long view: **the very success of humans as a species shows that we learned how to eat and how to feed our children long before learning, the formal science of nutrition and communications media existed.**

²² The word 'wean' is derived from an old English word meaning 'to accustom'. The word weaning is not used because inconsistent interpretation causes confusion.

²³ Richter J. *Public-Private Partnerships and International Health Policy-making*. Ministry of Foreign Affairs of Finland. 2004.

²⁴ See publications of Sarah Blaffer Hrdy: www.hup.harvard.edu

²⁵ See: Davis M. *Late Victorian Holocausts: El Niño famines and the making of the Third World*. Verso 2001. Also: Becker J. *Hungry Ghosts: China's Secret Famine*. John Murray 1996.

Article 24 of The Convention on the Rights of the Child (CRC)²⁶ refers to the 'provision of adequate nutritious foods and clean drinking water' but avoids specifying how this is to be achieved. It does not mention that the lack of access to water and nutritious food may be due to processes of 'development'. During the 20th and 21st century, thousands of hectares of food-providing land and forest have been appropriated for non-food production (or food for export) and water sources have been contaminated for industrialisation purposes²⁷. One researcher has noted that children may be better fed during economic downturns²⁸. High prices for cash crops often tempt subsistence farmers to divert more land for that crop. This has led to the need for food aid in fertile self-sufficient regions²⁹. Wangari Maathai's statement quoted above describes a process which damages nutrition. Ironically, the cash crop, tea, which has replaced the food crops of her childhood, is an anti-nutrient. Its consumption with food inhibits the absorption of iron in the diet (See Appendix 2). Tea drinking with meals contributes to iron deficiency anaemia (IDA) in women, infants and children and its cultivation takes fertile areas out of food production³⁰.

In common with many others, my vision is of a world where there is egalitarian food security for all; where the majority of humans get their nutrients from their food (and sunshine); where unbiased public education ensures that families have the knowledge and skills to feed their children without the need for different or specially made foods and where government policies protect public health rather than private profit. Many publications addressing child undernutrition ignore the underlying causes of the injustices that provoke it. They may go into great technical detail about the nutritional content of the diet often with the underlying assumption that a mass-produced industrially processed food is the way to deal with the problem. Funding may only be available for technical solutions.

1.7 Nutrition

Nutrition is the most inexact of sciences. There are no absolute truths and no perfect diets; the firm convictions of one decade can be superseded in the next. For example, sugar was viewed as a super food in the 19th century and, as an addition to the diet of poor families who struggled to meet their energy needs, it saved lives. It also conserved vitamin C rich fruits for the winter. It is now a key villain in the obesity pandemic and is implicated in epidemics of dental caries in both poor and rich societies³¹. However, though micronutrient poor (it lacks vitamins and minerals), it can still be useful in certain circumstances. In the 20th century meat was seen as a super food. Its overconsumption is now implicated in the chronic diseases of affluence yet if included in complementary feeding it could do much to combat iron deficiency anaemia. Most meat is eaten by men³². As a group they need less than women and children, and men who get sufficient energy in their diet might be healthier if they reduced meat consumption³³.

²⁶ The General Assembly of the United Nations. *The Convention on the Rights of the Child*. Adopted 1989.

²⁷ The problems of the Ogoni people of Nigeria have been well-documented. Oil industry development has harmed health and food security.

²⁸ Madeley J. The crisis has a silver lining. *UNICEF News*. 1984.

²⁹ Palmer G. Work, economics and the value of mothering. In: *The Politics of Breastfeeding*. Pinter & Martin. 2009: pp319-314

³⁰ This does not mean that tea is bad for healthy adults, indeed it has health advantages, but it is ironic that it is cultivated in areas of the world where women and children are undernourished due to lack of access and entitlement to nutritious food.

³¹ Moynihan P Dental disease. In *Human Nutrition 11th edition*, eds C Geissler & H Powers, pp461-478. Elsevier 2005.

³² Beardsworth A et al. Women, men and food: the significance of gender attitudes and choices. *British Food Journal* 2002;104 (7): 470-491.

³³ Besides cardio-vascular disease, excess consumption of red meat is associated with bowel cancer, Alzheimer's disease and arthritis. There are also associations with osteoporosis and breast cancer. The latter may be linked to the use of growth hormone in animal husbandry.

We must highlight the importance of pleasure in eating. This is not just to do with taste and skilled cooking but the company and affection involved. When humans eat together their oxytocin levels increase and the digestion and metabolism of their food becomes more efficient. A child eating on the lap of a mother or relative who loves him may actually utilise his food better³⁴. The pride and joy that a family takes in food preparation and meal sharing is as important for children as adults. Breastfeeding is a pleasure for a child, eating must be too.



No stance in nutrition is simple. Even popular definitions are unreliable. Foods are classified too roughly and the conventional perceptions of 'protein, carbohydrate or fat food' are misguided. All grains contain protein (sufficient for a balanced diet) yet are classed as carbohydrate foods. Beans, often classed as protein foods, contain carbohydrates; other 'protein foods' such as some meats and cheeses are predominantly fat foods.

Some groups of people may be genetically predisposed not to metabolise certain foods³⁵ so what is a 'healthy' and useful food for one group may harm another. Nevertheless, the extraordinary trait of the human species (shared with pigs, rats and cockroaches) is the ability to survive and thrive on a

broad range of diets. An Inuit living almost exclusively on sea mammals and fish may never eat a vegetable in her life; South Asian or European vegetarians may never eat a scrap of meat or fish in their lives. If they are healthy then they eat a 'healthy' diet. Their group's adaptation to their environmental resources is the reason they have survived, and even flourished, in their particular region. For most diets there is a 'swings and roundabouts' benefit and cost. The traditional Inuit diet, rich in omega-3 fatty acids, is protective against cardio-vascular disease (CVD) so an Inuit is unlikely to suffer a thrombosis due to a blood clot³⁶. However she has a risk of excessive bleeding after an injury because her blood can be slow to clot. The high fibre and complex carbohydrates in a traditional South Asian diet protect against CVD and bowel cancer but the low levels of haem iron (ie from flesh sources) make women and children more vulnerable to iron deficiency anaemia. The 'western' diet has become increasingly energy-dense, despite fewer people being physically active, to the detriment of health. All these issues are relevant to children's diets which in essence are very slightly adapted forms of the adult diet. **There is no need for 'baby food' to exist for the normal healthy child.**

Nutritionists have often got things dreadfully wrong, even without influence from the food industry. In the late 20th century the focus in infant and young child feeding was to increase the energy-density of the diet by adding oil, fat or sugar to the traditional starchy staple because nutritionists had calculated energy and protein 'gaps'. If the child was getting enough energy then adding oil (or fat or sugar) diluted the density of micronutrients (ie minerals and vitamins) in the food. Energy-dense foods will make a child feel full quickly and prevent her fulfilling her micronutrient requirements³⁷. Macronutrient (ie energy and protein) needs were over-estimated because nutritionists had ignored the energy and protein contribution to the diet from breastmilk³⁸.

³⁴ Uvnäs Moberg K *The Oxytocin Factor*. A Merloyd Lawrence Book, Da Capo Press (2003).

³⁵ For example: favism is a genetic trait common in ethnic groups of the Mediterranean region. People with favism lack the enzyme to digest certain beans (fava beans or vicia faba). Their consumption can lead to acute haemolytic anaemia and can even affect an exclusively breastfed baby if her mother eats the beans.

³⁶ See: Mann J. Cardiovascular Disease. In Geissler C & Powers H, eds. *Human Nutrition 11th Edition*. Elsevier. 2005.

³⁷ Lutter C. Meeting the challenge to improve complementary feeding. *SCN News* 27 December 2003 pp 4-9

³⁸ www.who.int/child-adolescent-health 2008.

Section 1: The big picture

Most (but not all) inadequate complementary feeding occurs in food insecure environments. Children in industrialised societies may also suffer inappropriate feeding, but they are less likely to die or become stunted. In the late 20th century a new problem of malnutrition emerged, that of overweight and obesity. **This problem is now prevalent in poor countries creating what has been termed 'the double burden of malnutrition'**³⁹. It may be that inappropriate complementary feeding is more significant in the obesity pandemic than whether a child is breastfed or not.



Summary of key points of Section 1

- This paper is not prescriptive but intended to stimulate thought.
- Successful child feeding has been achieved without the intervention of experts.
- Food and water entitlement and availability are crucial.
- Safe drinking water is not as important a factor in health as water quantity and access.
- Complementary feeding is as much about acculturation as physical development.
- Complementary foods often become breastmilk substitutes.
- The promotion of the use of ready-to-use therapeutic foods, designed to treat severe malnutrition in the context of emergencies, in normal conditions may have negative consequences.
- Nutrition is an inexact science.
- Political decisions affect nutrition.
- Both poor and rich children may be inappropriately fed.
- 'Baby food' need not exist.

³⁹ Standing Committee on Nutrition (SCN) 33rd Session (13-17 March, 2006). Tackling the Double Burden of Malnutrition: A Global Agenda. SCN, Geneva, Switzerland.

Section 2: A CLOSER LOOK

2.1 Food and nutrition: an historical perspective

To reflect on our topic we must ask the following questions:

- What is the 'natural' diet of small children?
- Why do many policy makers and nutritionists endorse the creation of special foods for infants and young children when for the greater part of human existence they ate the same foods as adults?
- Were our ancestors' children at greater risk of malnutrition?

Archaeological scientists have discovered much about early humans' food supplies and eating practices. Humans were living (and using tools) around 100,000 years ago⁴⁰. Of the 80 billion humans who have walked this earth, 90% have been hunter-gatherers⁴¹. Relative to human time on earth, farming and agriculture is very new, around 10,000 to 12,000 years old, and dairying a little younger. Industrial society is a mere 200 to 300 years old. In the gradual transition from hunting and gathering to farming there existed 'multi-track food webs'. These were comprised of some cultivation existing alongside hunting, gathering, foraging and fishing, sometimes by different groups, sometimes not⁴². Even after agriculture and pastoralism began to dominate production, these other activities continued and today, practices such as fishing echo our ancestors' survival skills.

2.2 Evolution and food systems

Humans (as child and adult) evolved to eat a diverse diet and multi-track food webs provided these. Diverse diets are associated with reduced disease and mortality⁴³. Farming only, or industrialised food only, can cause nutrition problems. We can see examples of multi-track food webs today which include industrialised foods. For example, financially secure, highly educated Europeans may eat a mixture of farmed (grains, meats, vegetables, fruits and fish), foraged (wild fungi, berries, land, river and sea molluscs), hunted (wild mammals, game birds, fish) and industrially processed foods (wheat ground into flour and made into bread outside the home).

During the past 100 or so years there has been an accelerating trend towards the use of industrialised food products and food systems. Some have been beneficial. For example iodine deficiency, a 'natural' dietary deficiency, is endemic in certain geographical regions. This was (and continues to be) overcome through salt-iodisation or trade in preserved foods from non iodine-deficient regions⁴⁴. **Some industrially-processed foods play a useful role in 21st century multi-track food webs⁴⁵. It is when they are inappropriately promoted and marketed and suppress other food production and use, that they can have adverse effects on diets.**

⁴⁰ I refer to modern humans (*homo sapiens*) and not other early hominids such as *homo erectus*.

⁴¹ Lee RB and Daly R, eds. *The Cambridge Encyclopaedia of Hunters and Gatherers*. Cambridge University Press 2002.

⁴² Jones M. *Feast: Why Humans Share Food*. Oxford University Press 2007. See also: Diamond J *Guns, germs and steel*. Vintage 1997.

⁴³ Johns T. Dietary diversity, global change, and human health. Proceedings of the symposium "Managing Bio diversity in Agricultural Ecosystems", Montreal, Canada, 8-10 November, 2001.

⁴⁴ The Himalayas, Alps, US Great Lake Region, Andes and other mountainous regions not covered by sea water during the ice age lack iodine in soils. Populations suffered (some still do) endemic iodine deficiency (ID) resulting in high prevalence of goitres, cretinism and lowered intelligence. ID also occurs in riverine areas where seasonal flooding washes away soil. Deficiency can be exacerbated by goitrogens in food plants such as cassava or millet. Logging and other soil eroding activities are also implicated. Salt iodisation has been a successful strategy for addressing this 'natural' problem.

⁴⁵ Eg tinned fish can dramatically improve and diversify inland region diets and is especially appropriate for infants and young children.

It is of interest that 'brands' came into being in the 19th century to protect the public from contaminated, adulterated or falsely described food. Cheating our fellow human beings existed long before industrialisation. Watering the milk or making bread with contaminated flour goes back to ancient times⁴⁶. Brands were established to indicate trust in product quality because the buyer could trace the provider. However the current dominance of giant transnational food corporations is not driven by the quest for improved nutrition but instead to maximise profits. That initial trust of the 'brand' has been exploited to extremes and has become a worshipped marketing tool. **Nevertheless not all industrialised food is bad and not all 'natural' food is good⁴⁷**. Certain foods require highly technical processes. The burning off of the hard outer casing of the cashew nut (cashew paste is a good food for young children) releases cyanide compounds and is safer and easier to carry out in a factory than in the domestic environment. Cocoa beans (rich in iron, calcium and vitamin A) are difficult to process at household level. Canned fish has a key role in combating iodine deficiency and is nutrient-dense.

