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Evidence *v.* rights-based decision making for nutrition

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The need for an evidence base for human nutrition action is analysed in the context of human rights. Over the last 50 years the twin tracks of development, economical needs based and normative rights based, have come progressively closer in terms of goals and objectives, even if they do maintain different orientations and origins. The international human rights machinery is described, together with those parts that are of relevance to the right to food and nutrition. The role of the State in respecting, protecting and facilitating these rights is further described. The evidence base for the benefit of nutrition interventions during the fetal and infant period to the health and well-being of populations throughout life's course is briefly reviewed, and reasons why such a large body of evidence has not been acted upon are discussed. The power of nutrition is in prevention more than cure, and the prevention of nutritional deficiency is best suited to radical population-wide strategies rather than high-risk strategies targeted at individuals. The population-wide distribution of benefits of nutrition is in congruence with universality of human rights. In the UK much remains to be done to ensure that food and nutrition rights are realised, especially during the critical period of fetal and infant growth. What role the Nutrition Society might play in the realisation of these rights, including the creation of a robust evidence base for nutrition action, is further discussed.

Evidence-based nutrition: Right to food: Fetal and infant growth

The health sector is increasingly extolled to secure the greatest possible improvement in the physical and mental health of populations through the resources available to it. To achieve this improvement, decisions about the delivery and provision of healthcare are increasingly driven by evidence of cost- and clinical effectiveness as well as systematic assessment of actual health outcomes (Sackett *et al.* 1996). What about food and nutrition, how do they fit into the equation? Although evidence for the importance of nutrition in health has been considered far from robust (Margetts, 2001), since we are what we eat, food consumption surely must have a great influence on health status. Health sector responsibilities in relation to food are relatively limited, however, as the responsibility for the production and distribution of food largely lies with the agricultural sector. Food is a basic necessity, and the right

to food is accepted as an integral part of human rights instruments. The responsibility for ensuring the provision of basic food entitlements, be it in the form of a minimum wage or a food ration, lies with the social welfare and/or social security services. With the progressive adoption of neo-liberal economic principles in most nations of the world, the provision of government funds for delivering welfare services is also increasingly subject to rigorous scrutiny. What is hunger? What is food security? What are the scientific underpinnings of food and nutrition entitlements? These decisions affect whole populations not just individual patients. The science of nutrition thus becomes inevitably enmeshed in politics. The purpose of the present article is to try to explore the relationship between nutrition and socio-economic development, and contrast the evidence for decision-making for better nutrition in the context

Abbreviations: CRC, Convention on the Rights of the Child; MDG, Millennium Development Goals.

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of human rights as opposed to that of a needs-based economic development paradigm. In order to explore these relationships the situation of nutrition and fetal and infant growth in the UK is used as an example.

From economics-based development to normative-based development

Since the setting up of the UN in the aftermath of the Second World War, development thinking and practice have been running on two tracks, one being rights based and the other economics or needs based. The objectives of economic development, promoted by the Breton Woods Institutions since their creation, are fundamentally aimed at the creation of wealth. With sufficient financial resources the hope was that all governments would be able to ensure that a minimum of basic needs was at some point met for all across the globe. Human rights-based development promoted by the UN is not only about the achievement of certain minimum standards of living, but it is also about the basis of those minimum standards as entitlements and how they are achieved. Over the last decade, the needs-based and rights-based development paradigms have become progressively closer in terms of objectives and outcome, even if they do have fundamentally different orientations and origins.

During the last half century, development largely focused on economic growth, and only in the last decade have social development objectives gained greater prominence. The development model that the Third World was largely encouraged to follow in the period after the Second World War promoted the export of commodities such as agricultural produce and/or mineral resources in order to gain revenues. This approach was later followed by the introduction of industrialisation to produce goods for the internal market and even for export. The purpose of economic growth is increasing wealth, or asset accumulation, and the principal measure of success of development was whether there was the accumulation of wealth, as measured by increases in the gross national product. In order to try to achieve social development, the Basic Needs approach was promoted by development agencies throughout the 1960s and 1970s. The Basic Needs approach encouraged the use of labour-intensive production methods to create jobs in order to increase the income of the poor, the provision of public services as resources permitted, together with the use of community participation to make it all more affordable. Despite the efforts of international development agencies over the past 40 years the average growth in wealth of the poor countries has been much less than that of the richer industrialised nations, widening the gap between the rich and the poor nations. Approximately half humanity is still trapped in poverty, subsisting on <US \$2 per d (World Bank, 2000). A study documenting the negative effects on social welfare services of economic adjustments imposed on developing countries as conditionality for rescheduling of debts in the 1980s helped to create a more human face to development thinking (Cornia *et al.* 1987).

