

Editor's note: This section contains reviews of books, whether brand new or classic, that we hope will be of interest to our readers.

.....

Book Review

The Biology of the First 1,000 Days

.....

The Biology of The First 1,000 Days

Publisher: CRC Press (September 20, 2017)

Language: English

Editors: Crystal D. Karakochuk, Kyly C. Whitfield, Tim J. Green and Klaus Kraemer

ISBN: 978-1-4987-5679-2

This aptly named book is a long overdue and welcome addition for everyone (researchers, program professionals, and students) active in the area of maternal, infant, and young child feeding. It is a comprehensive resource that brings together, in a single volume of 30 chapters by some 60 authors, contemporary and fundamental knowledge about nutrition in the first 1,000 days of life. It is also a reference book for the future, for which the physical qualities and feel of this 500-page publication are well suited.

The book deals separately with adolescence, pre-pregnancy, pregnancy, lactation, infancy, and young children. This is a wise organization of the subject matter. The book extends its scope and ideas beyond the usual considerations about nutrition to include epigenetics, the gut microbiome, metabolomics, and proteinomics. It contains chapters that examine the physiological and pathophysiological bases of nutrition for the groups of concern, the norms used to diagnose the more prevalent kinds of malnutrition in the developing world, and the epidemiology, determinants, and consequences of malnutrition in both poor and wealthy populations. It also presents the dietary norms required to formulate nutrition interventions.

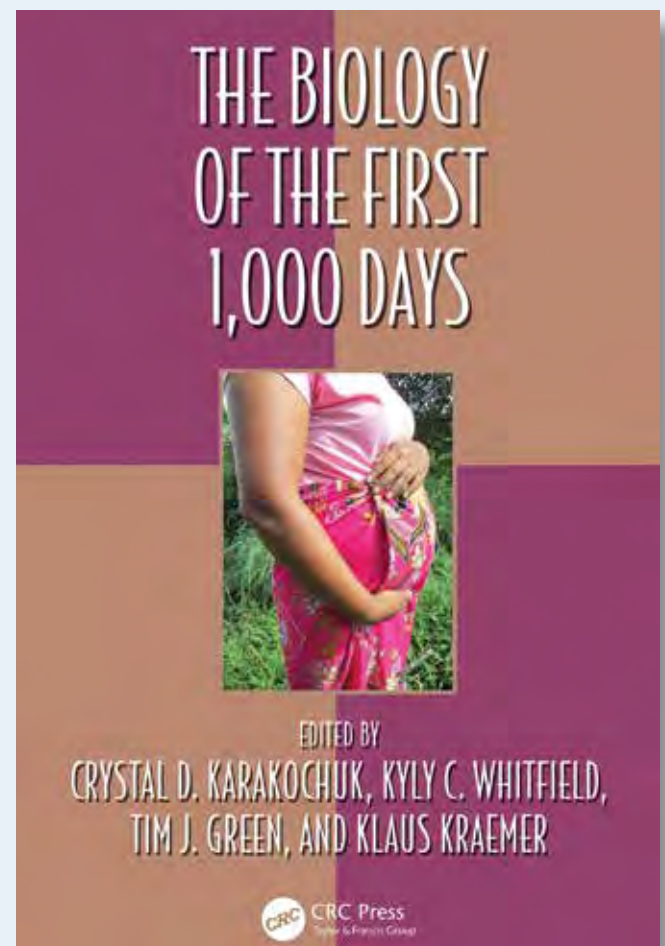
The chapters are clear and well-structured and often provide information about recent changes in thinking, which explain why some standards are not uniform and are still evolving.

.....

“The chapters are clear and well-structured and often provide information about recent changes in thinking”

.....

Klaus Kraemer, the initiator and one of the editors of the book, is a prime mover for implementation research in



nutrition through his publishing of papers in *Sight and Life* magazine (2014).¹ Also, very importantly, *Sight and Life* took the lead in establishing and founding the Society for Implementation Sciences in Nutrition (SISN).

The concern with implementation is represented by Section X – three chapters in the book that deal specifically with the topic. The first chapter, “Effectiveness of Nutrition-Specific Interventions in Pregnancy and Early Childhood,” is an excellent compilation of the biological interventions that have been shown to be effective in decreasing mortality and improving health. This demonstration of effectiveness has mostly been accomplished through randomized control trials that deliver the statistical probability of impact in a population. The design for these trials was first implemented for micronutrients by Alfred Sommer in the late 1970s.² Those trials are the gold standard for presenting impact in populations whose potential to benefit is homogeneous. However, differences in potential to benefit biologically or through access to the interventions result in inconsistent and confusing results.^{3,4} Also, extrapolating the results depends on similarities of potential to benefit both within and across populations.

