

# **Scientific Advisory Committee on Nutrition**

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## **Subgroup on Maternal and Child Nutrition (SMCN)**

**Paper for discussion: Early nutrition and development of disease in later life**

**Agenda item: 2**

Please see attached paper for discussion.

# Scientific Advisory Committee on Nutrition

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## Subgroup on Maternal and Child Nutrition (SMCN)

### Early nutrition and development of disease in later life

#### Issue

1. SMCN consideration of the influence of maternal, fetal and child nutrition on the development of disease later in life

#### Background

2. The original Terms of Reference for the Subgroup included:
  - *To review the evidence on the influence of maternal, fetal and child nutrition including growth and development in utero and early childhood on the development of disease later in life.*
  - *To identify opportunities for nutritional intervention that could influence the risk of disease later in life*
3. The policy context that prompted the need for this review is summarised in Annex 1. Meanwhile, the Medical Research Council (MRC) commissioned a review that is likely to cover, at least in part, the above issues, although details and the full scope of the review was not known
4. At the first meeting of SMCN (22 January 2003) members discussed the likelihood of the review informing tasks delegated to the Sub-group. Members were also of the view that it could not be assumed that the review would cover all the issues SMCN had planned to address. In particular, it was noted that the review did not appear to include matters related to pre-conception nutrition or pregnancy.
5. It was therefore agreed at the last meeting that the Secretariat circulate further details of the MRC review and prepare a paper identifying key issues that SMCN could potentially consider so as to avoid duplication.

## **MRC Review**

6. It was subsequently learned that an MRC systematic review was to be undertaken on the *Prevention of adult disease through interventions in early life: a systematic review to define optimal growth*. The review is being undertaken by Dr Catherine Law and colleagues at the MRC Environmental Epidemiology Unit, Southampton and Professor Helen Roberts at the City University, London. The review will:

- Systematically assess and collate the scientific evidence and lay perspectives on infant size or growth with a view to determining whether optimal patterns of infant growth can be defined.
- Identify gaps in the evidence, assess the implications of those gaps and make recommendations for addressing them
- Develop a testable intervention to prevent adult disease by optimising infant size or growth and/or recommend a policy change (and evaluation) to achieve this or recommend no change.

7. Literature review is currently in progress and an interim report is expected in January 2004. The review is supported by an advisory group incorporating expertise from a number of areas including social science, growth dynamics, epidemiology, paediatrics and child health, qualitative research, health economics, biostatistics and information science. There is also representation of parenting support organisations. A summary of the protocol and the composition of the advisory group is given at Annexe 2. The chairman of SMCN is a member.

### *Content of the MRC Review:*

8. The MRC review focuses on change in size during infancy as predictor variables. It will not explore effects of pre-conceptual nutrition or birthweight (and other measures of fetal growth). The range of outcomes to be studied by the MRC review is likely to be dictated to some extent by time available. To date, draft analyses have been presented for ischaemic heart disease, sudden infant death, cognitive and developmental outcomes. The candidate list is larger and includes, for example, insulin resistance, diabetes, cancer, accidents, musculoskeletal disorders and psychiatric illness. New publications continue to appear, some of which identify further potential associations (e.g. rheumatoid arthritis ( Jacobsson LTH *et al* 2003)).

9. In summary, it is likely that discrete areas of secondary research could be selected which will complement those being presently examined, though these aspects may not be apparent until completion of the current review.

### **Scope for SMCN**

10. SACN/SMCN will have an important role critically assessing the findings of the review and assessing them against current interventions selecting those areas that require scientific re-evaluation. This process may require examining of further primary research, for example National Diet and Nutrition Survey and cohort

databases (*e.g.* ALSPAC, Southampton women's study) and explore relationships between prenatal and early nutrition and growth and development.

**Issues for consideration.**

11. Members are asked to consider whether:

- SMCN should undertake a complementary review of the effects of maternal nutrition, fetal growth and birthweight that are not being considered by the MRC review.