The introduction of non-indigenous foodstuffs has improved nutrition⁴⁸. Seasonal scurvy was common in Britain until the introduction of the potato from the Americas because, unlike most grain or root staple foods, it contains vitamin C. Imported sugar enabled the conservation of sour summer fruits (eg jam) which protected against scurvy. It enabled the inedible to become edible. Few could enjoy bitter oranges, acid gooseberries, rhubarb and other sour wild fruits unless sweetened. Honey supplies can be haphazard and in any case domesticated bees must be fed with sugar syrup when honey is harvested⁴⁹.

Food systems have always been dynamic. Different systems work in different environments. In some regions there may have been a trade-off between food security and optimal nutrition from food. Farming and grain storage protected humans from starvation after adverse weather and seasons but monocultures led to nutrient deficiency disease⁵⁰. In the 21st century millions of human beings with no access to land and scant food-survival skills survive on industrialised foods but these are associated with obesity and its associated diseases⁵¹. Both systems can be associated with a deterioration in the quality of nutrition. Most modern humans would starve in a forest rich in foods because they have lost the skills to access its resources. Also subsistence farming, even with good climate and fertile soil, requires constant gruelling work and pests can wipe out a staple crop. **In many societies women were (and are) the main food producers and their work burdens are overwhelming. The removal of men for labour or military service could make a big difference to family food production.**

Context is everything. An African subsistence farmer may be unable to nourish her children adequately because she lives in an iodine deficient region and has no cash to buy foodstuffs (eg tinned fish) containing iodine. If her staple food is cassava, this exacerbates the risk of iodine deficiency⁵². A US woman, especially a poor one, may be unable to establish healthy eating habits in her children because she has scant access to diverse fresh foods, lacks the skill and time to

⁴⁶ Wilson B. Swindled: *The dark history of food cheats*. John Murray 2008.

⁴⁷ Many plants contain poisons, some edible ones in certain conditions, eg underripe ackee fruit is poisonous, the ripe fruit is not. Eating the *Lathyrus sativus* pea causes lathyrism, resulting in muscle cramps, weakness or paraplegia. This occurs in Central India and Ethiopia. Also nutritious animals can become poisonous eg small birds such as quails can eat the poisonous plant hemlock without harm, but if the quail is eaten it can be fatal. Occasional algae 'blooms' in seawater can make hitherto nutritious shellfish poisonous.

⁴⁸ The definition of 'indigenous' can be extrapolated from ecological theories which judge that any plant (or animal) introduced after 1500 CE is 'non-indigenous'. Therefore the potato and the tomato outside the Americas are non-indigenous plants. Theory based on Eser U. Ecological and normative fundamentals of value-judgements in nature conservation: the case of non-indigenous plants. In Freese L, ed. *Advances in Human Ecology*, Vol. 7. JAI Press Inc. 1998: p. 293-312

⁴⁹ As well as scurvy, marginal vitamin C deficiency remained a problem in Britain up to the 1940s. Potatoes are one of the best starchy staples because of their broad nutrient content and storage qualities. Sour fruits have other benefits, eg marmalade contains traces of calcium, iron and fibre.

⁵⁰ For example, the vitamin B deficiency diseases pellagra and beri-beri were associated with predominant maize and rice diets respectively.

⁵¹ About half the world's population now lives in urban environments.

⁵² Cassava contains goitrogens, substances which inhibit iodine absorption.

prepare them, and is exposed to aggressive marketing of high sugar/salt/fat containing processed products⁵³. Her child may receive plenty of nutrients to grow rapidly but may develop tastes which predispose him to a lifetime of overweight or obesity. It may be cheaper in terms of access and cost for a poor US woman to buy ready-made packaged or takeaway food.

Better educated and richer Europeans and North Americans have more diverse diets and better health than less-educated and poorer citizens who have a narrower diet. In industrialised countries the greater the inequality the greater the prevalence of overweight and obese children (and adults). This relationship also applies between US states⁵⁴. US 'fast food' style eating has spread across the world, damaging nutrition and health and the multi-track food webs which have underpinned some of the most balanced diets which are ideal for infants and young children. **The cycle of deskilling and dependency on industrialised products is bad for infants and young children⁵⁵.**

2.3 Salty, sweet and fat: the human drives for taste

The innate human drive for nutrient density is ruthlessly exploited by the marketing of industrialised foods. Most humans seek out salt, sweet and fat in foods: a craving for saltiness led us to the high mineral content of flesh foods, for sweetness to riper (and therefore more digestible) fruits and for fullness (satiation) to the energy-dense foods (eg fatty nuts, seeds (ie cereals) and certain parts of animals). The delight in finding the sweetest honey ant (see Appendix 1), the fattiest fish or the 'strongest' tasting morsel was a nutritional advantage for adults and children living in an environment where humans (including small children) had to be active and ingenious in order to gather, forage or hunt their food⁵⁶.

2.4 Human plumpness

Another innate human survival trait is the laying down of body fat. Only sea mammals equal or exceed the human capacity for fat storage which provides an energy-reserve to survive periods of scarcity. This is one reason why humans are more successful (in reproductive terms) than other primates. Female humans store more fat than males⁵⁷. This is why humans (unlike most other land mammals) can maintain a pregnancy and lactate even during times of food shortage⁵⁸. Plumpness enables children to get through periods of illness. I am not aware of research in this area (and it would be unethical to do) but it may be that the welcome decline in common childhood infections may have exacerbated problems of overweight and obesity. Until the latter half of the 20th century, the majority of children suffered inevitable periods of poor appetite (anorexia) and weight loss during bouts of measles, mumps and other infections. We can only rejoice in the life-saving benefits of mass immunisation but may consider that like TV and motor transport, this may be another factor in the 'obesogenic' environment⁵⁹.

⁵³ Both in the USA and the UK it is often hard to find sources of high quality fresh foods, especially in poor residential areas.

⁵⁴ Wilkinson R and Pickett K *The Spirit Level*. Allen Lane 2009.

⁵⁵ See Schlosser E *Fast Food Nation*. Allen Lane and Lawrence F (2008). *Eat your heart out: why the food business is bad for the planet and your health*. Penguin Books 2001.

⁵⁶ Sheiham A. Sweet taste. Paper in progress. August 2009.

⁵⁷ Fat is not always visible: a slim woman will still carry more body fat than a man of roughly the same size.

⁵⁸ Many other mammals, (eg badgers) will reabsorb the foetus during times of food scarcity. Women have borne infants and lactated successfully in concentration camps, during famines and other adverse conditions. This does not mean that food deprivation is good for the mother or child but the robustness of human reproduction is amazing. See Prentice AM & Prentice A. Reproduction against the odds. *New Scientist* 1988; 118:42-46

⁵⁹ *Diet, physical activity and health*. Geneva, World Health Organization, 2002 (documents A55/16 and A55/16 Corr.1). NB: Besides the mortality reduction due to immunisation, there is the protection from disability such as, for example, eye and/or brain damage from measles: I am in no way suggesting that childhood infections are a good thing, merely a factor to be considered.

The favouring of plumpness in children and cultural practices to urge them to eat energy-dense foods probably arose because plump children survived infections better than thin children. This custom actually contaminated scientific understanding during the 20th century. The 40 year belief that the greater weights of US children, who were artificially fed and given early complementary foods, were the ideal, has contributed to current childhood nutrition problems⁶⁰.

2.5 The timing of complementary feeding

It has been deduced from a range of evidence sources that for the greater part of human existence, children breastfed for between four and seven years⁶¹. The resulting lactational amenorrhoea protected women from the adverse effects of closely spaced pregnancies and, together with an iron-rich diet, from iron-deficiency. Good maternal iron status and delayed umbilical cord-cutting would have facilitated good iron stores in infants at birth⁶². **Iron (and zinc) is the crucial nutrient that breastmilk does not provide in adequate amounts in the second year of life** (see Appendix 2).



Breastfeeding provided food security during drought or other adverse conditions. A child might have alternated between periods of exclusive and non-exclusive breastfeeding during toddlerhood depending on environmental food abundance. **It is often still assumed that the main reason for complementary feeding is an insufficient quantity of breastmilk to exclusively feed in the second year but, as has been demonstrated by lifelong wet nurses⁶³, breastmilk quantity waxes and wanes according to the amount of suckling. Complementary food is necessary to fill a (variable) micronutrient 'gap' not (in most cases) an energy and protein gap.** Modern social and economic customs impede women from the frequent and continued breastfeeding long after infancy which would have been the norm for our ancestors.

The use of an age based cut-off for the introduction of complementary foods is unphysiological and is a clumsy (though necessary) public health tool. As Gill Rapley has pointed out so cogently, children do not crawl, walk, cut their teeth or talk at an exact age so why are they all expected to need complementary feeding at the same age⁶⁴.

⁶⁰ www.who.int/child-adolescent-health 2008.

⁶¹ Dettwyler KA. A time to wean: the hominid blueprint for the natural age of weaning. In: Stuart-Macadam P & Dettwyler KA, eds. *Breastfeeding: Biocultural Perspectives*. Aldine de Gruyter, 1995: p.39

⁶² Chaparro CM et al. Effect of timing of umbilical cord clamping on iron status in Mexican infants: a randomised control trial. *www.thelancet.com* 17 June 2006.

⁶³ Wet nurses might suckle two or more infants simultaneously and continued professionally to suckle series of infants for several years without adverse effects on their health. See: Palmer G (2009). *The Politics of Breastfeeding*. Pinter&Martin. 2009: p186. Also: Fildes V. *Wet-Nursing*. Basil Blackwell 1988.

⁶⁴ Rapley G. Baby-led weaning: a developmental approach to the introduction of complementary foods. In Hall Moran V & Dykes F. *Maternal and Infant Nutrition and Nurture Controversies and Challenges* pp275-298. Quay Books 2006.

It is only recently in human existence that people have taken age so seriously. Mothers would have responded to infant behaviour. Eating utensils were not used for thousands of years. Why would a breastfeeding mother bother to coax her child to eat something when the breast was always there? [I ask the same question today: why bother?] When a child can sit up, fix his gaze on an object, reach out and grasp it, he will put something edible in his mouth, if food is available. As he gets older, improving dexterity and visual acuity enables him to pick up smaller objects. At the same time his natural maturation of oral development enables him to chew. Children do not have to be taught to eat, these developmental reflexes are innate⁶⁵. **Pureed, semi-liquid and diluted foods are unnecessary because if a child cannot chew then he is not ready to have anything other than breastmilk (or the best possible breastmilk substitute). These foods (both industrially or home produced) that are customarily given to infants are inferior breastmilk substitutes.** Just as some children start to walk at nine and others at 15 months, so some children might eat earlier or later than others. Some breastfeeding infants are uninterested in foods until the end of the first year or later whilst other five month olds reach out and grasp food. All children are different. **The six-month edict is a public health guideline, not a description of infant behaviour or normality.** The risk is that children with early iron deficiency anaemia may lack appetite and the energy to reach out and grasp their foods, but this is an issue of cord-cutting protocols, food availability and ignorance (see Appendix 2). It is not an innate problem of children but of their environment.

There is evidence that children exposed to a range of 'wholesome and natural' foods will self-select a healthy balance that meets their nutritional needs⁶⁶. The issue is access to diverse and nutritious foods. Amidst the multi-track food webs, our ancestors' babies and toddlers ate the same food as older children and adults, learning through imitation. Mothers and other family members probably assisted the child at first. Many modern children are provided with 'activity learning' toys to stimulate their cognitive skills. These replace the fascinating lessons of learning how to prize open a mollusc shell or split the hard casing of some fruits. For older infants mothers and others would have selected softer parts of animals such as marrowbone and brain tissue and also pre-chewed some harder foods. Passing food directly to the baby from a mother's mouth, known as 'kiss feeding' is still practiced by some groups today and may be the origin of romantic/sexual kissing⁶⁷. Most children would have fended for themselves quite quickly. In a food rich environment children can do well without being actively fed, though children benefit from a mother or other loving carer who notes whether they are eating or not and shares their own food. However it may be that the child who did not actively seek out food might have been allowed to die because autonomy and self-sufficiency were important for the group's survival⁶⁸.

2.6 What did prehistoric young children eat?

Evidence indicates that prehistoric diets were more micronutrient-dense than modern diets⁶⁹. Existing hunter-gatherers whose diets echo those of prehistory do not have modern health problems (eg hypertension, obesity, cardiovascular disease, diabetes) nor their children the usual rates of gastrointestinal and respiratory infections. Derrick Jelliffe reported that children of the nomadic hunter-gatherer Hadza of Tanzania did not develop the malnutrition or deficiency diseases of the surrounding farmers' children⁷⁰. Most hunter-gatherers were nomadic or semi-nomadic and

⁶⁵ Rapley G Op cit

⁶⁶ Robertson A et al (eds). Food and health in Europe: a new basis for action. *WHO Regional Publications. European Series*. No 96, Copenhagen 2004. Also: Westenhoefer J. Establishing good dietary habits - capturing the minds of children *Public Health Nutrition* 2000: 4(1A), 125-129

⁶⁷ Jones M. op cit

⁶⁸ Turnbull C. *The Mountain People*. 1972. Anthropologist Colin Turnbull describes the Ik people of Uganda who left their children to fend for themselves in a harsh environment.

