0021-972X/00/$03.00/0
The Journal of Clinical Endocrinology & Metabolism

Vol. 85, No. 11
Printed in U.S.A.

CONSENSUS

Consensus Guidelines for the Diagnosis and Treatment of Growth Hormone (GH) Deficiency in Childhood and Adolescence: Summary Statement of the GH Research Society*

GH RESEARCH SOCIETY†

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Received March 20, 2000. Revision received July 11, 2000. Accepted July 12, 2000.

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* These consensus guidelines have been endorsed by the following international societies: the Councils and Drug and Therapeutics Committees of the European Society for Pediatric Endocrinology and the Lawson Wilkins Pediatric Endocrine Society. It has also been endorsed by the Councils of the Australasian Pediatric Endocrinology Group, the Japanese Society for Pediatric Endocrinology, and the Sociedad Latinoamericana de Endocrinologia Pediatrica.

† List of participants in the Growth Hormone Research Society Workshop on Child and Adolescent Growth Hormone Deficiency, Eilat, Israel, October 17–21, 1999: Dr. Kenneth M. Attie (Genentech, Inc., South San Francisco, CA), Dr. Bengt-Ake Bengtsson (University of Goteborg, Sahlgrenska Hospital, Goteborg, Sweden), Dr. Sandra L. Blethen (Genentech, Inc.), Dr. Werner Blum (Eli Lilly & Co., Bad Homburg, Germany), Dr. Fergus Cameron (Royal Children's Hospital, Parkville, Australia), Dr. Jean Claude Carel (Hôpital St. Vincent de Paul, Paris, France), Dr. Lena Carlsson (Sahlgren Hospital, Goteborg, Sweden), Dr. John J. Chipman (Eli Lilly & Co., Indianapolis, IN), Dr. Jens Sandahl Christiansen (Aarhus Kommunehospital, Aarhus, Denmark), Dr. Peter Clayton (Manchester Children's Hospital, Manchester, UK), Dr. David R. Clemmons (University of North Carolina, Chapel Hill, NC), Dr. Pinchas Cohen (Mattell Children's Hospital, Los Angeles, CA), Dr. Stenvert Drop (Sophia Children's Hospital, Rotterdam, The Netherlands), Dr. Kenji Fujieda (Hokkaido University School of Medicine, Sapporo, Japan), Dr. Ezio Ghigo (University of Turin, Turin, Italy), Dr. Raymond L. Hintz (Stanford University, Stanford, CA), Dr. Ken Ho (The Garvan Institute of Medical Research, Sydney, Australia), Dr. Mbelenge Mapoko Ilondo (Novo Nordisk A/S, Bagsvaerd, Denmark), Dr. Hector Jasper (CEDIE-CONICET, Buenos Aires, Argentina), Dr. Bernd Jesussek (Ferring Pharmaceuticals Ltd., Kiel, Germany), Dr. Anne-Marie Kappelgaard (Novo Nordisk A/S), Dr. Zvi Laron (Schneider Children's Medical Center of Israel, Petah Tiqva, Israel), Dr. Barbara M. Lippe (Pharmacia & Upjohn, Inc., Los Angeles, CA), Dr. Saul Malozowski (FDA, Rockville, MD), Dr. Primus E. Mullis (Inselspital, Bern, Switzerland), Dr. Sabine de Muinck-Keizer-Schrama (Sophia Kinderziekenhuls, Rotterdam, The Netherlands), Dr. Yoshikazu Nishi (Hiroshima Red Cross Hospital, Hiroshima, Japan), Dr. John S. Parks (Emory University School of Medicine, Atlanta, GA), Dr. Charlotte Phelps (Ferring Pharmaceuticals Ltd., Copenhagen, Denmark), Dr. Michael Ranke (University of Tubingen, Tubingen, Germany), Dr. Iain Robinson (National Institute for Medical Research, London, UK), Dr. Ron G. Rosenfeld (Oregon Health Sciences University, Portland, OR), Dr. Susan Rose (University of Tennessee, Memphis, TN), Dr. Paul Saenger (Albert Einstein College of Medicine, New York, NY), Dr. Guissepe Saggese (Universitá degli Studi di Pisa, Pisa, Italy), Dr. Martin Savage (St. Bartholomew's Hospital School of Medicine, London, UK), Dr. Stephen Shalet (Christie Hospital, Manchester, UK), Dr. Pierre C. Sizonenko (Hopital Universitaire Cantonal des Enfants, Geneva, Switzerland), Dr. Christian Strasburger (Ludwig Maximilians Universitat, Munich, Germany), Dr. Katsuhiko Tachibana (Kanagawa Children's Center, Yokohama, Japan), Dr. Toshiaki Tanaka (National Children's Medical Research Center, Tokyo, Japan), Dr. Michael O. Thorner (University of Virginia Health Sciences Center, Charlottesville, VA), Dr. Kerstin Albertsson Wikland (Pediatric Growth Center, Goteborg, Sweden), and Dr. Zvi Zadik (Kaplan Hospital, Rehovot, Israel).

The diagnosis and treatment of GH deficiency (GHD) during childhood and adolescence have been the subject of much controversy (1–3). To insure that patients are appropriately identified and treated, the GH Research Society (GRS) convened a workshop, on October 17–21 1999, in Eilat, Israel. The objectives of this workshop were to formulate consensus guidelines for the diagnosis and treatment of children and adolescents with GHD. The GRS invited clinicians and scientists with expertise in the field, representatives from industries involved in the manufacturing of recombinant GH, and representatives from health authorities from a number of countries to attend the workshop. All of them contributed to the consensus guidelines as detailed below.

Diagnosis of GHD in children

The diagnosis of GHD in childhood is a multifaceted process requiring comprehensive clinical and auxological assessment, combined with biochemical tests of the GH-insulin-like growth factor (IGF) axis and radiological evaluation. GHD may present as an isolated problem or in combination with multiple pituitary hormone deficiency (MPHD). Each component of this process requires criteria, each of which will be considered below.

Clinical and auxological criteria. The evaluation for GHD in a short child, where short stature is defined as a height more than 2 SD below the population mean, should not be initiated until other causes of growth failure, such as hypothyroidism, chronic systemic disease, Turner syndrome, or skeletal disorder, have been considered and appropriately excluded.

Key facts in the history and physical examination that may