During the 1990s, as the economics- and needs-based approach to development was increasingly questioned, a

more people-centred development paradigm began to prevail. Since first being published in 1990, the Human Development Report (United Nations Development Program, 1990) has made enormous contributions towards forwarding the case for more people-centred development (United Nations Development Program, 1999). The human development concept is a holistic one, which puts people at the centre of all aspects of development. Economic development is a means for achieving human development, not the contrary. At all levels of development, a few capabilities are essential for human development, without which many choices in life would not be available. These capabilities are to lead long and healthy lives, to be knowledgeable and to have access to the resources needed for a decent standard of living. The human development index pioneered by the Human Development Report is a reflection of these three distinct components, indicators of longevity, education and income per head. The human development index has been widely accepted as an alternative measure of development, one that is not exclusively focused on economic opulence as is gross national product. Human development is more than just about achieving greater human capabilities, it is also about the process of pursuing them in a way that is equitable, participatory, productive and sustainable. Human development concerns the expansion of human capabilities in order to achieve many substantive freedoms beyond that of just freedom from want and hunger (Sen, 2000). These freedoms include, amongst others, freedom from illness, freedom to develop and realise one's human potential, freedom for decent work without exploitation, freedom from discrimination, freedom of thought and speech, and freedom from fear. The notion that social development is economic development was accepted in World Bank publications in the early 1990s (Birdsall, 1993). A recent World Bank study of the dimensions of human development strangely makes no reference to human rights (Alkire, 2002). Human development shares a common vision and a common purpose with that of human rights, i.e. to secure the freedom, well-being and dignity of all people everywhere (United Nations Development Program, 2000).

The importance of human capital to development has become increasingly apparent in the last decade. Human capital represents the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being. Changing economic and social conditions associated with increasing globalisation have given knowledge and skills (human capital) an increasingly central role in the economic success of nations and individuals. Information and communications technology, globalisation of economic activity and the trend towards greater personal responsibility and autonomy have all changed the demand for learning. The non-economic returns to learning, in the form of enhanced personal well-being and greater social cohesion, are viewed by many as being as important as the impact on labour market earnings and economic growth, even though it is recognised that such benefits may only become apparent much later. These concepts of human and social capital have emerged in the last two decades to try to better define the relationship between labour and capital in promoting economic growth

in this rapidly changing world (Organization for Economic Cooperation and Development, 2001).

Over the half century since the UN was founded and the Universal Declaration of Human Rights was adopted, an international system of human rights has emerged, with a rapid rise in the commitments made to it since 1990 (United Nations Development Program, 1998; Eide & Kracht, 1999; Jonsson, 2000). According to International Human Rights Law, State Parties of a UN Convention have 'obligations'. These obligations are of three types: the obligation to 'respect'; the obligation to 'protect'; the obligation to 'fulfil'. The obligation to fulfil contains obligations to 'facilitate' and 'provide'. The obligation to respect requires the State to refrain from interfering directly or indirectly with the enjoyment of the right. The obligation to protect requires the State to take measures that prevent third parties from interfering with the enjoyment of the right. The obligation to fulfil (facilitate) requires the State to adopt appropriate legislative, administrative, budgetary, judicial, promotional and other measures towards the full realisation of the right. The obligation to fulfil (provide) requires the State to directly provide assistance or services for the realisation of the right.

Today, ≥ 140 countries have ratified all but one of the six core covenants and conventions on civil, political, economic, social and cultural rights. The main principles and objectives of human development have thus been accepted and adopted by the majority of nations. The International Covenant of Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights were both adopted by the UN General Assembly in 1966 and entered into force in 1976. The International Covenant of Civil and Political Rights includes the right to life, freedom from slavery, servitude, forced or compulsory labour, right to liberty and security, liberty of movement, equality before the law, freedom of thought, conscience and religion, freedom of expression and peaceful assembly and the right to vote and be elected. The International Covenant on Economic, Social and Cultural Rights includes the right to work, to form trade unions, the right to social security and the right to food, education and health. The Convention on the Rights of the Child (CRC) and the Convention on the Elimination of all forms of Discrimination against Women are complementary and mutually-reinforcing human rights instruments. The Convention on the Elimination of all forms of Discrimination against Women applies to females of all age-groups, and requires states to eliminate discrimination against women in the enjoyment of civil, political, economic and cultural rights. The CRC applies to boys and girls up to age 18 years, and requires States to ensure the civil, political, social, economic and cultural rights of children. A total of 163 countries, including the UK, have ratified the Convention on the Elimination of all forms of Discrimination against Women. The CRC has been ratified by all nations (191) except two, the USA and Somalia.