⁶⁹ Among many techniques scientists can discern from bone analysis is how long a child was breastfed.

⁷⁰ Jelliffe DB et al. The children of the Hadza hunters. *Journal of Pediatrics* 1962;60 (6)

Section 2: A closer look

therefore did not create the reservoirs of disease that settlement induces. Poor environmental hygiene (contaminated water and inadequate faecal disposal systems) and resulting infections contribute to the cycle of child malnutrition. Sick children do not feed well and poorly fed children are more vulnerable to infection. Some specific nutrient deficiencies are linked to the environment as much as diet. For example, besides geographical iodine deficiency, vitamin A deficiency has been directly linked to the absence of sewage disposal systems.⁷¹ This is because frequent diarrhoeal disease damages the intestine, causing nutrient malabsorption.⁷²

Some nutritional theorists argue that our bodies evolved over thousands of years to cope with entirely different dietary patterns from those of the contemporary industrialised world. **The adaptability of humans is one reason why diets vary throughout the world.** However during recent centuries changes in diet and behaviour have happened extremely rapidly. Our bodies are probably still adapted to a time when humans were physically active and ate a sparse and varied diet of foods rich in micronutrients.



Older babies and young children would have eaten or been fed parts of small mammals, molluscs, insects and other invertebrates, shellfish and other coastal sea creatures. Nuts, fruits, leaves, shoots, tubers, wild grass seeds and fungi may also have been eaten but the texture and nutrient density of small animals were ideal to fulfil small children's nutritional needs. **Breastmilk did not evolve to provide much iron and zinc after the first year because it was not necessary⁷³.** Just as humans evolved to get their vitamin D from sunshine and not from breastmilk, so they met their iron and zinc needs from birth stores and then sources in their environment (see Appendix 2).

⁷¹ Ahmed F, Azim A, Akhtaruzzaman M Vitamin A deficiency in poor, urban, lactating women in Bangladesh: factors influencing vitamin A status. *Public health Nutrition* 2003; 5,447-52

⁷² Despite the health advantages of the hunter-gatherer lifestyle, throughout the 20th and 21st centuries all governments have at best failed to protect and at worst persecuted nomadic and hunter-gatherer modes of living. Most settled peoples patronise or despise the nomadic groups who live in their countries. We have much to learn from them.

⁷³ Breastmilk also does not provide sufficient vitamin D. The term vitamin is a misnomer and vitamin D is a hormone triggered by sunlight. Humans evolved to live out of doors and vitamin D deficiency is a problem of lifestyle not diet. I will not address this issue in detail in this paper.

2.7 Are cereals appropriate food for babies?

Vegetable and fruit purees and cereal porridges were not part of the human diet until relatively recently, that is until around 10,000 years ago⁷⁴. The very word 'baby food' means a soft, semi-liquid adaptation of an adult food, often cereal-based. Small humans did not evolve to consume these products as their first foods and there is scientific theory to demonstrate this⁷⁵.

Our ancestors' children were getting iron by scrabbling in the earth (a rich source) and snacking on little creatures (see Appendix 2). As described above, infants go through a phase when they instinctively put everything they find on the ground in their mouths. Today's adults are usually horrified, remove the object, replace it with a plastic toy or dummy and try to place the child in a 'safe' environment. However, if you allowed your one year old to crawl in a garden she might pick up an insect, worm or snail and eat it, together with some soil, without your knowledge. With some justification, we fear parasites, poisonous animals and plants harming our children. However humans are social animals and the accumulated knowledge of what was safe or not would have been held and passed on orally by a group familiar with their natural environment. Though parasites (such as hookworm or ascaris) can exacerbate nutrient deficiencies **we have to be aware that being entirely parasite-free may be a trigger of allergy**⁷⁶.

Iron deficiency is a major and unresolved nutrient deficiency of young children. Iron is best provided by foods of animal origin particularly meat and fish. They are rich in the well absorbed form of iron (haem iron) and enhance the absorption of the less bioavailable form of iron (non-haem) in plant foods, if eaten together. For example small molluscs are good sources of bioavailable iron. They are also soft (or easily softened) and digestible.

Public health authorities give out ambiguous messages. For example FAO/WHO states: *"It is possible to meet these high requirements (ie for iron) if the diet has a consistently high content of meat and foods rich in ascorbic acid (vitamin C). In the most developed countries today, infant cereal products are the staple foods for that period of life. Commercial products are regularly fortified with iron and ascorbic acid and they are usually given together with fruit juices and solid foods containing meat, fish and vegetables. The fortification of cereal products with iron and ascorbic acid is important in meeting the high dietary needs, especially considering the importance of optimal iron nutrition during this phase of brain development"*⁷⁷. We have to question why cereals are promoted as the principal food of infants and young children in rich countries when they are naturally low in key nutrients. There may be extreme caution or even fear of giving meat, fish and sea food to infants and young children. It is not a question of poverty because in industrialised countries even the diets of disadvantaged adults may contain excessive amounts of meat⁷⁸.

I have seen a toddler in Taiwan eating cooked oysters and my Spanish daughter-in-law assumes she ate all these seafoods before she could walk. However in many regions flesh foods are reserved for older children and adults or only introduced to young children with great caution. In areas where their value for small children is traditionally recognised (such as parts of China), poor people cannot afford them, whilst the wealthy are increasingly ensnared by marketing to give commercial baby foods based on cereals, over-priced purees of locally available fruits and vegetables or

⁷⁴ Stone querns for grinding grain have been found and dated to have been made just around the time farming was becoming established 10,000 years ago.

⁷⁵ Hamosh MS. *Breastfeeding: Unraveling the Mysteries of Mother's Milk*. 1999. www.Medscape.com/hamosh/w120.hamosh.htm cited in Williams C. The Composition of Breastmilk and how it compares with Formula and Cows' milk. *WHO Consultancy Review Paper* 2007 (unpublished).

⁷⁶ Braun-Fahrlander C Does the 'hygiene hypothesis' provide an explanation for the relatively low prevalence of asthma in Bangladesh? *Int J of Epidem* 2002. 31(2):488-489.

⁷⁷ FAO/WHO Chapter 13 Iron. In *Expert consultation on human vitamin and mineral requirements*. FAO/WHO 1998.

⁷⁸ No adult needs to eat meat more than once a week and reduction would benefit health. Studies of vegetarians in industrialised countries consistently show health advantages.

spurious versions of popular dishes 'filled' with starches and thickeners. A complementary food on the UK market contains 'organic sweetcorn and potato'⁷⁹. These vegetables are naturally low in iron and the nutrient is not mentioned on the label's nutrition information. This product replaces breastmilk or a more nutritious solid food with micronutrient-poor starch.

Most modern babies' and toddlers' first non-milk foods are starchy staples such as rice or other cereal-based porridges either home-prepared or industrially produced. Some parents give mashed fruits or 'soups'. Despite the progress towards evidence-based public health edicts, I have not come across any challenge to these customs. Official public health messages, commercial advertising and popular perception see rice as a 'gentle' first food, benign and beneficial. In fact though an excellent basis for the adult diet, for infants and children under two years it is at best a low-nutrient food that accustoms the child to a texture and taste; at worst it replaces breastmilk. It is a breastmilk substitute rather than a complementary food.

The solution to cereal's lack of key nutrients for babies has been to compensate with industrialised fortification of commercially produced cereal products and to urge their use. Health and nutrition agencies through their public health messages do this as much as the companies do so through marketing. Cereal as a staple food is fine for older children and adults but it is an inadequate and inappropriate complementary food for infants and children under two.

The key fact to be aware of in this discussion is that starch is the major component of cereals and the enzyme amylase is needed to digest this. Babies do not develop the enzyme amylase in adequate quantities to digest starch until they are two years old and over.

What can be said about this situation? Many people, and not just vegetarians, are horrified at the idea of giving a six month old a flesh product. Yet biologically it is more appropriate for meeting the nutritional needs beyond breastmilk. Breastmilk actually contains some amylase but cows' milk and infant formulas do not. Its purpose in breastmilk is unclear but it may act as an antibacterial factor degrading bacterial cell walls⁸⁰. Alert readers may consider that this amylase is an evolutionary adaptation to the practice of feeding babies with cereals and that breastfeeding might aid their digestion. However there is insufficient amylase in breastmilk to break down the starch in a cereal meal.

Cereals have other adverse effects. The Ethiopian staple teff is exceptionally high in iron but most cereals, particularly rice, wheat and maize, are low in this key nutrient. The minerals and vitamins predominate in the outer part of the cereal grain (the husk) which babies cannot digest. This husk also contains phytates which remove important minerals such as iron, zinc and calcium from the body. Phytates strongly inhibit iron absorption⁸¹. The husk provides fibre which is protective against bowel cancer and other adult diseases **but babies and toddlers do not need fibre**. To combat this indigestibility the husk is removed. This age-old practice was not due to awareness of the effects of phytates but because human societies favoured the 'whiteness' of refined cereals for cultural reasons. The word 'wheat' is related to 'white' and many societies associate whiteness with 'purity' and quality⁸².

Modern industrialised society has addressed the problem of the widespread practice of feeding babies the 'wrong food' by fortifying dehusked cereals with the minerals and vitamins removed in the refining process. Whatever our feelings about the food industry, this compromise of

⁷⁹ Organix First 'Organic Sweetcorn and Potato' to be given 'from 4 months' and endorsed by 'Allergy UK' with 'Free from Gluten' on the label. Purchased 2008.

⁸⁰ Hamosh MS op cit. (ref 75)

⁸¹ Excess iron in the diet can be dangerous so there is a useful role for phytates. Iron-overload is a serious medical condition and is more common in men. Wholegrain diets are beneficial for most older children and adults and are protective against some chronic diseases such as CVD and bowel cancer.

⁸² Martin Jones in *Feast* (op cit) states that barley is hardier, more adaptable to difficult climates and contains higher levels of nutrients than wheat.

refinement, followed by enrichment, has provided children with a more nutritious foodstuff than the normal polished, dehusked cereal that adults favour. Parboiling of rice before dehusking makes some B vitamins 'stick' to the inner part of the grain but minerals in the husk are lost⁸³.

Certain cereals contain the 'toxic protein' gluten. It is present in wheat, barley, rye and oats but not maize and rice⁸⁴. Gluten intolerance (coeliac disease) is a common genetic disease in Europe which affects between one in 130 to one in 500 of the population and one in 133 in the USA. The gluten damages the mucosa of the small intestine and affects nutrient absorption⁸⁵. Early introduction of gluten containing cereals to infants may be a factor in type 1 diabetes⁸⁶.

Long before industrialisation, societies devised processing methods which by chance enhanced the nutritional value of cereals. The ancient peoples of Central America made tortillas with maize processed with lime (the mineral not the fruit). This made the amino acid tryptophan and the B vitamin niacin bioavailable. Maize was taken to Europe, Africa and North America without learning these techniques and pellagra (niacin deficiency) became widespread in regions where maize became the staple food.

Fermentation is another ancient process which enhances vitamin content, destroys phytates, makes iron more bioavailable and improves digestibility⁸⁷. The microorganisms or enzymes that cause the biological changes overwhelm pathogens and render foods safe for storage without refrigeration. The leavening process of yeasted breads (as opposed to unleavened flat breads) destroys or reduces the intrinsic phytates which inhibit iron absorption. Yoghurt and other fermented milk products are safer than fresh milk, and fermented vegetables such as German sauerkraut and Korean kimchee are micronutrient rich and anti-pathogenic.

Our current knowledge of cereals indicates that it is scientifically illogical to endorse the convention that a child's first food in addition to breastfeeding must be a cereal-based soft food. It is merely culturally and commercially expedient.

2.8 A word about animal milk

Though low in iron, animal milk can be a useful food and provide a range of nutrients. Until around 10,000 years ago, animal milk was not used as a food so it is a relatively new food product for human society. After early childhood, most humans do not produce the stomach enzyme (lactase) to digest milk sugar (lactose). However this does not mean that animal milk and its processed products (fermented milks, yoghurts, cheeses, butter) are bad for everyone. Northern Europeans and other pastoralist groups developed the mutation of producing lactase after early childhood and so could digest animal milk into adulthood. Probably because of European cultural dominance, this normal trait (of not producing lactase) is now described as 'alactasia', as though it is abnormal. People with 'alactasia' get pain, wind and flatulence if they drink fresh milk. The 20th century worship of milk has been so great that products have been developed to add to milk so that, for example, African Americans, many of whom are genetically

⁸³ Parboiling is both ancient and modern. It probably originated in India between 2000 to 4000 years ago. It is now a common method of factory processing. See: Owen S (1998). *The Rice Book*. Frances Lincoln.

⁸⁴ Millet does not contain gluten and has higher levels of iron and calcium than wheat or rice, but it contains goitrogens which can exacerbate iodine deficiency.

⁸⁵ Trayhurn P & Stuart Wood I Diet and genotype interactions – nutritional genomics. In *Human Nutrition*, eds. C Geissler & H Powers, pp537-553. Elsevier. 2005.

⁸⁶ Guandolini S. The influence of gluten: weaning recommendations for healthy children and children at risk for celiac disease. *Nestlé Nutr Workshop Ser Pediatr Program*. 2007;60:139-51. Comment: apologies for using a Nestlé reference but this had best information. This author wrote: "In most developed countries, gluten is currently introduced between 4 and 6 months of age, in spite of little evidence to support this practice." Ironic that Nestlé manufactures and promotes gluten-containing cereals.

