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Letters to the Editor

Vitamin D

The 2011 report on dietary reference intakes for calcium and vitamin D

Madam

The work of the Institute of Medicine's (IOM) Committee to Review Dietary Reference Intakes for Calcium and Vitamin D has been completed; its report[1] was publicly released on 30 November 2010, and the committee is no longer constituted. The report can be found at http://www.iom.edu/Reports/2010/Dietary-Reference-Intakes-for-Calcium-and-Vitamin-D.aspx. Following National Academies procedures, the committee conducted its work free from external influences, including sponsors. The federal sponsors of the report included agencies of the US Department of Health and Human Services, the US Department of Agriculture and the Department of the Army, as well as Health Canada.

The report addresses a wide range of issues regarding both calcium and vitamin D. As context for the report it was widely recognized that, since publication of the first report on Dietary Reference Intakes (DRI)[2] including those for calcium and vitamin D, a great deal of new information has become available. Notably, a review by scientists in federal agencies in the USA and Canada[3] determined that there was sufficient new information to justify a new assessment of DRI for vitamin D and calcium, and the IOM was asked to conduct this study. The process the IOM uses to constitute its committees follows strict rules, including disclosure, and seeks to achieve scientific balance and avoidance of conflicts of interest. The fourteen-member committee* met these requirements. The expert committee started with a wide-open approach, thoroughly reviewing the literature, and obtained input from stakeholders through an open workshop and website. After completion of a draft report in 2010, the report underwent extensive review by external reviewers. The names of the reviewers and report monitors are listed in the final report.

The committee report is a consensus report and the process followed assured that the *totality of the evidence* guided the decisions that the committee made. The committee worked over a 20-month period during which it followed the task specified by the sponsors, which included that: the report would contain an extensive review of the literature; make use of systematic evidence-based reviews; be organized around a risk assessment model[4]; and, if at all possible, specify the new DRI in terms of an Estimated Average Requirement (EAR), RDA and Tolerable Upper Intake Level (UL) for fourteen age–sex groups that had previously been defined. It can be noted parenthetically that the 1997 report specified only Adequate Intakes (AI) for calcium and vitamin D, which do not have the same utility as EAR and RDA for use in programme evaluation and policy decisions[5–8]. It is important to fully understand the meaning of these terms in order to understand the types of evidence that can best support the development of DRI values. The IOM has published several previous reports specifically on the framework and various uses of DRI[5,6]. It is also important to recognize that DRI are meant for the general population and thus represent values that will minimize risk – both of inadequacy and excess – over long periods. Overall, DRI have an important role in reducing risk and improving public health. The DRI are not intended to provide recommendations for individuals with medical conditions where vitamin D or calcium metabolism is altered by disease, and medical management must be personalized.

The report on DRI for calcium and vitamin D provides, following a Summary, an overview of the DRI process and a discussion of the types and reliability of different research study designs, ranging from case reports to randomized controlled trials (RCT), and their utility in the process of DRI development (Chapter 1). It also discusses the two systematic evidence-based reviews that aided the committee and the additional investigations the committee conducted. Over 1000 publications were reviewed. The report then provides succinct background on the biochemistry and physiology of calcium (Chapter 2) and vitamin D (Chapter 3), and then proceeds to detail the evidence for about twenty-five different potential indicators of nutrient adequacy (including more than twenty health outcomes) for both calcium and vitamin D, each of which is reviewed in Chapter 4. As the report discusses, certain types of evidence, especially RCT data which can show causality, were considered the stronger types of evidence, but RCT data were not available for many potential indicators. The process was made more challenging by the fact that many studies, particularly those

* This letter draws on the Institute of Medicine report, 'Dietary Reference Intakes for Calcium and Vitamin D' (2011), which was supported in part by the US Department of Health and Human Services, the US Department of Agriculture and Health Canada. It was prepared by a committee composed of Steven A. Abrams, John F. Aloia, Patsy M. Brannon, Steven K. Clinton, Ramon A. Durazo-Arvizu, J. Christopher Gallagher, Richard L. Gallo, Glenville Jones, Christopher S. Kovacs, JoAnn E. Manson, Susan T. Mayne, Clifford J. Rosen, Sue A. Shapses and the author of this letter. Any views not attributed to the report are those of the authors and do not necessarily represent the views of the Institute of Medicine.

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related to bone health, investigated both calcium and vitamin D combined, and very limited dose–response data were available for any of the potential indicators/outcomes. Moreover, many outcomes were studied in the context of serum 25-hydroxyvitamin D (25(OH)D) levels, whereas DRI must be specified in terms of nutrient intakes. The report evaluates, discusses and explains the evidence that was used, presented in Chapter 4 and related appendices. The entire life cycle was considered, from birth to old age and including pregnancy and lactation. Of note, the DRI for vitamin D were derived based on conditions of minimal sun exposure due to wide variability in vitamin D synthesis from UV light and the risks of skin cancer. Chapter 5 presents the reasoning for specifying and the DRI values (EAR and RDA, or AI for children up to 1 year) for each of the age–sex groups to which DRI values are applied.

The question of excess is addressed with a literature review of potential indicators/outcomes and the rationale and specification of UL (Chapter 6). The report on calcium and vitamin D also provides a discussion of new dietary intake data and serum 25(OH)D levels in the USA and Canada (Chapter 7), implications for special populations (Chapter 8) and research needs (Chapter 9). The source of new data on vitamin D intakes and serum 25(OH)D levels in the population was the National Health and Nutrition Examination Survey and Health Canada. An important finding based on these data is that serum 25(OH)D levels in the USA and Canada are, by and large, at levels consistent with intakes of vitamin D at the RDA level, as specified in Chapter 5. Since dietary intakes (known to often be under-reported) averaged below the new RDA levels, it seems highly likely that sunlight plus total dietary intake, together, are maintaining serum 25(OH)D levels, even in northerly regions of the USA and Canada. Throughout the text, the report discusses in detail uncertainties and caveats. The committee also authored two publications that provide a synopsis of the report directed specifically to clinical[9] and dietetic[10] professionals.

In conclusion, we are sure that interested readers will find much in the new report that explains the process, the reasoning and the development of the new DRIs, and the identification of research priorities. As expected, new scientific information was the driving force for the new DRI. Although the committee was not charged with determining standardized values defining risk of deficiency, sufficiency or risk of toxicity for serum 25(OH)D for clinical laboratories, the report does note that no authoritative body has defined appropriate levels and it identifies consensus on this issue as an urgent need. Overall, while the 2011 report on DRI for calcium and vitamin D is now completed, it is expected that new science in the future will continue to probe the biological requirements for these important nutrients.

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Vitamin D

The IOM D-lemma

Madam

It was with great anticipation that the world waited for the release of the recommendations on vitamin D by the Institute of Medicine (IOM), which finally made its debut in November 2010[1]. The committee relied on several large meta-analyses including those from the Agency for Healthcare Research and Quality from the USA and Canada as well as larger randomized controlled trials (RCT), and concluded that the previous recommendations made by the IOM in 1997 were woefully inadequate. The committee recognized that, at a minimum, most