*Or*

- SMCN should await completion of the MRC review.

12. If members decide to proceed with a complementary review, they are asked to consider what specific focus this work might take, given the extent of published literature:

- What effects should be considered? Should these be limited, for example, to cardiovascular disease, insulin resistance and diabetes?
- Should shorter term outcome measures be considered, for example infant morbidity and mortality,
- Should particular issues relating to pre-term infants be considered, eg rate of catch up growth?
- Should medium term outcomes be considered eg obesity in childhood, development of diabetes in childhood.
- Should a systematic review process be adopted, or a more traditional approach be followed?

Reference

Jacobsson LTH, Jacobsson ME, Askling J, Knowler WC. Perinatal characteristics and risk of rheumatoid arthritis. *BMJ* 2003; 326(7398):1068-1069.

## Annex 1

### Policy context

1. In 1998 the report of the *Independent Inquiry into Inequalities in Health*, chaired by Sir Donald Acheson (1) highlighted the complex relationships between poverty, education, health behaviour, early nutritional influences and illness. In particular it pointed out that:

*“While remediable risk factors affecting health occur throughout the life course, childhood is a critical and vulnerable stage where poor socioeconomic circumstances have lasting effects”*

*“...while there are many potentially beneficial interventions to reduce inequalities in health of adults of working age and older people, many of those with the best chance of reducing future inequalities in mental and physical health relate to parents, particularly present and future mothers, and children”.*

2. Key recommendations included:

*“...policies which improve the health and nutrition of women of childbearing age and their children with priority given to the elimination of food poverty and the prevention and reduction of obesity”.* Amongst the mechanisms proposed was *“...increasing benefits in cash or in kind to them”.*

*“...policies which increase the prevalence of breastfeeding”.*

3. In response to these recommendations the COMA Panel on Child and Maternal Nutrition conducted a review of the Welfare Food Scheme (2). Although recognising that the Scheme retained potential for improving the health of a potentially vulnerable group of pregnant women, mothers and young children, the report drew attention to the lack of scientific evidence of effectiveness in this area. It listed a number of information needs in this area.
4. The “upstream” potential of early life interventions in preventing adult disease is also now recognised as an important component of international policy. The “life-course” model conceptualises how, at a given rate of decrement with ageing, failure to achieve early functional potential precipitates earlier crossing of a disability “threshold”.
5. The report of the joint WHO/FAO Expert Consultation *Diet, Nutrition and the Prevention of Chronic Diseases* (4) regarded the following statements as justifiable from the evidence considered:
  - Nutrients and physical activity influence gene expression and may define susceptibility

- The major biological and behavioural risk factors emerge and act in early life, and continue to have a negative impact throughout the life course.
  - The major biological risk factors can continue to affect the health of the next generation.
  - An adequate and appropriate postnatal nutritional environment is important.
  - Selected interventions are effective but must extend beyond individual risk factors and continue throughout the life course.
  - Some preventive interventions early in the life course offer lifelong benefits.
6. In the context of inequality it is also important to observe that certain groups within the UK population may be more vulnerable by virtue of a combination of factors which inter-relate nutrition, early growth, genetic and ethnic background in ways not clearly understood (5) (6).
7. Given these considerations there is a clear need to collate scientific information of relevance to policy formulation.

## **References**

- (1) Independent inquiry into inequalities in health. 1-164. 1998. London, The Stationery Office.
- (2) Committee on Medical Aspects of Food and Nutrition Policy PoCaMN. Scientific review of the Welfare Food Scheme. Report on Health and Social Subjects 51, 1-147. 2002.
- (3) Stein C, Moritz I. A life course perspective of maintaining independence in older age. 1-20. 1999. Geneva, World Health Organisation.
- (4) WHO/FAO Expert Consultation. Diet, nutrition and the prevention of chronic diseases. 916, 1-149. 2003. Geneva, World Health Organisation. WHO Technical Report Series.
- (5) Yajnik CS. The lifecycle effects of nutrition and body size on adult adiposity, diabetes and cardiovascular disease. [Review] [48 refs]. Obesity Reviews 2002; 3(3):217-224.
- (6) Whincup PH, Gilg JA, Papacosta O, Seymour C, Miller GJ, Alberti KGMM et al. Early evidence of ethnic differences in cardiovascular risk: cross sectional comparison of British South Asian and white children. BMJ 2002; 324(7338):635-638.

