

D R I
DIETARY REFERENCE INTAKES

Calcium
Vitamin D

Committee to Review Dietary Reference Intakes for Vitamin D and Calcium
Food and Nutrition Board

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*“Knowing is not enough; we must apply.
Willing is not enough; we must do.”*

—Goethe



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This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by **Irwin H. Rosenberg**, Friedman School of Nutrition Science and Policy, Tufts University, and **Enriqueta C. Bond**, Burroughs Wellcome Fund (retired). Appointed by the National Research Council and Institute of Medicine, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Preface

It has been an honor to chair this committee tasked with reviewing Dietary Reference Intake (DRI) values for calcium and vitamin D. In this preface, I would like, first and foremost, to thank those persons without whose help this report would not have been possible. I also would like to comment briefly on the nature of the task we had at hand, and how our committee proceeded, from its first meeting in 2009 to the final stage of its report.

The work of our committee was preceded by three important papers and reports. At a time when interest in vitamin D had reached new heights, and many various claims for benefits were reported, health professionals in the governments of the United States and Canada worked together to address the question: Since the 1997 IOM report on DRIs, including vitamin D, is there sufficient new evidence on this micronutrient to warrant a new DRI study? The publication from this group, “Dietary reference intakes for vitamin D: justification for a review of the 1997 values”¹ concluded that there were sufficient new data to warrant a reevaluation. In funding the DRI review for vitamin D, the sponsors also judged that calcium should be reviewed as well, given its interrelationship with vitamin D. I thank the many individuals from the U.S. and Canadian governments who put into motion the processes that led to this report. Moreover, understanding that

¹Yetley, E. A., D. Brule, M. C. Cheney, C. D. Davis, K. A. Esslinger, P. W. Fischer, K. E. Friedl, L. S. Greene-Finestone, P. M. Guenther, D. M. Klurfeld, M. R. L’Abbe, K. Y. McMurry, P. E. Starke-Reed and P. R. Trumbo. 2009. Dietary reference intakes for vitamin D: justification for a review of the 1997 values. *American Journal of Clinical Nutrition* 89(3): 719-27.

a review of the literature would be a tremendous undertaking by itself, this group also commissioned an independent systematic review of the literature on vitamin D and health outcomes for the use of this DRI committee, and intended to update an earlier systematic review on vitamin D and bone health. The systematic review carried out by Dr. Joseph Lau and his colleagues at the Tufts Evidence-based Practice Center, and a preceding systematic review led by Dr. Ann Cranney of the University of Ottawa, both greatly aided the work of the current committee.

In the Statement of Task, the sponsors requested that our report be developed using a risk assessment framework. Such a framework is not one that committee members would naturally have been familiar with at the outset, and some readers of this report may also wonder, “What is that?” The process is discussed and diagrammed in the report in Chapter 1 and referred to throughout. We were greatly helped in adhering to the risk assessment approach by Christine Taylor, Ph.D., Study Director for this DRI study, whose previous background paper, “Framework for DRI Development,”² provided us with a much-needed understanding of the uses of risk assessment and the steps in conducting it that we would follow. Chris’ insights, as well as her discipline, good humor, and willingness to engage over and over in discussions to obtain a broad understanding and consensus were very much at the heart of the committee’s process. I thank her for being the amazing study director she has been. Our committee’s work also benefited from the excellent research and support of Ann Yaktine, Ph.D., Heather Del Valle, and Heather Breiner. Linda Meyers, Ph.D., Director, Food and Nutrition Board, kept a watchful eye on our progress and willingly provided guidance as needed. The committee never lacked for exceptionally well-qualified, rigorous, hardworking, professional, and friendly support from the FNB staff, and I sincerely thank each one of them.

It may be of interest to briefly comment on the committee’s approach, and how work evolved during its deliberations. The development of IOM reports is a consensus process. Thus, throughout we worked together, dividing specific tasks according to expertise but making sure that discussions proceeded and decisions were always made as a group. During this time, research did not stand still; not a week passed without new publications on these nutrients. We spent a good deal of effort, and staff performed invaluable service for us, in arraying new data, comparing aspects of study design, etc. The committee worked not only at the scheduled committee meetings, but also in a myriad of working groups by conference calls and emails. It was important to keep firmly in mind that DRIs are values meant for im-

²Taylor, C. L. 2008. Framework for DRI Development: Components “Known” and Components “To Be Explored.” Washington, DC.

proving public health—the health of the *general population* of the United States and Canada. They provide recommendations for adequate and safe daily intakes of nutrients consumed over *many* years, possibly a lifetime, not just for days, weeks, months, or a year. Thus, the need for sound, causal evidence to make the evidence-based recommendations in this report was always at the forefront of our thinking and deliberations. The terms *causality*, *dose–response*, *evidence-based*, *totality of evidence*, *uncertainty*, *caveats* were often on the committee minds and prominent in our discussions. On some points, we consulted with experts, whom we thank for generously providing their input in response to our needs, sometimes on quite short notice. New data on the intakes of vitamin D and calcium in the United States and Canada arrived from the Centers for Disease Control and Prevention and Health Canada just as we needed them, and here I would like to thank the persons in these organizations who worked diligently to make these new intake data available for the committee’s use. As DRI values evolved, we thought carefully about the implications of these recommendations for practitioners and decision makers in public health and policy who will use this report in their work, and for special populations in both the United States and Canada. Lastly, we considered research recommendations, linking our recommendations to knowledge gaps identified while using the risk assessment framework. This, of course, was a future-directed activity, and we hope that our recommendations will clarify the types of research and resulting new information that will make determining DRIs for calcium and vitamin D easier and more accurate in the future.

Throughout, the committee members worked together with common purpose and always amicably, even when viewpoints differed, and this made working on this study a remarkable experience for all of us. I sincerely thank all the members of the committee for sharing their expertise and greatly enriching the development of this report.

Finally, it is important to acknowledge the many people who assisted the committee with its work and who provided technical input and invaluable perspectives through a variety of venues ranging from white papers to participation in workshops and public information gathering meetings. Foremost, the committee is grateful to Dr. Hector DeLuca, who served as a tireless consultant and generously offered his wisdom and considerable experience to the committee. Many discussions were enriched by his input. Others who provided scientific evaluations and background information for the committee include: Dr. David Bushinsky, Dr. Thomas Carpenter, Dr. Gary Curhan, Dr. Gordon Guyatt, Dr. Craig Langman, Dr. Dwight Towler, and Dr. Susan Whiting. The committee is deeply appreciative of the heroic efforts of those who worked long hours to provide the committee timely national data on calcium and vitamin D intake as well as measures of serum 25-hydroxyvitamin D concentrations, specifically the

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A. Catharine Ross, *Chair*
Committee to Review Dietary Reference
Intakes for Vitamin D and Calcium

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