Whilst the right to food is covered in many parts of the CRC, the right to nutrition is not explicit. It can be said to be implicitly included as part of the rights to health, food and care (Jonsson, 1996). The protection of fetal and infant growth is covered by the CRC in many sections. In the preamble it states 'the child, by reason of physical and

mental immaturity, needs special safeguards and care, including appropriate legal protection, before as well as after birth'. In article 3 the CRC states, 'In all actions concerning children the best interests of the child shall be the primary consideration'. In article 6 it states, 'State Parties shall ensure to the maximum extent possible the survival and development of the child'. Article 24 states that State Parties 'recognising the right of the child to enjoy the highest attainable standard of health shall take appropriate measures to: diminish infant and child mortality; combat disease and malnutrition; ensure appropriate pre-natal and post-natal care for mothers; ensure that all segments of society are supported in basic knowledge of child health and nutrition, including the advantages of breastfeeding'. Article 27 states that State Parties: 'recognize the right of every child to a standard of living adequate for the child's physical, mental, spiritual, moral, and social development; shall in cases of need provide material assistance and support programmes, particularly with regard to nutrition, clothing and housing'.

During the 1990s the UN system and governments of the world gradually began to give more importance to social development, and a comprehensive set of goals and targets has been agreed (United Nations, 1997). During the decade a series of major conferences was held that included the World Summit for Children held in New York in 1990, The World Summit for Social Development held in Copenhagen in 1995 and the World Food Summit held in Rome in 1996. Amongst the many commitments made by the great majority of world leaders who attended these conferences, those of direct relevance to nutrition included: the reaffirmation of the fundamental right of everyone to be free from hunger and to reducing the number of undernourished people to half the 1995 level by 2015; reduction of child undernutrition by half the 1990 levels by 2000; reduction of low-birth-weight rate to $\leq 10\%$; reduction of Fe-deficiency anaemia in women by one-third the 1990 levels; virtual elimination of I-deficiency disorders; virtual elimination of vitamin A deficiency and its consequences; empowerment of all women to breast-feed. There was considerable success in achieving these nutrition goals during the 1990s, especially for micronutrient nutrition (Shrimpton & Schultink, 2000; Annan, 2001). The goals from these various summits were brought together and promoted as a set of International Development Goals by the Organization for Economic Cooperation and Development, the World Bank and the International Monetary Fund (International Monetary Fund/Organization for Economic Cooperation and Development/United Nations/World Bank, 2000). These goals were further endorsed and adopted at the Millennium Summit held at the UN General Assembly in New York in September 2000, when all member states of the UN reaffirmed their commitment to working towards a world in which sustaining development and elimination of poverty would have the highest priority and the Millennium Development Goals (MDG) were accepted as the framework for measuring development progress by the year 2015. Success for the principal MDG objective, the reduction of poverty, will be measured by judging whether the percentage of the population on $<US \$1$ per d, the percentage of the population consuming less than their

energy requirements and the percentage of children with malnutrition are reduced by half between 1990 and 2015 (World Bank, 2002).

The pursuit of the MDG is congruent with the achievements of human rights, and means that the dominant development paradigm is evolving towards becoming a normative one. Whether the evolution continues will depend on the quality of the development process being followed at the country level. Basic needs can be met by top-down goal or outcome-oriented strategies, but human rights can only be met by attention to both outcome and process. Goals and targets reflecting the meeting of needs are met or 'satisfied', whilst rights are 'realised' (respected, protected, facilitated and fulfilled). Basic needs can be met through charity and benevolence, whilst charity is obscene in a human rights perspective. Human rights are inalienable entitlements or interests that are agreed as necessary claims for people based on their human nature, needs and aspirations. A human right, however, is not any claim or a mere wish or hope. Human rights reflect relationships between subjects with valid claims and objects with correlative duties or obligations. The MDG may or may not be met depending on political whim and will, and as such are just promises and have no legal basis. The MDG represent the political commitment of world leaders who will no longer be in power in 2015. With particular regard to the pursuit of economic, social and cultural rights, State Parties are required to 'undertake such measures to the maximum extent of their available resources and, where needed, within the framework of international cooperation'. In presenting the MDG targets for discussion at the country level, they should be put in the context of human rights. The commitment to reduce child malnutrition by half is acceptable, as long as there is a commitment to try to achieve it before then if feasible and to continue after 2015 to try to achieve the rights of those whose rights are still not realised. By signing the covenants and conventions of the UN, governments of nation States have accepted their responsibility for ensuring these rights are achieved. They need to make these rights clear to their populations and together identify the correlative duties and obligations of the various actors involved in the full realisation of these rights (Eide, 2002).