⁸⁷ Lorri WSM. *Nutritional and microbiological evaluation of fermented cereal weaning foods*. Department of Food Science, Chalmers University of Technology, Goteborg, Sweden, 1993.

not milk-digesting mutants, can digest lactose in cows' milk. Fresh milk drinking has not been wholly beneficial⁸⁸. The fact is that the mutant Europeans have been such colonisers and busybodies that they have spread their habits to the whole world: good for some but not for all.

In the modern world cows' milk is perceived not just as a useful food for infants and young children but absolutely essential. Governments and international agencies have invested millions in supporting the powerful dairy industries, sometimes at the cost of small local production. In common with a wide range of foods, milk can play a useful role in a mixed diet but possible negative effects are not always considered⁸⁹. Epidemiological studies have shown an association between milk intake and prevalence of iron deficiency⁹⁰. Uniquely among animal protein sources it appears to stimulate insulin-like growth factor (IGF-1) secretion and promote growth in the child⁹¹. Whether this has adverse side-effects is not known. One hypothesis suggests that early contact with cows' milk may be implicated in breast cancer in later life⁹². Some studies have linked early contact with cows' milk based products to the incidence of type 1 diabetes⁹³. Many commercial complementary foods contain powdered cows' milk. This may contain intrinsic pathogens⁹⁴.

We also know that modern dairy industries use methods whose safety is unproven. Synthetic bovine somatotrophin hormone (used to increase milk yield) is banned in Europe yet routinely used in US milk production. The use of antibiotics and other veterinary products may be unsafe. The serious and accelerating problem of antibiotic resistance by human pathogens may be connected with antibiotic use in animal husbandry, including the dairy industry⁹⁵. There are also sporadic or systemised contamination cases such as the 2008 Sanlu scandal in China where cows' milk used for manufacturing infant formula was contaminated at the source⁹⁶. The focus of concern was, quite properly, on damaged artificially fed infants but it is likely that the same milk was used for other products for young children and that adverse effects were not sought or recognised. Monitoring of these products and their effects is inadequate. Most research on complementary feeding takes place in developing countries. In industrialised countries there is an assumption that products are benign but there is little official scrutiny of foods for infants and young children unless an adverse event occurs and is documented.

2.9 Why don't we give our babies molluscs and insects?

If they are so rich in the key nutrients for babies why do we commonly avoid oysters, other molluscs or seafoods as complementary foods? They are nutrient dense and easy to swallow and digest. Little ones come in baby bite-size portions, exactly like the small toys that eight month olds love putting in their mouths. There are some valid reasons. As human populations became more settled and more densely populated, seashores became polluted with human faeces and oral-faecal transmitted pathogens infected through seafood. Such pathogens thrive in hotter climates. This

⁸⁸ Before the advent of pasteurisation and refrigeration it was a risky practice. In the UK bovine TB from drinking infected milk caused over 800,000 deaths between 1850 and 1950. Atkins PJ & Brassley P. Mad cows and Englishmen. *History Today* 1996;46(9):14-7 Brucellosis can also be transmitted from animals to humans through milk consumption.

⁸⁹ I will leave aside the major issue of the effects of cows' milk promotion and breastmilk substitute marketing on breastfeeding in this paper.

⁹⁰ Hallberg L et al. Iron, zinc and other trace elements. In Garrow JS, James WPT & Ralph A, eds. *Human Nutrition and Dietetics (10th edition)*. Churchill Livingstone 2000: p.177-209

⁹¹ WHO *Management of severe malnutrition: a manual for physicians and other senior health workers*. WHO Geneva 1999.

⁹² Reiping EJ. Breast cancer and early contact with bovine milk. Paper presented at Meeting of the European Society of Gynaecological Oncology. 1987.

⁹³ Kostraba et al Early exposure to cows' milk and type 1 diabetes mellitus. A critical overview of the clinical literature. *Diabetes Care* 1994; 17, 13-19

⁹⁴ FAO/WHO. *Enterobacter sakazakii* and other microorganisms in powdered infant formula. Meeting Report. Geneva Switzerland, 2-5 February 2004. (FAO/WHO) *Microbiological Risk Assessment Series No. 6*

⁹⁵ BMJ 27 September 2008 vol 337.

⁹⁶ IBFAN-ICDC Press Statement. *The Sanlu Fiasco: Risks of formula feeding*. 20 September 2008.



may be why certain religious and cultural groups forbade the consumption of such foods. In the 20th century, the same sea foods have been vulnerable to the health hazard of industrial contamination. Nevertheless where vigilant health and safety supervision is practiced, these products provide safe, nutrient-dense and popular foods for the rich. They may be a hard currency earner in a developing country. For example in parts of Asia, the lucrative prawn industry exports to rich countries from regions where young children have inadequate diets.

Many early humans lived in settlements by the sea and left vast heaps of shells. Professor Michael Crawford postulates that humans evolved in coastal areas because a diet based on sea products contains the ideal fatty acids (and iodine) for optimum brain development. Some lake dwellers have similar nutritional advantage because some of the large lakes were cut off from ancient seas⁹⁷.

Whether they have access to the sea or not, most hunter-gatherers eat diets of great diversity, and diverse diets are associated with better nutrition⁹⁸. The customary diet of the !Kung of the Kalahari Desert in Southern Africa consisted of 85 species of food plant, including 30 roots and bulbs. They consumed 54 species of animals⁹⁹. The full term baby of such a nomadic mother would be born with good iron stores. His mother would have sufficient iron because of her diet, well-spaced births (three or four years) due to continued frequent breastfeeding and minimal episodes of menstruation. She would have her first period (menarche) much later than is normal in industrialised societies, probably because she would never have been overweight¹⁰⁰. It is unlikely that the umbilical cord was cut too soon as is the norm in most modern healthcare settings, so a baby would get his rightful amount of iron from blood transferred from the placenta¹⁰¹.

Insects (and insect products) provide a significant source of nutrient-dense foods. They have always been part of the human diet. (See Appendix 1) Currently 1509 species of insects are eaten by 3000 ethnic groups across 120 countries¹⁰². Many would be (and may be) ideal additions to the

⁹⁷ Crawford MA. The role of nutrition in human evolution. The Caroline Walker Lecture 2002.

⁹⁸ Johns T op cit.

⁹⁹ Truswell AS Diet and nutrition of hunter-gatherers. In *Health and disease in tribal societies*. Ciba Foundation Symposium No.49, Elsevier-Excerpta Medica N. Holland. 1977.

¹⁰⁰ The age of menarche is strongly related to body size and body fat.

¹⁰¹ Chaparro CM et al. Effect of timing of umbilical cord clamping on iron status in Mexican infants: a randomised control trial. *www.thelancet.com* 17 June 2006.

¹⁰² Dr Lynn Dicks of the Cambridge Centre for Climate Change and Mitigation Research. *Home Planet*. BBC Radio 4, 7 July 2009.

diet of the infant and young child. Various species are favoured as seasonal treats and may be traded. Many people deny that they eat insects because they do not perceive particular food products as insects. For example, in China, silk worm pupae are a delicacy but consumers do not think of themselves as insect eaters. In the same way, most consumers of dairy products would deny drinking animal body fluids or eating mould, yet they drink milk and eat cheese. It is cultural prejudice not lack of nutritional value which deters endorsement and promotion of their use. The next section addresses this issue.

2.10 Cultural and religious beliefs

I am aware that already some readers must be recoiling in horror at the idea of giving anyone, let alone a baby, a shellfish or an insect, because in their religion or culture these are proscribed foods. Such is the success of cultural communication that members of that group feel disgust at the thought of eating them. Every single human group whether ethnic, religious, philosophical, cultural, class or caste has food taboos, and the rationales for maintaining them overlap. For example, many vegetarians' and vegans' eating practices are based on moral principles (ie it is wrong to kill)¹⁰³, yet most believe that their health is better for such practices. During the 20th century, simultaneously in the USA and the USSR, propaganda overvalued the health-giving properties of meat and cows' milk, as much because of political and economic interests and ideologies, as contemporary nutritionists' miscalculations about protein requirements¹⁰⁴. There is not space here to discuss all the nutritional effects of food taboos but it is relevant to be aware that even in prehistoric times, groups would refrain from eating certain locally available foods for reasons of cultural beliefs and identity¹⁰⁵.

Humans have a strong drive to belong to a group, and identification with that group is linked to shared eating practices. Food taboos help people to feel they are different from, or even superior to, the next group. Even the omnivorous Shanghainese will say, "We are not like the Hong Kong people, we would never eat a cat". I think of myself as infinitely omnivorous but I have taboos against eating a hamburger or a product produced by Nestlé. My feelings about these products may echo that of a Muslim who will avoid non-halal meat. We both believe the products have been prepared in an unclean way. For me the uncleanliness is about production methods and marketing behaviours. Both of us feel upset if our children eat these products.

Whether people do or do not eat cats in Hong Kong (meat is meat whichever animal it comes from), or I eat a Nestlé chocolate product (chocolate is chocolate), is irrelevant. **How people feel about a food affects human society profoundly.** In parts of India at one stage the first move that any poor family made after a small rise in income was to abandon millet as a staple food¹⁰⁶. Still during the late 20th century more millet was consumed than rice in India. Millet contains more useful nutrients than rice¹⁰⁷, yet this change to a less nutritionally advantageous staple occurs in many societies. Richer rice consumers can compensate by eating nutritious accompanying foods and hence contrive a good balanced diet. Poor people often cannot afford this. 'Whiteness' still may be a key factor. In Europe and the USA poor people favour white over brown bread and in Africa white maize meal is favoured over yellow.

It seems that human groups have for thousands of years identified themselves and each other by what they eat and do not eat. This affects how children are fed. **Marketing hooks into our sense of identity.** Millions of Chinese who know how to prepare nutritious and delicious meals ideal for infants and young children, are seduced by the marketing of industrialised foods for

¹⁰³ For a scholarly account of the influence of Indian vegetarianism during the European age of enlightenment see: Stuart T. *The Bloodless Revolution: radical vegetarians and the discovery of India*. Harper Press 2006.

¹⁰⁴ McClaren DS. The great protein fiasco. *The Lancet* 1974;2:93-96

¹⁰⁵ Jones M op cit.

¹⁰⁶ I do not know whether this is still the case but in the 1980s more Indians subsisted on millet than on rice.

¹⁰⁷ Millet has higher levels of calcium and iron than wheat or rice and is gluten-free.



their children because as aspirational parents they believe that feeding their children the food of rich westerners will give advantages. Noticing so many overweight boys, I said to a Chinese friend: 'They'll have heart disease by 40', she replied, 'My mother-in-law criticises me because my sons don't look like that.'

Food is not just a way of keeping our bodies going, it has great significance for our identities. Many believe that their soul will be damaged if they eat a proscribed food or do not eat a food of great symbolic importance. Theories of hot and cold, clean and unclean, correct and incorrect foods go back to ancient times and have great significance within cultures. When we tell vegan parents that they must give their children animal foods, we are insulting their beliefs and trampling on their identities. It is the same when we urge families not to give rice or honey to a newborn.

Conservatism and fear of the unknown also plays a part. In the 17th century, English Pilgrim Fathers arrived at Cape Cod in North America not knowing how to fish, hunt or farm. Although extremely hungry they would not eat the abundant lobsters or molluscs on the beach¹⁰⁸. Folk memories create taboos. The Irish long despised seafood because its consumption was associated with the 19th century famines. Ireland's surrounding seas are rich in these products but the bulk are exported to Spain and France whose citizens pay high prices for products they consider to be healthy, delicious and luxurious.

Some theorists call the early historical change of diet from diverse wild products to planted crops, as 'cerealisation' and see it as a cause of the deterioration in human health and stature¹⁰⁹. The opposite argument is that without cereals as staple foods, human populations could not have expanded so much. Currently the rich industrialised populations are using up more than their fair share of nutrient dense foods whilst the poor have insufficient. The broad consensus among nutritionists is that for the majority of adults, a diverse plant-based diet is desirable, that vegetarianism is a healthy option and that non-vegetarians should eat animal foods sparingly. In the modern diet, the customary proportions of allocation of food types for adults and children seem to be the wrong way round. **Adults need a lower and children a higher proportion of animal foods.** Modern irrational taboos and cultural beliefs about complementary feeding impede good child nutrition.

¹⁰⁸ Kurlansky C *Cod: a biography of the fish that changed the world*. Vintage 1999.

¹⁰⁹ Jones M op cit

Summary of key points of Section 2

- For most of human existence everyone, including older infants and young children, consumed a diverse range of nutrient-dense foods available through multi-track food webs, with breastfeeding for four to seven years ensuring nutrient security during scarcity.
- Food systems are dynamic and women are usually the main food producers and processors.
- Humans have innate drives to favour certain food tastes and a unique capacity for body fat storage which have favoured survival.
- A diverse diet is best.
- Some industrialised foods are useful, some 'natural' foods harmful and the introduction of non-indigenous foods can be helpful.
- Iron deficiency is a major global health problem of older infants and young children that is associated with predominantly cereal diets.
- Early umbilical cord clamping is a cause of iron deficiency in infants and young children.
- Children may not be physiologically ready to digest cereals until around two years of age and gluten in some cereals is harmful in certain populations.
- Older infants and young children can digest flesh foods.
- Small animals, including seafood, molluscs and insect foods could add nutrient-density to the diets of young children.
- Dependency on industrialised foods and the destruction of food skills create nutrition problems.
- Using age as a marker for the introduction of foods is a clumsy public health tool.
- Cows' milk and cows' milk-based products may or may not be useful depending on the context. Cows' milk is not essential for all children and has been associated with some adverse effects.
- Cultural beliefs and group identity strongly influence food behaviours.

