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Meeting Micronutrient Requirements for Health and Development

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Preface

In the past two decades, micronutrients have been recognized as having a more prominent position in the global effort to control and overcome hunger and malnutrition. The three micronutrients whose deficiencies have the greatest prevalence and have attracted the greatest attention from international agencies and as well as institutions and not-for-profit agencies are vitamin A, iodine and iron. Recently, zinc has received much attention for its role in the treatment of diarrhea and its preventive potential for childhood diarrhea and pneumonia. Even with this increased attention and enhanced research, a number of important questions remain. What is the importance of these micronutrients and others, including folate and vitamin B<sub>12</sub>, as limiting nutrients in growth and development and their potential for preventing stunting and global malnutrition? What are the forms and doses of these micronutrients that may be required for the prevention of stunting and malnutrition or the treatment of moderate and severe malnutrition? What are the effective interventions including individual or multiple micronutrient interventions, and what are the effective methods of addition of these micronutrients to the food supply and in the form of fortification? In which form are these micronutrients most effective and most appropriately or most effectively absorbed and bioavailable? Are there any potential safety concerns? Do interactions restrict potential coadministration? And perhaps most importantly, what are the appropriate target populations for interventions in treatment or prevention?

To address the current knowledge in these and other related questions, Nestlé Nutrition Institute invited three nutrition scientists to organize a symposium with other leading scientists knowledgeable and active in the field of micronutrient nutrition. These scientists were invited to give their presentations at the meeting in Cebu, Philippines, in April 2011, along with an invited group of knowledgeable leaders in the fields of pediatric nutrition and micronutrient nutrition from all parts of the world. The papers that were presented at this meeting and a summary of the discussions form the substance of this publication and report. We hope that this publication is another milestone in the path
towards a better understanding of the importance of micronutrients in nutrition and development, and that it will contribute to the growing urgency for the control of childhood malnutrition.

Zulfiqar A. Bhutta
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Foreword

Meeting macro- and micronutrient requirements during pregnancy and early childhood (‘the first 1,000 days’) is crucial for short- and long-term health and cognitive function. Recent surveys on the timing of growth retardation and stunting indicate that the onset is maternal under nutrition before and during pregnancy. Inappropriate weaning food and frequent infections hamper growth and development during the ‘critical window’ of the first 24 months after birth. Stunting (178 million children world wide) and severe acute malnutrition (wasting –19 million) are associated with micronutrient deficiencies. Epidemiology indicates that the most common micronutrient deficiencies – vitamin A, iron, zinc, and iodine – could be related to an estimated 1 million child deaths per year and 9% of global childhood DALYs [1]. Meta-analyses confirm that supplementation or fortification of food with the ‘big four’ is efficacious to reduce risk of infectious disease, improves growth and cognitive outcome. More recently, folate and vitamin $B_{12}$ deficiencies during pregnancy have been shown to be associated with poor neurodevelopmental outcome and childhood obesity. Because of the high prevalence of micronutrient deficiencies in populations from developing countries, the challenge is to develop the right intervention strategies. Governmental agencies and international non-governmental organizations need strong support from scientific institutions, and industry should cooperate with all relevant stakeholders.

The 70th Nestlé Nutrition Institute Workshop, which took place in March 2011 in Cebu, Philippines, was the third to address micronutrient needs. Two previous NNI workshops addressed the needs during the first months of life (NNIW 52) and the weaning period (NNIW 54). It became clear during the last years and was addressed at this workshop that maternal and fetal deficiencies can induce inadequate metabolic programming in the offspring with increased risk for non-communicable diseases later in life. In order to answer questions and lead scientific discussions, we asked world-renowned experts in the area of health science and nutrition to clarify the pathogenesis of micronutrient deficiencies in pregnancy and childhood, preventive methods and strategies, and opportunities for treatment.
To discuss the most recent findings and outcome strategies, leading experts in the fields of epidemiology and nutritional intervention met with those in genetics, epigenetics, and metabolic outcome. We would like to warmly acknowledge the excellent program conceived by the chairpersons – Prof. Zulfiqar A. Bhutta, Pakistan, Prof. Richard F. Hurrell, Switzerland, and Prof. Irwin H. Rosenberg, USA. We are also indebted to all the renowned speakers giving the presentations, and discussants leading the debates of this important topic. We thank all experts who came from across the globe to review and discuss the importance of the micronutrients in child life and the opportunity to meet them.

Finally, we wish to thank Dr. Marco Turini and Dr. Grace L. Uy with their teams from the Nestlé Nutrition Institutes in South East Asia – Philippines for excellent logistic support and hospitality which allowed the participants to enjoy both the scientific program and the wonderful cultural spirit of Cebu.

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