The evidence base and actions taken for the promotion of nutrition in development

Evidence of the critical nature of nutrition for fetal and infant growth in the course of the life cycle has great relevance to both rights-based and economics-based decision-making. The evidence that the satisfaction of a nutritional need produces a positive outcome, be it for diminished infant and child mortality and/or adequate physical, mental, spiritual, moral, and social development of the child, is equally essential for a normative rights-based strategy as it is for an economical needs-based strategy. The methodology of establishing adequate levels of intake of nutrients, which can be used to make recommendations on the minimum levels of intake of nutrients for populations and for establishing entitlements, relies on such an evidence base. The most recent work of the Institute of Medicine,

which established dietary reference intakes for fourteen micronutrients (Food and Nutrition Board, 2001), emphasised the need for further research to correct inadequacies in published databases. Apart from studies of overt deficiency disease, there is a dearth of studies that address specific effects of inadequate micronutrient intakes on health status.

Two recent reviews of the evidence base for nutrition interventions for improving maternal and child nutrition have concluded that even if hard evidence based on randomised control trials is limited, there is still substantial evidence that investing in nutrition interventions improves health outcomes. A working group report of the Commission on Macroeconomics and Health (Nemer *et al.* 2001) concluded that only micronutrient supplementation interventions such as vitamin A had been found to be effective in reducing child mortality and morbidity in randomised control trial settings, and that food-based strategies are long-term sustainable interventions that are not effective in the short term, and therefore need complementing with micronutrient supplementation strategies. In addition, they concluded that public health interventions (vector control, sanitation, hygiene) have a large impact on child malnutrition when combined with nutrition interventions and that food supplementation is an effective intervention for protein-energy malnutrition in children if it is carried out on a targeted and short-term basis. The review of 'what works' carried out by Allen & Gillespie (2001) looked at five major nutrition problems of women and children in developing countries, including low birth weight, early childhood growth failure, anaemia, I deficiency and vitamin A deficiency. Recognising that undernutrition is usually the result of many factors, and that the most effective approaches were those that involved several sectors and strategies, the review recommended the adoption of key 'minimum packages' of interventions. The evidence suggests that combining improved infant feeding, better household access to food, and improved and more accessible health services and sanitation is clearly more effective in combating undernutrition than any of these factors taken alone. None of the evidence for interventions to reduce malnutrition in children considered in both these comprehensive reviews looked at the possible benefits of improving maternal nutrition or child malnutrition. It is unfortunately true that most nutrition interventions aimed at preventing child malnutrition are too late. After 2 years of age the growth of children is largely the same anywhere in the world, and the greatest influence on differences in children's height and weight across continents occurs in the uterus and in infancy (Shrimpton *et al.* 2001).

Although Allen & Gillespie (2001) concluded that interventions to reduce the prevalence of low birth weight should receive a high priority in Asia, the results of randomised control trials that have investigated the effects of maternal food and nutrient supplements have found very limited evidence that maternal nutrition is important for fetal and infant growth. Supplements of Fe, Fe and folate, and folate alone all prevent low haemoglobin at delivery, without evidence of an effect on low birth weight, intra-uterine growth retardation or preterm birth (Mahomed, 2002*a,b,c*). The only intervention shown to have any effect on intrauterine growth retardation was food

supplementation with adequately-balanced protein:energy (de Onis *et al.* 1998). It is recognised that there are limitations to these findings, in that most of these studies were carried out in non-nutritionally-challenged populations and did not look at effects after birth such as growth in infancy. More recently, a 5-year randomised control trial of maternal dietary supplements in rural Gambia showed positive effects on birth weight and perinatal mortality (Ceesay *et al.* 1997). Another recent large randomised controlled trial of vitamin A supplementation to women of reproductive age in Nepal has reported a reduction in mortality related to pregnancy by half (West *et al.* 1999). Guidance on how to develop programmes to reduce the prevalence of low birth weight is perhaps not surprisingly limited (ACC/SCN, 2000).

The evidence base for the beneficial effects of breast-feeding for both mother and child is extensive. Anything other than exclusive breast-feeding for the first 6 months of life has disadvantages for morbidity, mortality, growth and development (Anderson *et al.* 1999; Villalpando & Lopez-Alarcon, 2000; World Health Organization, 2000, 2002; Betran *et al.* 2001; Kramer & Kakuma, 2002; Richards *et al.* 2002). Recent evidence suggests that artificial feeding instead of breast-feeding in the first year of life is associated with childhood obesity and degenerative diseases in later life and that this relationship might be attenuated by constrained fetal growth (Dewey *et al.* 1993; Kries *et al.* 1999; Ravelli *et al.* 2000; Armstrong & Reilly, 2002). The WHO/UNICEF International Code of Marketing of Breastmilk Substitutes was adopted by the World Health Assembly in May 1981, recommending member States to adopt legislative measures to ensure that breast-feeding was protected from unethical marketing practices (Sokol, 1997). In 1900 WHO and UNICEF adopted the Innocenti Declaration, encouraging all governments to take action to give effect to the principles and aims of all articles of the International Code of Marketing of Breastmilk Substitutes, and subsequent relevant World Health Assembly resolutions and to promote the ten steps of the Baby Friendly Hospital Initiative. The Baby Friendly Hospital Initiative was designed to ensure that hospital practices favoured exclusive breast-feeding, including rooming-in, putting the baby to the breast immediately after birth and not allowing the distribution of free samples or the receipt of free or low-cost donations of breast-milk substitutes (World Health Organization, 1998). A randomised controlled trial of the Baby Friendly Hospital Initiative approach in Belarus showed that it had considerable benefits in terms of promoting exclusive breast-feeding, with an associated reduction in infant morbidity (Promotion of Breastfeeding Intervention Study Group, 2001).

