

Position Development Paper

FRAX[®] International Task Force of the 2010 Joint International Society for Clinical Densitometry & International Osteoporosis Foundation Position Development Conference

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on behalf of the FRAX[®] Position Development Conference Members^a

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Abstract

Osteoporosis is a serious worldwide epidemic. FRAX[®] is a web-based tool developed by the Sheffield WHO Collaborating Center team, that integrates clinical risk factors and femoral neck BMD and calculates the 10 year fracture probability in order to help health care professionals identify patients who need treatment. However, only 31 countries have a FRAX[®] calculator. In the absence of a FRAX[®] model for a particular country, it has been suggested to use a surrogate country for which the epidemiology of osteoporosis most closely approximates the index country. More specific recommendations for clinicians in these countries are not available.

In North America, concerns have also been raised regarding the assumptions used to construct the US ethnic specific FRAX[®] calculators with respect to the correction factors applied to derive fracture probabilities in Blacks, Asians and Hispanics in comparison to Whites. In addition, questions were raised about calculating fracture risk in other ethnic groups e.g., Native Americans and First Canadians.

The International Society for Clinical Densitometry (ISCD) in conjunction with the International Osteoporosis Foundation (IOF) assembled an international panel of experts that ultimately developed joint Official Positions of the ISCD and IOF advising clinicians regarding FRAX[®] usage.

As part of the process, the charge of the FRAX[®] International Task Force was to review and synthesize data regarding geographic and race/ethnic variability in hip fractures, non-hip osteoporotic fractures, and make recommendations about the use of FRAX[®] in ethnic groups and countries without a FRAX[®] calculator. This synthesis was presented to the expert panel and constitutes the data on which the subsequent Official Positions are predicated. A summary of the International Task Force composition and charge is presented here.

Key Words: FRAX; fracture risk; osteoporosis; ISCD; official positions; international variability.

Background

Reduced bone mineral density (BMD), age, and other clinical risk factors all increase fracture risk and can be utilized to

identify individuals most likely to fracture. The WHO Fracture Risk Assessment calculation Tool, FRAX[®], combines clinical risk factors, BMD and country-specific mortality and fracture data to calculate 10-year fracture probabilities in individual patients and provides a platform to assist clinicians and public health agencies in making rational treatment decisions. Although the development of FRAX has been a major advance in the field of osteoporosis, its' clinical impact worldwide has so far been limited by lack of availability of country-specific fracture data. Despite a growing global

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consensus that treatment decision paradigms should be based on absolute fracture probabilities, country-specific FRAX calculators are currently available for only 31 countries worldwide. Over 130 countries remain without this tool to help stem the growing tide of fractures.

In the US, ethnic-specific FRAX calculators are available for Whites, Blacks, Hispanics and Asians. These calculators were constructed using ethnic specific mortality rates (US 2005 mortality data by 5 year age categories using CDC Vital Statistics) and fracture rates derived by applying ethnic- and sex-specific correction factors to the fracture incidence observed in white women and men. For Blacks, the correction factor is 0.43 for women and 0.53 for men; for Asians, 0.50 for women and 0.64 for men; and for Hispanic: 0.53 for women and 0.58 for men. The calculators also assume that the gradient of risk/standard deviation (SD) change in BMD, body mass index (BMI) and other risk factors is the same in Whites and other ethnic groups (Eugene McCloskey, personal communication). The validity of these assumptions is important to the accuracy of FRAX calculations for individuals in these ethnic groups. Accuracy errors will affect the absolute probability of fracture reported by FRAX, and thus could have a significant impact on treatment decisions for individuals within these ethnic groups when thresholds of fracture risk are used for treatment decisions, as recommended by the National Osteoporosis Foundation Guidelines for the US. In addition, there is uncertainty about which calculator should be used for other ethnic groups in the US and Canada.

The FRAX International Task Force consisted of a panel of experts, who addressed specific questions raised by physicians in countries without FRAX calculators who wish to integrate FRAX into their clinical practice, and questions pertaining to the use of the ethnic-specific FRAX calculators in the US. The Task Force members conducted appropriate literature reviews and developed preliminary statements that were discussed and graded by a panel of experts at the ISCD-IOF FRAX Initiative joint conference, held in Bucharest November 12–14, 2010. The questions addressed by the International Task Force members and the statements approved by the panel of experts and their grading are discussed in the current paper.

North American Subgroup

Subgroup Leader: Jane A. Cauley

Subgroup Members: Ghada El-Hajj Fuleihan, Marjorie M. Luckey, Andrew Calderon, Zhao Chen, Jeffrey Curtis, Michelle E. Danielson, David Hanley, Jeri Nieves, Stuart Silverman

Acknowledgments: Sharon Happe

Questions addressed by this task force included a review of what is currently known about hip and non-hip fractures in US ethnic groups and how they compare to US Whites. The literature was also reviewed to evaluate the inherent impact of “ethnicity” on fracture rates after adjustments for age, body mass index (BMI), or bone mineral density (BMD), in each of the 3 US

main ethnic groups (Blacks, Hispanics and Asians). The task force addressed the current state of our knowledge of other groups e.g., Native Americans and First Nations Canadians and possible approaches to implement FRAX in these groups. FRAX assumes that the relationship between BMD and other risk factors and between BMI and mortality is the same in all ethnic groups. To test the validity of these assumptions, the task force addressed whether there are ethnic differences in the impact of BMI on mortality and whether the magnitude of the association between risk factors and fracture were similar across ethnic groups. Finally, the literature was examined for intra-ethnic diversity in fracture rates among US Asians, Blacks or Hispanics and compared US ethnic fracture rates to those in their native countries of origin i.e., US Chinese to Chinese in China or Hong Kong; US Hispanics to Mexico and US Japanese to Japan.