Section 3: PROCESSES FOR CHANGE

3.1 The language of food

IBFAN's main concern is with the abuse and exploitation of parents and carers by companies who manufacture and promote industrially produced foods for babies. These foods in themselves may or may not be appropriate. They may reduce women's domestic work burdens but may also create dependency and long-term food insecurity. Part of the strategy of protest is to promote the use of foods from non-industrialized sources. Common words and phrases used in these statements include: fresh, home-prepared, indigenous, local, locally produced, natural, wholesome, traditional and unprocessed. Many are blithely used in the literature without definition. This is a pity. Decades of research comparing breastfeeding with artificial feeding were wasted because researchers neglected to define their terms. The establishment of common agreed terms for infant feeding practices has proved invaluable in coordinating research, policy formation and a reduction of misunderstanding between the actors in the issue. For example, to agree on the exact difference between 'attachment' and 'positioning' (and other terms) has enhanced breastfeeding training. As the focus on complementary feeding becomes stronger, a common clearer vocabulary would aid discussion.

Clarity is essential for any campaign. The great strength of the campaigns against the unethical marketing of breastmilk substitutes has been that breastfeeding alone is unequalled. The evidence for this statement is so powerful that this concept can be easily explained and justified. Matters are not so straightforward with complementary foods.

For example, the 2006 Philippines law recommends that babies are fed with 'fresh, natural and indigenous food'¹¹⁰. What do these three terms mean? They are all ambiguous. Ambiguous words can subvert a law's purpose. For example, the Guatemalan Code of Marketing of Breastmilk Substitutes Law defined (in Spanish) complementary foods as 'todo alimento, manufacturado o preparado localmente como complemento de la leche materno' in its Code Law. Most people would understand and translate this as 'all foods whether manufactured (ie by a commercial company) or prepared locally (ie in the home or local community) as a complement to breastmilk'. The transnational baby food company Gerber challenged the law because Gerber did not want to remove the baby face picture from its baby food labels. The company won its case because their lawyer argued that the law only applied to 'foods manufactured or prepared locally'. Gerber products were imported¹¹¹. Careless drafting made Guatemalans vulnerable to the predatory skills of an external vested interest.

Let us take the word 'fresh'. It could merely mean 'not rotten' or it could mean 'unprocessed'. It might mean leaves and fruits picked just before consumption, a fish or animal captured alive a few minutes before preparation. But many labels on jars of baby foods state 'made with fresh ingredients.' I can guess that the drafters of the law intended to mean that families prepared unpackaged foodstuffs gathered from home grown sources or bought in their local market. Not all market food is fresh. In some regions it is customary to buy a live chicken or fish and kill it just before or during the cooking. In other societies, including my own, it is unacceptable and/or illegal to sell and buy live animals (except for molluscs and shellfish) for immediate consumption. Vegetables and fruits may be sold a few hours after gathering but if transported in the hot sun their vitamin levels are reduced. How food is harvested, covered, packed and displayed is important for infants and young children because of the risk of pathogenic contamination and nutrient decay. We value fresh fruit and vegetables yet a toddler may get more vitamins from

¹¹⁰ Administrative Order (AO) No. 51: Implementing Rules and Regulations (RIRR) of Executive Order No. 51. Otherwise known as "The Milk Code." 2006-0012 Revised.

¹¹¹ Sokol E. Implementing national measures. *In The Code Handbook*. ICDC 1997, pp112-133

frozen peas than if he is fed peas that sat on a sunny market stall all day. Specially designed machines can harvest vegetables in record time. Controlled blanching and freezing in factories near the fields can inactivate the intrinsic enzymes which cause deterioration within the produce and thus conserve vitamins.

Many foodstuffs are improved by not being 'fresh' but by being processed. Cassava is poisonous unless steeped and pounded. As described in section 2.7, processes such as the liming of maize flour and fermentation of cereals, milks and vegetables can enhance nutrient content, digestibility and storage safety. Many cheeses improve with age and retain their nutritional value. Also drying, salting and pickling for storage can be safer in hot climates where refrigeration is absent or unreliable. Dried or salted fish was a staple food for centuries, especially in regions (eg Iceland) where neither grain nor fruit could be cultivated¹¹². Highly salted food is not good for infants and young children and should be avoided but many traditional preserved foods are nutritionally valuable and introducing them establishes diverse long-term eating habits.

The term 'natural' is fraught with even more problems. **'Natural' does not always equate with 'good'**. My description above of prehistoric diets has not included a history of how humans learned to recognise poisonous products. In the same way that people noticed positive effects of certain foods on health, strength or healing, trial and error meant that human groups had to deduce from illness or death of an individual that a certain berry, mushroom or part of an animal was harmful¹¹³. There are many examples of 'natural' foods which do harm. In 2001 in the Solomon Islands an entire family became seriously ill and several members died, including an exclusively breastfed baby. The family had feasted on a hawksbill turtle¹¹⁴. It had probably eaten toxic algae 'blooms' which occur periodically at sea. Wild foods have many health advantages but a good food can change to bad. For example, if quails (small game birds) eat the poisonous plant hemlock¹¹⁵ they do not suffer but a human who eats that quail is likely to die.

Vegetables and fruits can contain adverse traits. Oxalic acids, in many dark green leaves, remove minerals from the body. The spinach-promoting message in the 20th century US cartoon 'Popeye' was based on an arithmetical error concerning the iron-content of spinach by public health scientists. Spinach is not good for babies (and how clever they are to reject it). The more bitter the leaf, the more oxalic acid and the more removal of valuable iron from the body. Lathyrism is a form of poisoning caused by eating too much of a particular legume¹¹⁶. In cassava eating communities there are sporadic outbreaks of 'tropical paralysis' caused by the cyanide in the cassava. A 1981 outbreak in Northern Mozambique was attributed to the selection of more drought-resistant cassava containing higher levels of cyanide. Other food shortages led to shortened processing time so that the cyanide was not fully leached. The selection of the different cassava was through subsistence peasant exchange of products and had nothing to do with any company marketing or government initiative.

Iodine deficiency (ID) is 'natural' and widespread with 2.2 billion people at risk with varying rates depending on the region¹¹⁷. Sustained and routine iodine fortification of foods or salt is the only effective way to combat it. It is difficult and expensive to persuade people to eat sea fish, seaweed or other seafoods, especially in regions far from the sea and where it is not the custom. Iodine fortified food is not 'natural' but a child whose mother is iodine-deficient is likely to be less intelligent or be born with cretinism. In this case an artificially fortified product is welcome.

¹¹² Kurlansky op cit

¹¹³ For example, polar bear liver is poisonous to humans because of its high levels of vitamin A. Someone had to die from eating the liver for this to be known.

¹¹⁴ Personal communication: Dr Robert Challen who was working in the Solomon Islands in 2001. Hawksbill turtles are part of the traditional diet of Pacific Islanders. These turtles are omnivorous but favour certain sponges which are toxic to other animals, they also like areas of brown algae. Either of these factors could have transferred toxins to the consumers.

¹¹⁵ Hemlock is a tall umbelliferous plant. The Greek philosopher Socrates (469BCE-399BCE) was made to drink a potion of hemlock as a form of execution.

¹¹⁶ Botanical name: *Lathyrus sativus*; in English it is called the lathyrus pea.

¹¹⁷ WHO/UNICEF/ICCIDD Report *Progress Towards the Elimination of Iodine Deficiency Disorders (IDD)*, WHO/NHD/99.4 1999.

'Indigenous' is a problematic term¹¹⁸. It means innate or native to a locality. If we only ate indigenous foods in Europe, we would forego potatoes, tomatoes, maize, coffee, tea, chocolate, spices, turkeys and many other foods. As mentioned in Section 2.2 above, the introduction of foods across the world has and can increase diversity of eating.

There are several regions of the world where a child fed only on fresh, natural and indigenous foods could become malnourished. All terms have their problems. 'Local or locally available food' is often used. For many urban families (50% of global population) cola drinks and mass-produced fast food are locally available foods. Is this good for infants and young children? It is not for me to decide which terms are best but to urge a considered process to achieve clarity and to warn against making generalised statements which may lead to misunderstanding and harm infant health and development. The context is everything.



3.2 Is a 'local' diet possible and good enough for infants and young children?

Some nutritionists have claimed that it is impossible to feed a child adequate nutrients without fortified industrialised products.

Poverty causes undernutrition. Save the Children state that cash is the missing ingredient to tackle hunger. In Ethiopia the Productive Safety Nets Programme provides 7.2 million people with 30 Birr (\$3.50) per head per month for seven months during the lean season. More than 70% of this cash is spent on food, and mothers report that they can then feed their children with a greater variety of food¹¹⁹.

When families have sufficient income, high education levels and access to information they are capable of feeding their children adequately with a diet based on local foods. The Fife Diet (see Box 1) provides a contemporary example. We have to return to Sen's theory of entitlement. Most financially secure families can feed their children well from family foods, if they have access to unbiased information and the confidence to withstand marketing messages. Their money and

¹¹⁸ See Eser U, Footnote 48: any plant (or animal) introduced after 1500 CE is '*non-indigenous*'.

¹¹⁹ Duffield A Impact of cash relief programme on child caring practices in Meket Wareda, Save the Children UK (unpublished) 2005. Cited in SCF 2007. Running on empty: poverty and child malnutrition. SCF Briefing.

inclusion in the social infrastructure entitles them to make rational decisions. The Fife Diet showed that a predominantly local diet with a small quantity of imported ingredients, some of which were industrially processed (eg soya sauce) could keep a whole family well-nourished. This community challenged a national culture of industrialised food provision and promotion. The following section shows how national policies influence eating practices.

Box 1: The Fife Diet

In Fife, Scotland, one family, Mike and Karen Small and their children, changed their eating patterns for environmental and ethical reasons (to reduce food miles) and committed themselves to live on locally grown foods (the Fife Diet). Their son Sorley was nearly three years old, and breastfed baby Alex five months old when they embarked on this project. Scotland lacks sunshine and the growing season is short but produce suited to the climate is grown. The family lived on local potatoes, other root and leafy vegetables, meat, fish, eggs, milk, butter and seasonal fruits. Karen abandoned her former vegetarianism because she used so many imported foods. The few imported products they decided to use were: coffee, tea, chocolate, spices, lemons, peanut butter and soya sauce. Doubters claimed that the Fife diet was nutritionally irresponsible and might impair the health of their children. They consume delicious food and the children are thriving. Food preparation time doubled but costs almost halved¹²⁰. They no longer eat manufactured snacks like biscuits. They do not have scurvy or any other deficiencies. An example list of a week's meals indicated a diverse and balanced diet that could meet all their children's needs.

The project originally started with 14 people and now has 600 participants. They are now exploring the possibility of cultivating quinoa in their area¹²¹.

3.3 A lesson from history: the example of wartime UK

In 1937, two years before the onset of the Second World War, a study revealed that out of a population of 41 million people in the UK, 32 million had some nutritional deficiencies and four and a half million were deficient in every nutrient. Only a wealthy minority consumed sufficient basic dietary requirements. Nutritional status was strongly related to income¹²². There is a parallel situation in many developing countries today.

At the outbreak of war, a comprehensive food policy was devised and led by The Ministry of Food (MOF). Much thought and planning went into the policy¹²³. The goal was to protect the population from the effects of food shortages. Agricultural policy, food quality, availability and distribution were centrally coordinated by the MOF. Rationing, devised to maximise nutritional advantage, provided equal food distribution for all. Despite food shortages and other wartime deprivations, the results of this policy led to remarkable improvements in mother and child

¹²⁰ Their weekly food bill went down from around £100 to £50 to £60. UK median weekly wage at time of reporting was £479.00. It is estimated that a healthy diet and minimum basket of necessities in the UK for a family of four costs £67 a week. The Smalls were able to access local fresh food; in poor urban areas this may not be possible.

¹²¹ BBC News UK, Living on the Fife Diet, 20 December 2007 and other related websites.

¹²² Orr, JB. *Food, health and income: report on a survey of adequacy of diet in relation to income*. Macmillan 1937. This research led by Sir John Boyd Orr, then Director of the Rowett Research Institute is cited in Le Gros Clark F & Titmuss RM. *Our food problem and its relation to our national defences*. Penguin Books 1939. Also cited in Norman J. *Eating for Victory*. Michael O' Mara Books Ltd 2007.

¹²³ Le Gros Clark F & Titmuss RM. *Our Food Problem and its relation to our national defences*. Penguin Books 1939.

health. Infant, neonatal and maternal mortality and stillbirths reached their lowest levels in British history. Incidence of iron deficiency anaemia and dental caries declined, and the growth of schoolchildren improved. Tuberculosis control improved.