The costs of appropriate programmes to prevent the occurrence of malnutrition are very small in comparison with the lifetime costs of the malnutrition itself. Studies in developing countries suggest that the costs of such malnutrition may exceed 2 or 3 % of the gross domestic product (Horton, 1999). Even taking a conservative estimate of 2 % of the gross domestic product, the annual costs for all the countries in Sub-Saharan Africa is US \$6.2 × 10⁹ and for South Asia is US \$11.9 × 10⁹. These costs of malnutrition are only those related to losses in economic productivity, and do not include the priceless cost of child lives lost with

malnutrition as the underlying cause (the under 5-year-old lives lost yearly amount to two million in South Asia and 2.3 million in Sub-Saharan Africa), and the extra cost related to health care because of increased infectious illness, or the increased repetition rates in schools among those who survive. None of these studies and computations has included the link of inadequate fetal and infant growth to the development of chronic degenerative diseases in adulthood and the downstream costs for health provision that this outcome entails. A recent WHO review of the literature relating to fetal nutrition and the programming of chronic disease (Delisle, 2002) concluded that the prevention of impaired fetal growth through improved nutrition of girls and women not only contributes to lower maternal mortality and better child survival and development, it may also help prevent chronic disease and, in particular, the obesity, diabetes, and cardiovascular disease epidemic in developing countries. Furthermore, the benefit of improving maternal (and fetal) nutrition may go beyond what may be projected based on birth weights, since intrauterine programming may occur without verifiable effect on size or proportions at birth.

The most comprehensive study of the cost-effectiveness of health interventions in developing countries, summarised in the World Bank Development Report (World Bank, 1993), found six nutrition interventions to rank among the top twenty-two most cost-effective interventions. If it is assumed that the cost of a reasonably comprehensive, yet targeted, set of nutrition interventions to prevent child undernutrition can be delivered through community-based nutrition programmes for approximately \$20 per beneficiary per year (Horton, 1999), and if such interventions were delivered to all pregnant mothers and children <2 years of age, the annual cost for South Asia would be US \$1.6 × 10⁹ and for Sub-Saharan Africa US \$2.2 × 10⁹. These costs are less than one-quarter of the annual cost of letting malnutrition prevail in these two regions, 0.4 % of the combined gross national incomes of the countries of South Asia and 4.9 % of the combined gross national incomes of the countries in Sub-Saharan Africa (calculations based on data taken from the statistical appendix of the UNICEF State of the World's Children 2003, using results from Horton, 1999).

Despite this wealth of evidence that investing in nutrition gives great benefit, there has been no major priority given to trying to tackle child undernutrition by the development community to date (Macdonald *et al.* 2000). Perhaps one of the problems of getting nutrition programmes implemented is that the economic benefits from investments to prevent malnutrition in terms of productivity are not seen by the individual or by governments in the short term. Such benefits only materialise during life's course. Approximately half the economic growth achieved by the UK between 1790 and 1980, for example, has been attributed to better nutrition and improved health and sanitation conditions; social investments made as much as a century earlier (Fogel, 1994). This long-term nature of the benefit means that the cost of investing in programmes to reduce child malnutrition today will only be paid back tomorrow, i.e. when today's babies join the work force. In approximately one decade, the gross domestic product should be

much greater, and thus the cost or losses much greater than today, if no action is taken.

Perhaps the biggest problem nutrition encounters is the clinical obsession with the prevalence of frank deficiencies in individuals and the lack of a wider understanding of the importance of more subtle population-wide effects of nutritional deficiencies. Policy makers and the public at large can recognise and feel compassion for a child who has kwashiorkor or marasmus, who is blind due to vitamin A deficiency, or who is a cretin because of I deficiency. Typically, whether a nutritional deficiency is a problem of public health importance is based on the existence of a certain prevalence of a clinical deficiency sign. If there are no signs of vitamin A deficiency (xerophthalmia) in the eye then vitamin A deficiency is not considered to be a problem of public health importance in the population. Similarly, if there is no palpable goitre in schoolchildren then I deficiency is not considered to be a problem in the population. Poor fetal growth is only considered to be a public health problem if the low-birth-weight rate is > 15 % (World Health Organization, 1995).