## ANNEX 2

### **Prevention of adult disease through interventions in early life: Protocol for a systematic review to define optimal infant size or growth**

#### Summary

1. The health of children is strongly influenced by how they grow and improving growth in infancy can lead to improvements in early health. Observational evidence suggests that infant growth is also linked to health in later life. A number of studies show that poor infant growth is associated with increased rates of death from coronary heart disease (CHD). Conversely, more recent research suggests that rapid infant weight gain may be a risk factor for later obesity, hypertension and insulin resistance. This suggests that interventions aimed at optimising infant growth could lead to the primary prevention of CHD. The development of any proposed intervention to improve infant growth should be informed by a systematic collation of the evidence to assess whether it is justified scientifically, and is feasible, desirable and ethical.
2. This systematic review is aimed at informing the development of an intervention study to improve infant size or growth. The review will address the first of a series of questions that need to be answered to design an intervention, that is, what is optimal infant size or growth for early and later health?
3. The review will assess and collate the scientific evidence and lay perspectives with a view to determining if optimal patterns of infant growth can be defined. We will also identify gaps in the evidence, assess the implications of those gaps, and make recommendations for addressing them.
4. The questions that will be addressed in the review will focus on the relationship of infant size/growth to a broad range of outcomes in adults and children. Since the review is intended to inform public health action, outcome variables will be selected if they have a significant impact on health, disease or quality of life.
5. The plan of research has two main elements:
  - Systematic review to address questions aimed at defining optimal infant size/growth.
  - Work on lay perspectives on infant size and growth which will include focus groups with mothers.
6. At the end of the project, we should be able to come to an evidence based opinion as to whether optimal infant size or growth can be defined, and whether parents would find an intervention to promote such optimal growth acceptable. Thus, the next steps would be to determine whether such an intervention(s) is already known, or can be designed and tested. In turn this should lead to a recommendation for research or policy, or an evidence based decision that no change is justified.

## Prevention of adult disease through interventions in early life

### Composition of advisory group

Expert area	Member of group	Contact details
Epidemiology	Prof Dave Leon	Professor of Epidemiology Department of Epidemiology and Population Health London School of Hygiene & Tropical Medicine Keppel Street London WC1E 7HT
Public Health	Dr Catherine Law	MRC Environmental Epidemiology Unit Southampton General Hospital Tremona Road Southampton Hampshire SO16 6YD
Systematic review/ information science	Prof Jos Kleijnen	Director NHS Centre for Reviews and Dissemination University of York York, YO10 5DD
Social care (including qualitative research and lay perspectives)	Prof Helen Roberts	Professor of Child Health Child Health Research and Policy Unit Institute of Health Sciences 20 Bartholomew Close London EC1A 7QN
Paediatrics and Nutrition	Dr Tony Williams	Dr Anthony F Williams Department of Child Health St George's Hospital Medical School Cranmer Terrace London SW17 0RE
Health visiting and community practice	Dr Helen Bedford	Lecturer Centre for Paediatric Epidemiology & Biostatistics Institute of Child Health 30 Guilford Street London WC1N 1EH
Biostatistics	Prof David Jones	Professor of Medical Statistics Department of Epidemiology and Public Health University of Leicester 22-28 Princess Road West Leicester LE1 6TP
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Qualitative research - user views	Dr Sandy Oliver	Research Officer Institute of Education Social Science Research Unit 18 Woburn Square London WC1H 0NR
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Lay perspectives	Mrs Joanna Hancock	Postnatal Supporter The National Childbirth Trust 24 Bruton Way