There was nationwide public health and nutrition education through mass media. MOF advertisements such as 'Welcome little stranger' gave advice on eating in pregnancy and 'Don't let Dad get all the meat' directed household food distribution. Public awareness of the relationship between food and health grew. This was done with clearly disseminated knowledge, use of locally available foods and respect for family skills, carried out without food industry pressures. It was assumed that complementary feeding would be derived from family foods. Successful media messages ensured children's priority for nutrient dense foods. Breastfeeding was the norm but provision of state supplied breastmilk substitutes was introduced. Adverse 20th century practices (eg restricted breastfeeding) meant that some women 'could not breastfeed'¹²⁴.

Key points of success were government control of food supplies and the inclusion of the scientific experts in Ministry decision-making. Another aspect was that increased numbers of women joined all levels of the labour force and contributed to decision-making processes. This was due to the absence of men and not because of any drive for gender equality.

So remarkable were these achievements that in 1947 the American Public Health Association presented The Lasker Group Award to "The British Ministries of Food and Health for the unprecedented program of food distribution in Great Britain, with resulting improvement in the health of the people"¹²⁵.

This British experience has been consigned to history and is often viewed with mere sentiment but its lessons are relevant to the 21st century. The fact that a simple system transformed child nutrition and health for the better in adverse circumstances, within a very short period of time, provides an evidence-based model for societies struggling to improve mother and child nutrition (see Appendix 3).



¹²⁴ Restricting breastfeeding through routines was in medical vogue so 'insufficient milk' did occur. Sevrage between six and nine months was the norm but depending on the region, less educated women breastfed for longer. State manufactured 'National Dried Milk' was provided for children up to two years of age. It was not promoted or on sale in shops but leaflets instructed application to The Food Office or Welfare Centre. Branded breastmilk substitutes were available and promoted but were expensive for the mass of the people.

¹²⁵ Greaves JP. *Food and nutrition policy in Britain during World War II*. Turning adversity to advantage. Internal UNICEF Paper 1984.

3.4 A contemporary lesson: US Special Supplemental Nutrition Programme for Women, Infants and Children (WIC)

The US Special Supplemental Nutrition Programme for Women, Infants and Children (WIC) was authorised by the 1966 US Child Nutrition Act. It was launched in 1974 and during that year 88,000 people participated. By 2008 average monthly participation was 8.2 million. WIC was and is targeted to poor women, infants and children to improve their nutrition and health and provides food directly to recipients. WIC cannot serve all eligible people and uses a priority system to select those at most nutrition risk¹²⁶.

Being a WIC recipient is a sign of poverty and carries some stigma. Food provision may disempower mothers because it slants and restricts their food decisions. The WIC programme provides breastmilk substitutes and specific foods or vouchers. It does not appear to have significantly improved nutritional awareness and child feeding skills. It has probably had a negative effect on breastfeeding.

Poor mothers are more likely to be WIC participants and have children who are less healthy. Within the USA there is a correlation between income inequality and infant mortality rates (IMR). For example, Louisiana with wide income differentials has more than double the IMR of Alaska, one of the most equal states¹²⁷. Though it may have ameliorated the ill effects of other economic and social problems one cannot present WIC as a model for the development of beneficial infant and young child feeding policies. US income differentials are the widest of any industrialised country. The USA ranks 43rd in the world IMR¹²⁸.

These comments are not intended to deprecate the work of those who strive to make the WIC programme effective in protecting health and nutrition. In recent years there have been WIC breastfeeding programmes and other nutrition education inputs. Changes to the content of the food package are ongoing¹²⁹. It is probable that in the early days WIC prevented undernutrition. Nevertheless the fact that in the 21st century a sophisticated, industrialised country has to provide foods for such a substantial proportion of mothers, infants and children and commit such a large amount of public expenditure to do this, is a gloomy model for developing nations (see Appendix 4).

3.5 The majority world

To return to my experience in Mozambique: despite war, economic collapse and entrenched poverty, some older infants and young children did very well. The doctor with whom I worked did some rapid research. We found that the children who thrived had family in both the city and the countryside. Food was rarely available on the open market¹³⁰ and in the capital city Maputo, citizens depended on local government distribution of a monthly ration of staple cereal (maize meal or rice), coconut oil and sugar. Vegetables, fruit, eggs, meat, fish were available only sporadically and were snapped up by people with connections. We discovered that if a child's family had entitlement to the monthly ration and also produced food in the countryside, then that child was less likely to become undernourished.

One approach to infant and young child feeding has been to address specific nutrient deficiencies. Vitamin A, zinc, iodine and iron deficiencies contribute most to infant and young

¹²⁶ www.fns.usda.gov/wic/

¹²⁷ Wilkinson R & Pickett K. *The Spirit Level*. Allen Lane 2009.

¹²⁸ CIA World Fact Book 2009.

¹²⁹ Devaney B. WIC turns 35: program effectiveness and future directions. Mathematica Policy Research national Invitational Conference of the Early Childhood Research Collaborative Minneapolis, Minnesota. December 7, 2007.

¹³⁰ There was no functioning market. The only food products on open sale were tea, garlic, leaves and occasionally tomatoes. Most trading was through a small black market and a tiny hard currency shop.

child mortality¹³¹. They are associated with the conditions of poverty, what region a child lives in and food insecurity. Some specific programmes of technical intervention have proved useful. Iodine deficiency declines with economic development because dietary diversification increases when people can buy imported food produced in iodine-rich regions. However many human beings subsist on locally-produced food. If they live in an iodine deficient region they and their children are at risk. In this case routine fortification (eg through iodised salt) can be a beneficial strategy¹³². This requires coordinated action at national and international level. Such initiatives have worked well and are examples of an industrialised process providing a nutritional benefit¹³³.

But the delivery of synthetic nutrients through programming does not always bring such beneficial results. During the late 20th century, widespread programmes to deliver synthetic vitamin A doses to newborns was hailed as the answer to infant mortality and morbidity. A recent review of neonatal vitamin A supplementation has found no reduced risk of common morbidities (diarrhoea and others), admission to hospital or mortality. Moreover there was an increased risk of acute respiratory infection. The authors conclude that there is no justification for such supplementation¹³⁴. A costly and 'top-down' system has failed to achieve its goals.

These reviewers also uncovered another uncomfortable fact: in their scrutiny of these studies, they could not find enough data on maternal night blindness prevalence and low birth weights (LBW). Night blindness indicates a mother's vitamin A deficiency. Night blindness is commoner during pregnancy because vitamin A requirements increase. In some poor societies it is so common that it is considered a normal sign in pregnancy. Poor nutrition in pregnancy is a leading cause of LBW in the majority world. Both conditions reveal the state of women's nutrition. The fact that so many studies omitted to gather full data about these conditions speaks loudly about the status of women and their human rights.

It is mostly women, and especially mothers who do the complementary feeding. If a mother's own nutrition is neglected she is more likely to have a LBW baby whose mortality risk is greater. LBW babies can have more difficulties breastfeeding and, without skilled assistance, there is more pressure to introduce complementary foods too early which increases the risk of morbidity and mortality. More importantly, an undernourished mother whose vision is impaired is less likely to be able to prepare complementary foods hygienically or feed a baby when light is poor. Moreover she needs to be healthy to attend to her child's needs.

Breastfeeding is biologically robust; even a weak mother can carry on suckling when she is ill, but complementary feeding takes initiative, activity and energy. A woman has to obtain sufficient food, fetch water and buy soap to do all the preparation hygienically; she must contrive to allocate the most nutritious morsels for her child, often in competition with other family members. She may deprive herself of food to do this. This is all on top of her normal work burden which can be overwhelming even when she is healthy. If she is herself nutrient deficient then it may be impossible. If she delegates the complementary feeding to other family members, can she ensure their hygiene skills or devotion to the baby? Might hungry siblings be tempted to eat the baby's portion? **Good complementary feeding cannot happen if women's right to nutrition is ignored.**

There is another aspect to the link between the nutrition and health of mothers and their children. Genetic research has shown that there are physiological, intergenerational effects that may even be traced back to grandparents. A baby in the womb of a nutrition deprived mother will be programmed to withstand the harsh environment of food scarcity. If that baby then ends up having an energy dense diet he may be more vulnerable to long term diseases such as

¹³¹ Black RE et al. Maternal and Child Undernutrition 1. Maternal and child undernutrition: global and regional exposures and health consequences. *www.thelancet.com*; 371:243-260

¹³² For example, when Papua New Guinea introduced legislation banning the import or trade of non-iodised salt, the prevalence of goitres and cretinism dropped significantly.

¹³³ Hetzel BS. Iodine-deficiency disorders. In: Garrow JS, James WPT & Ralph A. *Human nutrition and dietetics (10th edition)*. Churchill Livingstone, 2000: pp 621-650

¹³⁴ Gogia S & Sachdev HS. Neonatal vitamin A supplementation for prevention of mortality and morbidity in infancy: systematic review of randomised controlled trials. *BMJ* 2009;338:b919

diabetes¹³⁵. As one public health expert said: “We used to say, you are what you eat, now we know, you are what your mother ate”¹³⁶ Transforming the nutrition of girls and women is essential for babies to be born healthy. Just as with delayed umbilical cord clamping and exclusive breastfeeding, what goes before complementary feeding is as important as the nature of the feeding itself. A healthy child feeds better.

I do not want to suggest that all supplementation programmes are wrong. Some nutrient supplementation for older babies and young children may remain a necessity as long as food insecurity is neglected. The provision of synthetic nutrients can provide a vital bridge for survival while society resolves its food systems and poverty. However such interventions should always be under review. For example, routine iron supplementation of pregnant women is a good public health strategy whilst iron deficiency anaemia prevalence is high. When overall nutrition improves the risks outweigh the benefits. Then only women with diagnosed IDA should be supplemented.

It seems in the 21st century that nutrient supplementation initiatives do not build withdrawal into their implementation plans. For example, vitamin A supplementation programmes do not appear to include measures for future closure. Is it assumed that poor sanitation and inadequate diets will last forever? The late 20th century political drive for public-private partnerships could be interpreted as the state handing over responsibility for nutrition to the profit-making sector, whilst side-stepping the central role of family skills and household self-sufficiency. For example, the Global Alliance for Improved Nutrition (GAIN) was launched in 2002 as “*an alliance of international public, private and civic organisations committed to improving health, cognitive development and productivity in developing countries through the elimination of vitamin and mineral deficiencies - especially deficiencies of vitamin A, folic acid and iron.*” The main aim of this “*alliance of public and private sector partners*” was to “*leverage cost-effective food fortification initiatives*” to achieve this goal¹³⁷.

A 2008 WHO/UNICEF report states that ‘*there are not enough well-documented, large scale programmes that have successfully improved feeding practices in children 6-23 months of age and resulted in improved outcomes*’¹³⁸. **A systematic review of interventions concludes that there is no universal best package, that educational approaches can be effective, especially when combined with home fortification or provision of fortified foods. Any provision of food must be modest to avoid displacement of breastmilk¹³⁹. These authors also conclude that context is crucial.**

The so called ‘developing world’ is not developing. Within most international nutrition and health documents there is an intrinsic and almost fatalistic ‘them and us’ stance as though there are two separate planets occupied by the rich and the poor. There are however well-documented programmes of national child health improvements in regions that had experienced high rates of child undernutrition in the past, such as Kerala State in India, Cuba and parts of Europe.

Lessons can be learned from the two systems designed to protect mother and child nutrition, described in sections 3.3 and 3.4 (UK and USA) above. Both included the goal of protecting and improving infant and young child nutrition. The former succeeded in a remarkably short period of time. The latter may have contributed to an entrenched culture of adverse infant and young child eating practices within an underclass.

International agencies attempt to tackle child nutrition issues with guidance constrained by political pressures. The Global Strategy for Infant and Young Child Feeding (GSIYCF) emphasises

¹³⁵ Gluckman PD & Hanson MA. Living with the past: Evolution, development, and patterns of disease. *Science*, 17 September 2004.

¹³⁶ Quinn V (Director of the Academy for Educational Development (USAID)). Statement made in discussion at *Countdown to 2015 Child Survival Conference*. Senate House, University of London, 13-14 December 2005.

¹³⁷ www.gainhealth.org/pressrelease.asp 5.5.02 cited in Richter J. *We the people or we the corporations*. IBFAN-GIFA 2003; see also Lhotska L. *Whatever happened to health for all?* IBFAN-GIFA 2008.

¹³⁸ WHO/UNICEF Strengthening action to improve feeding of infants and young children 6-23 months of age in nutrition and child health programmes. *Report of Proceedings Geneva*, 6-9 October 2008, WHO 2008.

¹³⁹ Dewey K & Adu-Afarwah S. Review article: Systematic review of the efficacy and effectiveness of complementary feeding interventions in developing countries. *Maternal and Child Nutrition*. 2008, 4:24-85

the need for accurate information and skilled support from the family, community and healthcare system. It calls for diversified approaches and suggests home and community based technologies to enhance nutrient density, bioavailability and the micronutrient content of local foods. It also states that, “*Industrially processed complementary foods also provide an option for some mothers who have the means to buy them and the knowledge and facilities to prepare them safely*”¹⁴⁰.