The notion that only those cases with severe signs of nutritional deficiency are at risk has, however, been challenged in the last decade (Yip & Scanlon, 1994). In populations at risk of I deficiency it is now accepted that the low levels of I in the diet reduce intellectual capacity, even in those members of the population without detectable goitre. A meta-analysis that looked at studies that compared the effects of I status on intelligence quotient found an average of 13.5 intelligence quotient points less in intelligence across the whole population that was affected by I deficiency when compared with populations not so affected (Bleichrodt & Born, 1994). Another example is shown by studies looking at the effects of birth weight on neonatal mortality in babies suffering intrauterine growth retardation, as reported by Ashworth (1997), in which the lowest risk for the individual baby in terms of survival is for those born weighing > 3.5 kg and < 4.0 kg. Although the individual risks are about four times greater for those born weighing < 2.5 kg, than for those weighing 2.5–3.4 kg, there are at least three times as many more babies born in the latter category. Thus, in populations experiencing intrauterine growth retardation, the number of neonatal deaths is likely to be as great for babies born with 'normal weight' (i.e. > 2.5 kg and < 3.5 kg) as it is for babies born with low birth weight (< 2.5 kg). The same population-wide relationships are seen for child malnutrition, where although the relative risk of dying is greatest in those severely malnourished, because there are much fewer severely-malnourished children than mildly-malnourished children, the absolute risk of dying is greater in the mildly-malnourished group (Pelletier *et al.* 1994). Studies in the UK have shown that similar population-wide relationships exist for birth weight and both cognitive functions in later life (Richards *et al.* 2001) and CHD in adult men (Godfrey & Barker, 2000), with the birth-weight group with the least risk of adverse outcome being 3.5–4.0 kg.

The seminal work of Rose (1985) on sick individuals and sick populations exemplifies the situation of nutrition interventions in relation to the problems of proving their efficacy and effectiveness. Rose (1985) contrasted the

advantages and disadvantages of prevention by 'high-risk' strategies as opposed to prevention by 'population' strategies. The three main tenets of his work are that: first, the causes of cases of disease and causes of disease incidence may be different; second, prevention by a population strategy requires a radical approach; third, there is a 'population paradox'. An example of how case causes and causes of incidence may be different is provided by vitamin A deficiency, where at the individual level the clinical signs of vitamin A deficiency are always associated with low tissue levels and body reserves of vitamin A. At the population level, however, the incidence of xerophthalmia may not be associated with the intake of vitamin A, and is very often determined by a recent outbreak of measles and/or the presence of other diseases. The inadequate ingestion of the vitamin A and the presence of disease are immediate causes of xerophthalmia, which are themselves associated with more distal underlying causes such as food availability, poverty, lack of knowledge, lack of access to health services. The incidence of xerophthalmia might be different in different populations because of differences in the availability of health services or of knowledge of the importance of immunisation, and not necessarily because of differences in vitamin A intake. The two approaches of aetiology, the individual and the population, have their counterparts in prevention and lead to the need for radical approaches to prevent malnutrition. It is possible to treat xerophthalmia by screening the population and treating those found positive with vitamin A supplements. Such a high-risk strategy would be highly efficacious, but highly expensive. Furthermore, it would be palliative and temporary, with new cases continuing to occur in the population. A better solution is a radical one that ensures the continuous provision of vitamin A supplements to all young children in the form of periodic massive-dose capsules. Even more radical would be to ensure that all children were immunised and therefore not likely to get measles. Even more radical again would be to ensure that all children lived in households with clean water and toilets, where infectious disease incidence was reduced. By moving from the immediate cause to the underlying cause to the basic cause the prevention strategy becomes increasingly radical, but increasingly sustainable. The added advantage of treatment of the underlying and basic causes is that not only vitamin A deficiency outcomes are prevented. The 'population paradox' is when a preventive measure that brings much benefit to the population offers little to each participating individual. The promotion of breast-feeding, the promotion of weight gain in pregnancy, the promotion of weight gain in infancy, the promotion of eating a varied diet and the promotion of eating iodised salt are all practices that may result in small individual benefits, or reduction in individual risk, but result in a large combined benefit for the population as a whole, albeit that such benefits only appear later in the life cycle, or even in another generation. The conclusion to be drawn from the work of Rose (1985) is that nutritional deficiencies in populations should only be tackled using radical population strategies, since the very existence of even 3 % frank deficiency signs means that the whole population is exposed to higher adverse risks, and that even when no frank deficiencies exist there may still

be substantial subclinical deficiency affecting a large part of the apparently-normal population. Such a radical population-wide approach is consistent with a rights-based one, for although rights are individual rights, rights are for all individuals, i.e. the population as a whole.