The second chapter in Section X, “Nutrition-Sensitive Interventions for the First 1,000 Days,” describes interventions that improve the determinants of ingestion and biological utilization of the nutrients reviewed in the first chapter. Calling these interventions “nutrition-sensitive” and distinguishing them from “nutrition-specific” interventions was an intellectual breakthrough because it forced the recognition that assessing impact required taking context and “potential to benefit” into account.⁵ Because it is very expensive to examine potential to benefit in randomized controlled trials, appropriate intervention trials have to depend on high plausibility designs that permit triangulation across contexts.^{6,7} It also requires more understanding about how the pathway from a successful impact on the nutrition-sensitive outcome leads to better nutrition. This methodology remains to be developed and systematized. However, the excellent review of nutrition-sensitive interventions in this chapter presents enough evidence to advocate for selected nutrition-sensitive interventions.

The last chapter in this section is “Global Progress in the Scaling Up Nutrition (SUN) Movement” – the latest iteration in mobilizing countries’ political will and resources to implement policies and programs to improve nutrition. The first iteration, initiated by a UN subcommittee designed to coordinate UN nutrition work, occurred under the leadership of Abraham Horwitz and John Mason. This iteration led to five World Nutrition Situation reports, issued between 1988 and 2010.⁸ The

reports raised awareness but were handicapped by a lack of funding and country-level leadership to initiate action, which SUN is now mobilizing.

Although the chapter on metabolomics and proteomics (Chapter 30), which presents the results of modern scientific laboratory techniques, would appear to be far removed from implementation concerns focused on delivering interventions to improve nutrition in populations, it is highly relevant. This chapter mentions that stunting is associated with abnormalities in protein nutrition. This mention resurrects the well-supported and previously widespread understanding that protein malnutrition is a significant cause of stunting. This understanding was effectively destroyed in 1974 by a paper by Donald S. McLaren entitled “The Great Protein Fiasco.”¹⁰ That paper, whose conclusions were quickly adopted by the nutrition community, purported to show that protein undernutrition was responsible for only a tiny fraction of growth stunting. Unfortunately, the scientific community did not recognize that McLaren’s findings were only true in severely *marasmic* populations in whom energy was more limiting (lacking) than protein. This is a complicated concept and is rarely examined analytically. As a consequence of the wide acceptance of McLaren’s paper, research into promising solutions to find feasible offerings to families to remedy deficiencies in selected amino acids essentially ceased for lack of funding.¹¹ Very recently, new findings, if supported by more sophisticated thinking about limiting nutrients and appropriate epidemiology, are likely to result in new strategies to address stunting.¹² This is particularly important in view of the evidence that many populations have not responded as well as expected to current strategies.

.....
Review by: Jean-Pierre Habicht and

Gretel H. Pelto, Division of Nutritional Sciences,
 Cornell University, Ithaca, NY 14850 USA

Email: jh48@cornell.edu and gp32@cornell.edu

References

1. *Sight and Life*. 2014; 28(2).
2. Sommer A, Tarwotjo I, Djunaedi E, West KP Jr, Loeden AA, Tilden R, et al. Impact of vitamin A supplementation on childhood mortality. A randomised controlled community trial. *Lancet* 1986;1(8491):1169-73.
3. Habicht JP, Pelto GH. Multiple micronutrient interventions are efficacious, but research on adequacy, plausibility, and implementation needs attention. *J Nutr*. 2012;142(1):205-9.
4. Habicht JP, Pelto GH. From biological to program efficacy: promoting dialogue among the research, policy, and program communities. *Adv Nutr*. 2014;5(1):27-34.

05. Ruel MT, Alderman H. Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? *Lancet*. 2013;382(9891):536-51.
06. Habicht JP, Victora CG, Vaughan, JP. Evaluation designs for adequacy, plausibility and probability of public health programme performance and impact. *Int J Epidemiol*. 1999;28(1):10-8.
07. Leroy JL, Habicht JP, Gonzalez de Cossio T, et al. Maternal education mitigates the negative effects of higher income on the double burden of child stunting and maternal overweight in rural Mexico. *J Nutr*. 2014;144(5):765-70.
08. Longhurst R. Global leadership for nutrition: The UN's Standing Committee on Nutrition (SCN) and its contributions. Brighton, UK: Institute of Development Studies; 2010. [Institute of Development Studies Discussion Paper no. 390.]
09. Waterlow JC, Alleyne G. Protein malnutrition in children advances in knowledge in the last ten years. *Adv Protein Chem*. 1971;25:117-241.
10. McLaren DS. The great protein fiasco. *Lancet*. 1974;2(7872):93-6.
11. National Academy of Sciences. The results and interpretation of three field trials of lysine fortification of cereals. Report of a task force on amino acid fortification of cereals. Committee on International Programs, Food and Nutrition Board. Washington, DC: National Academy Press; 1984.
12. Di Giovanni V, Bourdon C, Wang DX, Seshadri S, Senga E, Versloot CJ, et al. Metabolomic changes in serum of children with different clinical diagnoses of malnutrition. *J Nutr*. 2016;146(12):2436-44.