There is a risk contained within this information. If elite mothers in any community buy and use industrially processed complementary foods this creates a two tier food system and motivates poor mothers to buy such foods. The marketing of these foods exploits parental aspirations, exaggerates the nutritional benefits of the foods and obliterates impartial messages about locally available foods. It is also designed to normalise their use and imply that they are essential.

The current practice of setting up local community manufacture of nutritionally adequate complementary foods is seen in many quarters as the compromise answer. There are inherent dangers. If the enterprise is well run, successful and creates a functioning local demand for the product then this will inevitably attract large-scale manufacturers to buy out the enterprise and eventually dominate the local market. The fact that the baby food company Danone is an active working partner within the private-public partnership GAIN, and that GAIN is seen by many powerful donors as the route to the conquest of infant and young child undernutrition, highlights this problem. Is the goal to support a well-informed population to feed their children primarily within the home from locally-available foods or to establish an international market for transnational manufacturers?

The lesson from the UK WW2 experience shows that national awareness and skills can be enhanced and supported in a very short space of time in extremely difficult circumstances and

lead to real improvements in health and nutrition.

The lesson from the US WIC experience is that deskilling and dependency can transfer power to the infant food manufacturers who have a vested interest in maintaining the system. The fact that such a large tranche of public subsidy could survive the era of neo-liberal economics attests to the stranglehold of a strong vested interest. What should have been a temporary solution to an economic problem of a disadvantaged minority group has become a permanent and narrow approach which lacks the capacity to address the root causes. It is possible that the GAIN initiative carries the same dangers.



¹⁴⁰ WHO/UNICEF *The Global Strategy for Infant and Young Child Feeding*, 2003 pp8-9

Summary of key points of Section 3

- The terms of complementary feeding and foods confuse and the establishment of definitions of terms is important.
- Complementary feeding is a more complex campaign subject than breastfeeding.
- Not all industrialised foods are bad and not all 'natural' foods good.
- Poverty causes child undernutrition.
- Context is everything.
- The UK policy and experience during the Second World War provide one example of a successful food and nutrition strategy.
- The US WIC policy and experience show that nutrition support can be costly and create unforeseen negative consequences.
- Programmes to tackle specific nutrient deficiencies can be successful.
- Adequate complementary feeding depends on food security.
- The fulfilment and respect of women's right to adequate nutrition is essential for adequate complementary feeding.
- There are genetic intergenerational influences on nutrition which endorse the fact that the nutrition of infants and young children must not be addressed separately from that of women.
- Current global public-private initiatives may do damage and disempower families.
- Complacency about global differentials restricts progress.

Afterword: Health for all?

IBFAN has over 30 years' experience of campaigns on breastfeeding and the regulation of marketing of breastmilk substitutes. It is agreed that some industrialised foods may be necessary and useful in certain circumstances, but that regulation of marketing is essential. The situation regarding complementary feeding is exactly the same. Governments and international health agencies appear impotent to control the actions of transnational companies and agency documents sidestep the problem and ignore 'the elephant in the room'. Taking on this issue with a commitment to success will be difficult. It has to be addressed at political level.

In a recent IBFAN publication focussing on breastfeeding, the foreword described recent crises and stated: *'One by one, these crises have demonstrated the weakness of market based solutions and have underscored the urgency of providing adequate protection to the world's peoples to safeguard their health, safety and livelihoods. Sustainable, affordable solutions already exist, but may be threatened by market forces seeking to place private profit above public health'*¹⁴¹. This statement exactly applies to the complementary food situation as it does to breastfeeding.



¹⁴¹ Linnecar A. Foreword in Lhotska L. *Whatever happened to Health for All?* BFAN-GIFA 2008.

Appendix 1 Insects and other invertebrates as food

A 1.1 Prevalence of consumption

Insects have always been part of the human diet. They are used both as drought season foods and as delicacies. Currently 1509 species of insects are eaten by 3000 ethnic groups across 120 countries. These include caterpillars, locusts and beetles of which 443 species are consumed¹⁴². Many are seasonal treats. Others are insect products such as the papery substance making up ant and wasp nests or the golden globe of sugary liquid carried by the honey ant. Professor Peter Pharoah filmed 20th century toddlers in Papua New Guinea catching insects and spiders for food¹⁴³.

Other small and nutrient dense invertebrates include snails. French 'escargots' have become elite delicacies but in the 1970s I snacked on miscellaneous cooked garden snails in a bar in central Portugal. In China I have eaten silk worms, scorpion and locusts, deliciously prepared and skewered in open food markets. In Northern Thailand consumption of diverse small vertebrates and invertebrates is normal. A prestige sauce is made from a translucent, perfumed secretion extracted from the 'pimp beetle'¹⁴⁴.

A 1.2 Nutrition

Insects and related products can provide nutrient-dense food for older infants and young children. The hard outer casing (called chitin, the equivalent of a prawn's shell) of insects such as beetles is not digestible but in other respects most insects are extremely nutritious. Some are rich in fats and therefore energy dense; most contain significant proportions of protein, vitamins and minerals. The high content of iron and zinc is of particular interest¹⁴⁵. It maybe that the inevitable inclusion of some unseen insect pests in plant-based diets provides the vitamin B12 that is only found in animal products. If this is so then pesticides may be viewed as anti-nutrients.

A 1.3 Cultural attitudes

In Mozambique in 1982, due to civil war, economic collapse and food scarcity, child malnutrition was prevalent. Ministry of Health nutritionists designed a poster urging mothers to add nutrient-dense products to the staple maize porridge fed to older infants and young children. Suggestions were meat, fish, eggs (all hard to get), ground peanuts and cashews, caterpillars and locusts. Despite the traditional use of the latter two products the Deputy Minister of Health (DMH) forbade their mention on the poster, "because the South Africans might read them and think we are starving". The fact that some children were starving was overridden by concerns about national identity. The DMH believed such information might make Mozambicans appear 'uncivilised'.

Many Europeans and North Americans express disgust at the idea of insect consumption yet a red colouring matter from the immature cochineal insect is widely used in foodstuffs. It is more stable and is considered safer than synthetic red colouring matter.

In 2009, a South Korean team won the Microsoft 'Imagine Cup' top prize for a system to help people farm insect foods in famine areas. Stag beetle cookies were made in Gabon, Africa and were eaten with pleasure¹⁴⁶.

NB: Caution is needed when there is a focus on special foods for famines. 'Branding' foods specifically for disadvantaged groups or situations may lead to a scorn for those foods in normal circumstances.

¹⁴² Biologist Dr Lynn Dicks of the Cambridge Centre for Climate Change and Mitigation Research reported these data in BBC Radio 4 'Home Planet'. 7 July 2009. Accessible in Home Planet archives on BBC Radio 4 website.

¹⁴³ Pharoah P (1984). Endemic Cretinism in the Jimi Valley. Film available on CD Rom from Professor Peter Pharoah, University of Liverpool School of Tropical Medicine, UK.

¹⁴⁴ Personal communication: Dr Judith Richter 2009.

¹⁴⁵ DeFoliart G. Insects as Human Food in *Crop Protection* 1992;11: 395-399

¹⁴⁶ Knell Y. Looking for the next Bill Gates. BBC News Channel 10 July 2009.

Appendix 2 A nutrient case study: iron deficiency anaemia (IDA)

A 2.1 An IDA lesson

Current textbooks state that two billion humans suffer from IDA, making this the most common nutritional deficiency syndrome. Menstruating and pregnant women are at risk. IDA in infants and young children impairs development. Another reason for the choice of iron as the case study nutrient for this paper is that most iron-rich food sources also supply zinc. These are the two priority nutrients not fully met by breastmilk after about six months (depending on the child's iron stores at birth). In evolutionary terms this was unnecessary because our ancestors got the iron they needed from external sources. The tiny proportion of iron in breastmilk is highly bioavailable. Other animals' milk is a poor source of iron; moreover its consumption during a meal inhibits the absorption of iron in other foods. Using milk as a vehicle of iron fortification (as in follow-on milks) is illogical. I will discuss dietary inhibitors and enhancers of iron in sections A2.4 below.

Iron deficiency and IDA is not the same thing. The human body stores iron in the bone marrow and serum. A protein called transferrin (because its job is to transfer) carries this iron to form haemoglobin in red blood cells which transport oxygen throughout the body. It is the iron in haemoglobin which makes our blood red. Iron is 'recycled' around the body. However if iron is lost from blood loss due to injury, parasitic infection or menstrual periods, this must be replaced from sources outside the body. Without replacement through the diet, iron stores in the bone marrow and serum are used up. As stores decline, absorption of iron into the bloodstream becomes more efficient. However if iron stores become too low, then haemoglobin production is impaired. This is iron deficiency.

IDA is a different matter. Different countries and health agencies have differing criteria for what are acceptable haemoglobin values. IDA occurs in an individual when haemoglobin levels fall below the 2.5th percentile of a country's stated values. The definition of IDA is a statistical nicety. Hypothetically, if Country X sets a value that anaemia occurs when a woman has a serum ferritin (ie her iron store) level of less than 17 micrograms (μg) per litre(l) and nearby Country Y sets the value at less than 16 $\mu\text{g}/\text{l}$, then a woman from Country X with $<17\mu\text{g}/\text{l}$ could stop having anaemia by walking across the border to Country Y. This is not a joke and does in fact cause problems. In the late 20th century experts contested UNICEF's statements about the global prevalence of IDA because of differing assessment methods¹⁴⁷.

Two points are important. One is that IDA becomes a serious problem when it is so severe that oxygen delivery to tissues is impaired. Women in developing countries die of heart failure during their prime years because of such levels of IDA. However individuals vary: one woman, carrying out physical labour without feeling tired, may have a lower haemoglobin value than another woman who does no hard work but is breathless and exhausted. If a child is growing well and full of energy one can be relaxed about his iron status; if he is listless, tired and without appetite, one should be concerned about his iron status. IDA is associated with impairment of cognitive development in children as well as other developmental problems.

The second important point is that iron can be dangerous. Too much iron damages the vital organs. Groups, who brew beer in iron pots, drink excessive red wine or self-medicate with over-the-counter iron tablets are all at risk. Iron supplementation could be fatal for certain populations with genetic traits which make absorption of dietary iron too efficient leading to iron overload. It can also prove fatal if given too early during the rehabilitation of severely malnourished children, even though they are usually iron deficient.

¹⁴⁷ Sharp P (2005). Minerals and Trace Elements. In: *Human Nutrition*, eds. C Geissler & H. Powers, pp231-250. Elsevier

Pathogens thrive in the presence of iron. Lactoferrin (which has many functions) in breastmilk, binds with iron to prevent too much becoming available to pathogens in the baby's gut. About 50% to 70% of the small quantity of iron in breastmilk is absorbed, in contrast to about 12% in iron-fortified infant formula. This iron can be a risk to a newborn's immature kidneys which may be unable to excrete excess iron in artificial feeds.

A 2.2 IDA is a global public health problem

Despite the controversies of definitions and diagnoses, we can confidently state that IDA is a major global public health problem. Iron requirements are high in infants after about six months (depending on birth stores, see below), young children, menstruating and pregnant women. Lactational amenorrhoea provides some protection from IDA for lactating women. The levels of iron in breastmilk are remarkably consistent (and low) and are not influenced by a mother's diet or her iron stores.

Evidence about early human diets indicates that early human babies and toddlers achieved their iron needs. It must therefore be asked why so many modern children suffer IDA? During the 20th century UNICEF nutritionists stated that no mother could provide enough iron in her child's diet. Some argued that a small child would need to eat a kilo of liver a day to meet iron needs and therefore synthetic fortification of infant foods (inevitably industrially produced) was the only answer.

In a discussion with a nutritionist colleague who justified the UNICEF policy at that time I asked this question: "If you believe that no child can derive sufficient iron from food, are you suggesting that Socrates, Jesus, Mohammed, Galileo, Einstein, Marie Curie (and others with great talent and wisdom) would all have had better brains if they had eaten iron-fortified cereals?" To my astonishment the UNICEF nutritionist replied, "Yes". By his own theories he must have been a rather iron-deprived child. Some nutritionists seem to forget that one can only judge the strength of theories by results. If millions of human beings have grown up to be strong, healthy and intelligent without synthetically fortified foods then these calculations must be wrong.

There are evidently other routes to satisfactory iron status. In the 1980s scientist Dr Peter Hartmann described an Australian child exclusively breastfed at 15 months. A British Professor of Nutrition asked if Peter Hartmann had looked at this child's iron status. "No" replied Peter, "I couldn't catch him"¹⁴⁸. Clearly there are many confounding factors as to why some children have IDA and others do not. Living in a developing country or being poor in a rich one are both key risks. Nevertheless it is important to know some of the straightforward biological causes of IDA.

A 2.3 Complementary feeding before birth? A mother's iron status plus early cord clamping

The Australian child mentioned above thrived on exclusive breastfeeding long after he was supposed to. It is likely that he was born with optimal iron stores; that his mother was well-nourished, ate a diet rich in meat and fish and therefore maintained good iron status throughout her pregnancy. If her haemoglobin during pregnancy had fallen below Australian IDA levels she would have received iron supplementation. Iron deficiency does not occur because of insufficient dietary iron alone. IDA is connected with poverty and an impoverished diet. When vitamin A became the fashionable deficiency and pill distribution programmes were established one of the bonuses was that vitamin A consumption appeared to enhance iron status and reduce ID and IDA without iron supplementation.

