I. INTRODUCTION AND COMMENTARY

This workshop was convened jointly by The International Paediatric Association and the Committee on Nutrition of the European Society of Paediatric Gastroenterology, Hepatology, and Nutrition in Casablanca, Morocco, August 26–28, 1991. Its aim was to explore the research issues and questions that would need to be addressed to improve the understanding and practice of complementary feeding.

Each contributor was asked to review briefly a specific topic, and to identify the research which, in his or her opinion, was needed to optimize complementary feeding in infancy. Current guidelines and practices were reviewed, but it was appreciated that because the evidence base is limited, current guidelines are to some extent arbitrary. There is a need to be constantly aware of this and to share this uncertainty with caregivers and policymakers, lest undue credence is placed in the current guidelines. Guidelines will adapt as more evidence becomes available and they will become less dependent on accepted practices.

Probably the biggest debate centers on the best time to introduce complementary foods, and on the nature of these foods. Most, if not all, guidelines recommend exclusive breastfeeding until at least 4 months. Even so, many mothers, including those in populations that epitomize ideal breastfeeding by maintaining it into the second year of life, give infants solids as early as 2 months. Of particular concern in the timing, and the amount, of exposure to complementary foods are issues relating to immune function, the acquisition of immunotolerance, and functional imprinting of intestinal function, its microbiota, and of systemic metabolism. The main debate over timing is if it should be about 6 months, or at 4 to 6 months.

Of particular significance is the recently published report by the World Health Organization (WHO) entitled "Complementary Feeding of Young Children in Developing Countries: A Review of Scientific Knowledge," which is targeted at practice in developing countries. This exemplary report, nonetheless, provides information that has much relevance to practice in developed countries, and it stresses the need for a sound evidence base for infant feeding practices. In the absence of such definitive evidence the debate about timing is in danger of becoming paralyzed and overpoliticized. The meeting accepted that the current WHO guidelines are to introduce solids between 4 and 6 months of age and did not propose that it should be changed.

In fact, this meeting did not discuss the issue of timing as such; rather it focused on how to improve the knowledge base that would be necessary to inform and justify proposals and recommendations about the diversification of infants' diets.

It was felt based on the probable commonality of infants' metabolic function and development that a single set of information and standards might be applicable, i.e., all infants are essentially the same irrespective of ethnicity and gender, but that beyond these considerations there were extrinsic socioeconomic, cultural, and environmental factors which meant that the differing circumstances in which children are reared can make it necessary to vary guidelines according to these local factors. It was made clear to this meeting that much effort is needed to characterize and understand better the attitude of caregivers to weaning and complementary feeding. The dialogue involved in such an exercise might also have the additional benefit of better enabling health professionals to develop effective strategies to support breastfeeding and infant care, and to promote a broader awareness of food hygiene.

The meeting agreed that the ideal outcome of complementary feeding for all infants, namely that all should have equal opportunity to achieve their full potential, would also be conditioned by environmental factors. Thus, given the morbidity and mortality that accompanies microbiologically hazardous complementary foods, it is understandable that a policy may be implemented to delay introduction of solids to 6 months or later, thereby to minimize this risk by postponing and reducing exposure to such biohazards. However, this is not to say that such a practice is physiologically or nutritionally ideal. Better growth is observed in infants from developing communities in which complementary feeding is delayed until 6 months, but it is not clear if this is attributable to reduced morbidity from infections, or attributable to the supply of energy and nutrients, usually from breast milk, not being compromised or displaced by low-nutrient density complementary foods.

The nutritional benefit of complementary feeds and their introduction needs to be appraised against their impact on breastfeeding, and against the nutritional needs of the infant particularly with respect to essential micronutrients such as iron and zinc and lipids. In this context, the crucial characteristics of complementary feeds are their nutrient density and the bioavailability of the essential nutrients.

The significance for later health, including through to adulthood, of complementary feeding practice and of body size and composition in infancy is not known. Neither is the ideal body composition. As yet, there is not much evidence that the nature of complementary feeding practice influences long-term health. It probably influences immune function and the development of atopy and enteropathies: and, it seems reasonable to hypothesize that it could influence, among other things, substrate metabolism, taste acquisition, appetite control, and psychomotor development.

A major difficulty in attributing outcomes to complementary feeds is that of determining to what extent they are modified by the child being given formulas or being breastfed. Furthermore, maternal nutrition both prenatally and postnatally may also have an effect on the growth and development of the infant and on the composition of breast milk. The relative impacts of these factors need to be better characterized. It is also possible, for example, that breastfeeding might modulate the pathogenesis of atopic disease and enteropathies, inasmuch as these may be related to a child not being breastfed, as well as being exposed to allergens. The increasing prevalence of such diseases in developed countries might, paradoxically, be in part the consequence of reduced exposure to adventitious environmental microbiologic hazards and allergens.

Each contributor’s selected research issues are listed in this supplement. As an overview, those listed below highlight the breadth and the interdisciplinarity of the work, which is needed.

- How should "optimal" growth and body composition during infancy be defined and appraised? Long-term studies are needed of functional outcomes related to growth and body composition during the period of complementary feeding and to complementary feeding itself.
- How does complementary feeding influence the development of taste and smell and appetite control?
- What impact does complementary feeding have on the development of immunotolerance, enteropathies, and atopic disease?
- Does complementary feeding affect metabolic imprinting or programming?
- Is health in later life influenced by complementary feeding?
- Does the timing of introduction or amount of complementary foods affect breast milk frequency and intake, and the duration of breastfeeding?

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• How does complementary feeding interact with and influence the physiologic maturation and metabolic competence of infants to digest, absorb, and metabolize nonbreast milk and non-formula-based foods?
• What are the accurate nutrient requirements during infancy?
• What strategies would improve nutrient supply and bioavailability in complementary foods?
• Should complementary foods be different for breastfed and formula-fed infants?
• What are the potentially modifiable constraints to adoption of parenting practices that are geared to children’s developmental and nutritional needs, and to the maintenance of food safety?

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