There seems to be a renewed interest in developing and implementing programmes to tackle malnutrition. The Commission on Nutrition Challenges of the 21st Century noted that if progress in reducing child malnutrition continued at rates observed in the last decade, then the goals of the World Food Summit for 2015 (i.e. the MDG) would require another century to be met (James *et al.* 2000). The Commission proposed a new paradigm of nutrition, which incorporates the double burden of undernutrition and diet-related adult disease and recognises that this double burden is amplified by the link between maternal and fetal nutrition and a population's susceptibility to adult diet-related disease. The report identified eight major nutrition challenges, of which five were related to improving maternal nutritional status. The latest World Health Report (World Health Organization, 2002) has also identified underweight as one of the principal risk factors in terms of burden of disease globally, and will hopefully lead to more radical efforts to tackle the problem on the part of WHO.

The food and nutrition rights of the fetus and infant in the UK

Fetal and infant growth in the UK is not optimal, and the government is not doing all in its power to respect, protect and fulfil the rights of fetuses and infants to grow to their genetic potential. Whilst the relative individual risks are highest in babies born weighing <2.5 kg, the absolute risk of adverse outcomes for the population is highest in those babies weighing 2.5–3.4 kg. There has been a steady increase in the low-birth-weight rates in UK from 6.2 % in 1974 to 7.7 % in 1996 and more than half the babies in the UK are still born weighing between 2.5 and 3.5 kg (Macfarlane, 2000). Whilst the increase in the low-birth-weight rate in the UK has been attributed to the increased survival of very-low-birth-weight babies (<1.5 kg) due to better intensive care in neonatal units (Power, 1994), there are also strong geographic differences in low-birth-weight rates that are unlikely to be entirely explained by this phenomenon. During the 1990s low-birth-weight rates ranged from 5.6 to 12.3 % in electoral wards of Birmingham, from 3.0 to 12.0 % in wards of Leeds and from 5.1 to 12.8 % in wards of Manchester (Wynn & Wynn, 2000). In Wakefield, where the low-birth-weight rate in 2000 was 10 %, it was >14 % in four wards (J Appleton, personal communication). Although the average income *per capita* in the UK increased by 43 % in the two decades to 1996, the income of the poorest 10 % of the population decreased by 12 % in real terms, and the UK now has the highest rate of poverty in Western Europe (Seymour, 2000). In developed country settings like the UK by far the most important single factor influencing birth weight is cigarette smoking, followed by poor gestational nutrition and low pre-pregnancy weight (Kramer, 1987). Smoking twenty cigarettes per d throughout pregnancy is thought to reduce

birth weight by about 300 g (Secker-Walker *et al.* 1998). The dietary intakes of the poor in the UK are lacking in quality more than quantity. Between 1980 and 1995 the intake of antioxidants decreased dramatically amongst the poorest one-fifth of families, with vitamin C intakes falling 23 % and carotene intakes 47 % (Leather & Dowler, 1997). As the result of a variety of access problems, the poor consume less fresh foods such as fruit and vegetables, the main sources of antioxidants in the diet. The poorest segments of the population also smoke more, compounding the effects of a poor-quality diet by increasing oxidant stress (James *et al.* 1997). The government still has to realise its promise to ban tobacco advertising, and gives no priority to, nor has a special programme with interventions specifically designed to, promote peri-conceptual nutritional status and optimal weight gain during pregnancy aimed at pregnant women in the poorer segments of society (Department of Health, 1999). Much remains to be done in the UK to respect, protect and fulfil the right of all fetuses and infants to grow to their full genetic potential.