¹⁴⁸ Hartmann P. Winthrop, Professor of Biochemistry & Molecular Biology, University of Western Australia. Personal Communication 2000.

Well-nourished mothers produce babies who are born with a store of iron which will last them well into the second half year of life. From this we can conclude that respecting women's human rights to economic justice and food equity is likely to be a more effective strategy for reducing IDA in infants and young children than providing iron-enriched foods for infants.

Many common birth practices worldwide are regrettable. In too many regions it is still normal for women to give birth on their backs and suffer unnecessary and/or harmful interventions such as shaving, episiotomy, routine use of drugs and non-essential Caesarean-sections. These practices harm women, undermine exclusive breastfeeding and sabotage infant iron status.

Early cord clamping is the norm in hospitals all over the world in both rich and poor settings. It is only necessary in a minority of situations where the baby's or mother's life is at stake. Birth attendants should wait at least two minutes, or until the cord stops pulsating, before clamping. This allows a significant transfer of blood from the placenta to the baby and makes a big difference to a baby's long term iron stores, especially those born to mothers with low iron themselves¹⁴⁹.

In some industrialised countries, there have been proposals that cord-blood should be routinely harvested to gather stem cells to be stored in case that individual needs them in later life. Such harvesting deprives a baby of her rightful blood and reduces her iron stores; 100mls of blood from a newborn is equivalent to taking over a litre from an adult¹⁵⁰. When breastfeeding mothers are harassed and made anxious about their babies' haemoglobin levels, the question they should ask is, "Who deprived my baby of his placental blood transfer?"

An effective global campaign against early umbilical cord cutting might lead to a decline in IDA in infants. It would require the donation of two minutes per birth of hospital staff time. Birth attendants could find another useful ritual to perform (maybe collecting their own breath) during those two minutes. Such a pause would have the added benefit of facilitating unhurried postnatal skin-to-skin contact between a mother and her baby which is crucial for successful breastfeeding.

A 2.4 Iron bioavailability: inhibitors and enhancers

The quantity of iron in the diet is less important than its bioavailability. Dietary iron comes in two forms: Flesh-foods such as meat and fish contain haem iron; plant-foods contain non-haem iron. Haem iron is more bioavailable than non-haem iron. This does not mean that a predominantly plant food diet is iron-deficient but dietary practices influence bioavailability. A plant-food based diet has health advantages for the whole society but the proportion of animal foods should be geared towards the older infant and young child. In many societies, adults, particularly men, appropriate the animal products¹⁵¹ and children get too few. Many men in industrialised societies would benefit from reduction of animal-food consumption and most small children, especially in poor societies, would benefit from an increase. The British WW2 poster '*Don't let Dad get all the meat*' could usefully be an international slogan.

A 2.4.1 Iron inhibitors

- a) Phenolic compounds are substances in plants which protect them from pests. They bind with iron and thus reduce absorption. They are plentiful in many vegetables such as spinach,

¹⁴⁹ Chaparro CM et al. Effect of timing of umbilical cord clamping on iron status in Mexican infants: a randomised control trial. *www.thelancet.com* 2006;367: 1997-2004.

¹⁵⁰ Dunn P. Clamping the umbilical cord. *AIMS Journal* 2004/5; 16(4): 8-9

¹⁵¹ Beardsworth A et al. Women, men and food: the significance of gender for nutritional attitudes and choices. *British Food Journal* 2002; 104 (7):470-91

herbs such as oregano and some spices. They are especially high in tea, coffee and cocoa so drinking these with food significantly reduces absorption of iron in a meal. In several regions (eg Central Asia) tea (ie *Camilla cinensis*) with sugar is given to babies from the earliest weeks and is drunk throughout childhood. Besides the replacement of breastmilk with a nutrient poor fluid, the reduction of iron absorption from the meal can be as much as 60% (tea) and 40% (coffee). Sweetened black coffee is given to children from about nine months in Guatemala.

- b) Calcium also reduces absorption. A glass of milk with a meal reduces iron absorption by 50%. Epidemiological evidence shows an association between milk intake and iron deficiency.
- c) Phytates in cereals strongly inhibit iron absorption. Wholegrain cereals have higher levels of phytates; oats are particularly effective iron inhibitors.
- d) Fibre reduces iron absorption.
- e) Soy protein reduces iron absorption.
- f) Prolonged cooking of meat at high temperatures reduces bioavailability.

NB: For all those who are not at risk of iron deficiency (eg men and post-menopausal women) iron-binding mechanisms may have a health advantage by protecting against iron overload.

A 2.4.2 Iron enhancers

- a) The most potent enhancer is vitamin C. There is a wonderful synergy through eating a mixed meal. Vitamin C in the fruit and vegetables enhances the absorption of iron from all other foods. Adding a small amount of meat, fish or seafood with a meal enhances absorption of non-haem iron in the plant foods. Thus a few chopped fresh herbs (such as coriander, parsley or basil) or a squeeze of lemon or lime (or any citrus fruit) on the food makes more iron bioavailable. Citric acid itself enhances iron absorption. These practices not only enhance nutrition but accustom the infant and young child to healthy practices for a lifetime. Almost all traditional diets have food customs which appear ritualistic but in fact enhance iron absorption. Ironically people often omit the squeeze of lemon, the chopped herbs, or the inclusion of the animal foods when they feed the infant or young child.
- b) Fermentation processes favour iron absorption.
- c) Iron from the soil can be present in significant quantities on the surface of the food and may have nutritional importance. Cooking in iron pots also contributes iron to the diet¹⁵².

A 2.4.3 Iron fortification

If a population has eating practices that limit iron then it is only ethical to endorse iron fortification of foods. The question is whether these should be general foods such as bread flour or foods manufactured for babies. The issues of affordability and dependency on commercial products must be considered. Sprinkles or pills of multi-vitamins and iron are another option. The risk of accidental overdose must be considered.

¹⁵² Hallberg L et al. Iron, zinc and other trace elements. In Garrow JS, James WPT & Ralph A, eds. *Human Nutrition and Dietetics*. Churchill Livingstone 2000: p177-209.

Appendix 3 Additional information on the British 'Food for Victory' Campaign

A 3.1 Rations and rules

In 1942, a typical week's ration for an adult was 150g of bacon and cheese, six pence (£0.025) worth of meat (<500g depending on the type and cut of meat), 100g of fat, one egg, 1.2 to 1.8 litres of milk, 225 g of sugar and 50g of tea. Hoarding food was a punishable offence. Wild game meats or home-reared chickens and rabbits were not rationed. Vegetable growing was strongly supported and by 1943 over a million tons of vegetables were being produced in home gardens and allotments¹⁵³. Fish was not rationed but availability haphazard. All bread flour was of higher extraction (ie less refined) and fortified with iron, vitamins and calcium. People were encouraged to forage for wild foods such as rose hips (a key source of vitamin C for children), mushrooms, berries and wild leaves. There was some black marketeering and the rich could afford occasional luxury products when available but for the first time in British history, the poorest citizens had nutritious food security. Research showed that the nation had never been so healthy. Sugar imports fell to half their pre-war levels and sweets were rationed. Dental caries decreased. By 1944 expectant mothers and children were consuming more eggs and milk per head than before the war.

A recent BBC TV series, where two people live on the food of a particular historical era for one week and then measure the physiological effects, found that the Second World War diet made them healthier than any other diet in history¹⁵⁴.

A 3.2 The Welfare Foods Scheme for women and children

The health of women, infants and children improved dramatically throughout the war. Awareness of their priority needs spread. In 1944 the maternal mortality rate was half 1938 levels. Introduced in 1941, the Welfare Foods scheme entitled pregnant women, babies and children to special or extra foods, extra free or cheaper milk, meat, eggs and fruit. Orange juice and rose hip syrup were provided at affordable prices. Cod liver oil imported from Iceland was provided free to pregnant and breastfeeding women, children under five and adults over forty. Vitamin pills were distributed. By 1942, after an initial rise, infant mortality had fallen below pre-war levels.

A 3.3 Leaders of the programme

The food industry did not have undue influence on the policy, but had to fulfil obligations such as fortification of bread flour or vitamin D enrichment of margarine. The policy was devised by respected scientists, including Sir Jack Drummond, Sir Wilson Jameson, Sir John Boyd Orr, nutritionists Robert McCance and Elsie Widdowson, who worked closely with the government. The Minister of Food, Lord Woolton, became so famous that a vegetable pie was named after him. The healthy babies in propaganda photographs were called 'Lord Woolton's babies'.

¹⁵³ Allotments are small plots of land in towns allocated for growing family food. It is still a legal requirement for local councils to provide them. I have had one for over 30 years.

¹⁵⁴ 'Supersizers go to World War Two', BBC 2 TV, 2008.

A 3.4 Personal experience

Though born after WW2, I am a beneficiary of that system. My mother, raised on a poor diet and with no nutritional knowledge, benefitted from the focus on pregnant women and infants. She bore four healthy children and fed them on the war time diet. In contrast to pre-war culture, prioritising the child's diet in the household became normal. As a child, I learned from my mother that potatoes should be plunged into boiling water (not cold) to conserve their vitamin C; that sodium bicarbonate must not be added to the cooking of green vegetables (an old British custom to enhance the green colour) because it destroyed B vitamins; that watercress was rich in minerals and vitamins. She learned all this and how to be a thrifty and imaginative cook from wartime propaganda. As one author wrote, *'Never before have the British people been so wisely fed or British women so sensibly interested in cooking'*¹⁵⁵.

A 3.5 Key points

The key to the UK policy's success was egalitarianism and consistent, clear, practical nutrition information through radio and print media. Healthy food (but not luxuries) was affordable to all. The policy was to ration nothing, however scarce until there was enough to go round and then to ensure that the ration, however small was always honoured. Everyone from the woman in a slum to the royal family had ration books and media advice was directed to everyone without targeting a particular social group. It became culturally expected that a pregnant woman should get a larger helping of meat and children would be offered the best bits of the family meal. This influence survived the war. A later study of working class families published in 1963 noted: "...these children benefit additionally from the high tea custom, in that they are likely still to be up when father is having his evening meal and to be fed from his plate with titbits of meat or bacon. This extra source of protein foods which seems considerable enough to be mentioned frequently by mothers, is a privilege probably only enjoyed by the youngest child"¹⁵⁶. This was written in the era of the great protein obsession¹⁵⁷ but is nevertheless sound. Both protein and micronutrients such as iron would be in these 'titbits'.

¹⁵⁵ Veal I. *Recipes of the 1940s* cited in Norman J. 1943 Longmate N (1971) *How we lived then: a history of everyday life during the Second World War*. Arrow Books. Norman J *Eating for Victory: reproductions of official Second World War instruction leaflets*. Michael O' Mara Books Ltd 2007. Kurlansky M. *Cod: a biography of the fish that changed the world*. Vintage 1999 Greaves JP. Food and Nutrition policy in Britain during World War II. Turning adversity to advantage. UNICEF Internal Document 1984.

¹⁵⁶ Newson J and Newson E (1963). *Infant care in an urban community*. George Allen and Unwin.

¹⁵⁷ McClaren Ds. The great protein fiasco. *The Lancet* 1974;2:93-6

Appendix 4 Additional information on the Special Supplemental Nutrition Program for Women, Infants and Children (WIC)

The US Congress appropriated US\$6.86 billion for WIC in 2009 (cf US\$20.6 million in 1974). Costs are met by the federal government, ie the US taxpayer but individual States negotiate rebates from infant formula manufacturers who bid competitively. The WIC infant formula 'market' is the largest in the world. It is probable that WIC, as much as hospital practices and promotion has assisted in the decline of breastfeeding¹⁵⁸. In 2008, 8.2 million people received WIC 'benefits'. In addition to infant formula, WIC provides complementary foods for use before six months which include infant cereals, 'baby food' (ie jars of pureed foods) and juices. There is a dilemma that if these products are withheld from mothers until after six months, that infants will be given unsuitable complementary foods. Infant cereal is encouraged and promoted in the USA as the principle source of iron in the diet of infants and young children. Recent research shows that 70% of infants consume complementary foods before six months despite professional advice.

WIC also provides a package of family foods which reflect the nutritional priorities of the 1950s, ie predominantly they are high protein, high energy foods. In recent years there have been moves to change the WIC food package because it is acknowledged that it has lacked sufficient fresh and diverse fruits and vegetables¹⁵⁹.

The USA now has the highest proportion of overweight people in the world and 30% of adults are obese (cf Japan 2.4%). In the USA, 25.1% of children between 13 and 15 are overweight compared with 7.6% in Holland. Within the USA the prevalence of childhood overweight and obesity is linked to inequality. The more unequal US States will inevitably have more WIC recipients and it is likely that the WIC nutritional programme has contributed to the epidemic of overweight and obesity¹⁶⁰.

The WIC programme extends to US overseas territories such as American Samoa where overweight, obesity and associated disease are a major public health problem¹⁶¹.

¹⁵⁸ Kent G. *WIC's promotion of infant formula in the United States*. International Breastfeeding Journal 2006; 1989: pp1-14

¹⁵⁹ www.fns.usda.gov/fns

¹⁶⁰ US National Survey of Children's Health cited in Wilkinson R & Pickett K op cit.

¹⁶¹ Lang S. Report on Mother and Child Health in American Samoa. WHO 2003.