Global Subgroup

Subgroup Leader: Ghada El-Hajj Fuleihan

Subgroup Report Leaders: Asma Arabi, Jane A. Cauley, Marjorie M. Luckey, Rene Rizzoli, Saeko Fujiwara (Asia/Oceania), Ghada El-Hajj Fuleihan and Asma Arabi (Middle East/Africa), Sergio Ragi-Eis (Latin America), Heikki Kroger and Asma Arabi (Europe).

Subgroup Members: Anne-Marie Schott, Wojciech Pluskiewicz, Olga Lesnyak, Rola El Rassi, Michelle E. Danielson, Siok Bee Chionh, Annie Kung

Acknowledgments: Aida Farha, Maha Hoteit

Hip fracture rates vary dramatically across the world. The task force addressed the question of “what do I do if my country does not have a FRAX calculator?” taking into account the requirements for the construction of a FRAX calculator and the needed desirable optimal characteristics of the data to develop such calculators, as provided by the WHO FRAX team. The task force examined whether these countries have national or regional epidemiologic data on fractures, assessed the quality and limitations of such data, whether it included relevant ethnic groups, both genders and relevant age groups, and whether cohort studies existed to validate the use of another country’s FRAX calculator.

The full reports of each subgroup in this task force are included in this issue of the Journal of Clinical Densitometry.

Appendix 1. Position Conference Members

Organizers: Didier B. Hans (Chair), Cyrus Cooper (Co-chair), Sanford Baim, Bess Dawson-Hughes, John A. Kanis, William D. Leslie, Marjorie M. Luckey, Rene Rizzoli, Catalina Poiana, John P. Bilezikian (Moderator), Socrates E. Papapoulos (Co-moderator).

FRAX[®] Clinical: Eugene V. McCloskey (Chair), Neil Binkley (Co-chair), Jonathan D. Adachi, Sanford Baim (Program committee liaison), Robert D. Blank, Steven Boonen, Susan B. Broy, Olivier Bruyere, Manju Chandran, Cyrus Cooper, Bess Dawson-Hughes (Co-program committee liaison), Richard Eastell, Kris Ensrud, Hans P. Dimai, Joseph

Foldes, Patrick Garnero, Piet P. Geusen, Andrea Griesmacher, Marian T. Hannan, John A. Kanis, Michael Kleerekoper, Marc-Antoine Krieg, Bente Langdahl, Andrew Laster, Edward S. Leib, Tahir Masud, Mike McClung, Howard Morris, Sergio Ortolani, Kenneth G. Saag, Ethel Siris, Stuart Silverman, S. Bobo Tanner, Tommaso Trenti, Samuel Vasikaran, Peter Vestergaard, Denys A. Wahl.

FRAX[®] BMD: E. Michael Lewiecki (Chair), Juliet E. Compston (Co-chair), Jonathan D. Adachi, Judith E. Adams, Robert A. Adler, Doug C. Bauer, Glen M. Blake, Patricia Clark, Adolfo Diez-Perez, Didier B. Hans, Robert G. Josse, John A. Kanis (Co-Program committee liaison), David L. Kendler, Aliya A. Khan, Marc-Antoine Krieg, William D. Leslie (Program committee liaison), Roman R. Lorenc, Alireza Moayyeri, Basel K. Masri, Paul D. Miller.

FRAX[®] International: Jane A. Cauley (Chair), Ghada El-Hajj Fuleihan (Co-chair), Asma Arabi, Andrew Calderon,

Zhao Chen, Siok Bee Chionh, Jeffrey Curtis, Michelle E. Danielson, Saeko Fujiwara, David Hanley, Heikki Kroger, Annie Kung, Olga Lesnyak, Marjorie M. Luckey (Program committee liaison), Jeri Nieves, Wojciech Pluskiewicz, Rola El Rassi, René Rizzoli (Co-program committee liaison), Sergio Ragi-Eis, Anne-Marie Schott, Stuart Silverman.

Expert Panel: John P. Bilezikian (Moderator), Socrates E. Papapoulos (Co-moderator), Jonathan D. Adachi, Robert D. Blank, Roland Chapurlat, Wu (Paulo) Chih-Hsing, Edward Czerwinski, Adolfo Diez Perez, Hans P. Dimai, Ghada El-Hajj Fuleihan, Saeko Fujiwara, Ruxandra M. Ionescu, John A. Kanis, Mike McClung, Sergio Ragi-Eis, Jan Stepan, Kenneth G. Saag, John T. Schousboe, Wei Yu, Cristiano Zerbini.

Supporting Person: Peter D. Brown (ISCD), Patrice McKenney (IOF), Helena Johansson, Judit Nagy, Anders Oden and Denys A. Wahl.