Infant feeding patterns in the UK are far from optimal, and the government is not doing all that it should to respect, protect and fulfil the right to be appropriately fed during infancy. Exclusive breast-feeding is the optimal feeding pattern during the first 6 months of life, as recommended by both WHO and the UK government. Initiation of breast-feeding seems to be improving in the UK, but still 29 % of mothers in England and Wales, 37 % in Scotland and 54 % in Northern Ireland feed formula to their babies from birth. Furthermore, it is estimated that ≤10 % of mothers are giving breast milk alone to their infants at 6 months of age (Hamlyn *et al.* 2002). At 20 years after the adoption of the International Code of Marketing of Breastmilk Substitutes, approximately fifty-five countries have included most or many of the provisions of the code in national legislation or other legal measures (Kean & Allain, 2001). The law adopted in the UK in 1995, the Infant Formulae and Follow-on Formulae Regulations, falls far short of the International Code and Resolutions. It is limited in its scope and allows the advertising of infant formula in magazines distributed through the health care system. It does not regulate promotion activities to health workers or direct contact with mothers. Whilst for each baby born the food industry spent £17 promoting baby milks in 1997, the UK government spent the equivalent of £0.10 promoting and supporting breast-feeding (Baby Milk Action, 1997). The Baby-Friendly Initiative in the UK is a voluntary scheme run by a non-governmental organisation that is making encouraging progress, but which as yet covers only a limited number of health facilities (UNICEF UK Baby Friendly Initiative, 2002). Breast-feeding is not even mentioned in 'Our Healthier Nation' the blueprint for health of the nation (Department of Health, 1999). At the same time that the baby food manufactures are using increasingly sophisticated methods to circumvent the International Code and Resolutions and subsequent relevant WHO resolutions (Richter, 2001), much more could be done by the UK government to respect, protect and facilitate breast-feeding, the optimal infant-feeding practice.

Health policy in the UK and in Europe still lacks an appropriate human rights orientation. 'Our Healthier

Nation' (Department of Health, 1999) makes no mention of human rights, nor does it map out the duties and obligations of individuals, communities and government to ensure that the rights of all citizens to food and nutrition are realised. The convention for the protection of human rights and fundamental freedoms of the Council of Europe is still largely limited to the civil and political rights. A committee is in the process of establishing a European Social Charter that will cover the social economic rights, but on a State-by-State basis. Health care reform in Europe is guided by the Ljubljana Charter, which states that health care systems should be driven by values, but does not mention human rights. Experience with health care reform in Europe suggests that success is more associated with changing the behaviour of the providers of health services than a focus on cost containment. Evidence-based health care reform is evidently a double-edged sword that can strengthen primary care and equity as well as harm them, and can re-enforce the moral underpinnings of the welfare state as well as erode them (Vienonen *et al.* 1999).

The role of civil society in ensuring the realisation of the right to food and nutrition is critically important, and is something the Nutrition Society should reflect on as it looks to its future. It is recognised by the UK government that some of the factors that harm the health of the population are beyond the control of any single individual. A new three-way partnership is proposed that comprises individuals, communities and government, and the aim to create the right conditions for individuals to make healthy decisions is at the heart of the new approach (Department of Health, 1999). The Nutrition Society needs to consider how it fits into this three-way partnership. As noted by Kracht & Hug (1996), at a time when the development debate seems to have narrowed to a polarised 'state v. private sector action' argument, public action is critically important for 'entitlement promotion'. Public action here does not mean action being taken by the State, but action being taken by civil society. The realisation of the right to food and nutrition relies on the creation of an evidence base that defines food and nutrition entitlements. However, the realisation of those rights also depends on civil society actors applying pressure, influencing public opinion and engaging in political activism in order to achieve the desired changes in the way society is run. To date the Nutrition Society has preferred to focus on the creation of scientific evidence and take virtually no public stance on whether such evidence is used to take nutrition action. As members of the Society pursue efforts to stimulate the creation of a sound evidence base to guide public health nutrition actions (Brunner *et al.* 2001), the many problems created by the 'population paradox' will need to be confronted. Most health services still give priority to acute care, and with decentralisation of health care management this tendency is strengthened. The pressures of the market favour the adoption of high-risk individual strategies, with private sector funding readily available for research to find products that can treat patients with curative approaches. Who will fund research to investigate population-based preventive strategies? The interests of the population as a whole (i.e. the State and civil society) is not in treating individual high-risk cases, but in helping prevent them happen by ensuring that the nutrition status of the

population as a whole is optimally distributed (Heller *et al.* 2001). Improving nutritional status in a sustainable way inevitably requires the adoption of multifaceted approaches that cover the whole population. For example, the prevention of chronic disease and disability of the poor is considered to require that continued priority be given to reducing the burden of disease associated with material and social deprivation, with nutrition advice and support to mothers and newborn infants (including breast-feeding) playing a vital role in preventing heart disease (Yach, 2001). The difficulty is that the multi-component nature of these interventions does not facilitate the conduct of randomised controlled trials with comparison control groups, and even if such trials could be mounted and the logistical and ethical problems could be solved, they would lack external validity. In reality, the only way to learn whether such nutrition-oriented interventions work is by evaluating them as multifaceted multi-component programmes. A framework to guide the evaluation of public health performance and impact has been developed, taking into consideration the complexity of constructing an evidence base that includes both efficacy and effectiveness dimensions (Habicht *et al.* 1999). The efforts of the Nutrition Society to promote the creation of a sound evidence base to guide public health nutrition actions should contemplate the need for an advocacy role to encourage the government not only to develop such programmes but also to adequately fund their evaluation.

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