and prompt intrathecal administration of antiserum would make such adjuvant therapy problematic.

Morton N. Swartz, M.D.
Massachusetts General Hospital
Boston, MA 02114

1. Fothergill LD. Hemophilus influenzae (Pfeiffer bacillus) meningitis and its specific treatment. N Engl J Med 1937;216:587-90.
2. Flexner S. The results of the serum treatment in thirteen hundred cases of epidemic meningitis. J Exp Med 1913;17:553-76.

New York–Presbyterian and GE

TO THE EDITOR: In his Perspective article, Dr. Garber (Oct. 14 issue)[1] appropriately alerts us to the potential for conflicts of interest when an academic medical center forms a relationship with a business company. New York–Presbyterian Hospital is very sensitive to this possibility. At the same time, academic medical centers, facing formidable challenges to bring down the costs of care without affecting quality or access, would do well to embrace best business practices and new technology, regardless of where those ideas originate.

Our collaboration with GE Medical Systems is based on having access to business skills and cutting-edge equipment that, in our judgment, will benefit our patients and increase our ability to provide cost-effective, high-quality care. We purchase from GE only technology that the hospital deems to be in the best interest of its patients. We will never delegate to a third party any decisions regarding our patients and the manner or method of our delivery of health care.

Herbert Pardes, M.D.
New York–Presbyterian Hospital
New York, NY 10032
mmanners@nyp.org

1. Garber AM. Corporate treatment for the ills of academic medicine. N Engl J Med 2004;351:1601-3.

Normal Serum Vitamin D Levels

TO THE EDITOR: Kratz et al. report in the October 7 issue[1] the revised laboratory reference values for tests commonly ordered at the Massachusetts General Hospital. We noticed that the normative range for 25-hydroxyvitamin D is below what is now the recommended range.[2,3] Historical, "normative" data for circulating 25-hydroxyvitamin D levels were based on samples from sun-deprived human subjects, who appeared to be free of disease, with normal circulating 25-hydroxyvitamin D levels assessed by plotting a Gaussian distribution.[4] There are many reasons why this method is inaccurate, including such factors as race, lifestyle, use or nonuse of sunscreen, age, and geographic latitude, as well as inappropriately low recommended dietary intake of vitamin D. As a result, investigators have begun to define nutritional vitamin D deficiency by using various biomarkers for circulating 25-hydroxyvitamin D levels, including calcium homeostatic indicators, such as parathyroid hormone, calcium absorption, and bone-mineral density.[2,4] Noncalcium homeostatic factors, such as insulin resistance and beta-cell function, have been added to the list of 25-hydroxyvitamin D biomarkers.[5] With the use of data from these biomarkers, vitamin D deficiency should be defined as circulating levels of 25-hydroxyvitamin D that are less than 32 ng per milliliter (80 nmol per liter).[2]

Bruce W. Hollis, Ph.D.
Carol L. Wagner, M.D.
Medical University of South Carolina
Charleston, SC 29425
hollisb@musc.edu

1. Kratz A, Ferraro M, Sluss PM, Lewandrowski KB. Laboratory reference values. N Engl J Med 2004;351:1548-63. [Erratum, N Engl J Med 2004;351:2461.]
2. Hollis BW. Circulating 25-hydroxy vitamin D levels indicative of vitamin D sufficiency: implications for establishing a new effective dietary intake recommendation for vitamin D. J Nutr (in press).
3. Laboratory reference data. Rochester, Minn.: Mayo Clinic, 2004.
4. Haddad JG, Chyu KJ. Competitive protein-binding radioassay for 25-hydroxycholecalciferol. J Clin Endocrinol Metab 1971;33:922-5.
5. Chiu KC, Chu A, Go V, Saad MF. Hypovitaminosis D is associated with insulin resistance and beta cell dysfunction. Am J Clin Nutr 2004;79:820-5.

THE AUTHORS REPLY: Drs. Hollis and Wagner raise an important issue: What is the appropriate nor-

mative range for serum 25-hydroxyvitamin D? Clearly, historical "normative" data may underestimate circulating levels of 25-hydroxyvitamin D expected in patients with sufficient vitamin D.[1] Currently, however, methodologic and technical issues prevent a direct comparison of values across laboratories.[2-4] In fact, there is no consensus on a specific level of 25-hydroxyvitamin D that is indicative of vitamin D deficiency. Reported[5] lower limits of the normal range are between 2 and 32 ng per milliliter (5 to 80 nmol per liter) — levels associated with minimized serum parathyroid hormone values. Given the absence of assay standardization and the lack of consensus regarding clinical cutoff values, reference ranges must remain laboratory-specific. As we point out in the introduction to our tables, the reference ranges listed are for tests performed at the Massachusetts General Hospital. Clinical measurements from most immunoassays, and certainly from immunoassays for 25-hydroxyvitamin D, must be interpreted within the clinical context of each patient; one should not rely solely on cutoff values based on so-called normal levels, even those defined with the use of additional biomarkers.

Alexander Kratz, M.D., Ph.D.
Patrick M. Sluss, Ph.D.
Kent B. Lewandrowski, M.D.

Massachusetts General Hospital
Boston, MA 02114

1. Heaney RP, Dowell MS, Hale CA, Bendich A. Calcium absorption varies within the reference range for serum 25-hydroxyvitamin D. J Am Coll Nutr 2003;22:142-6.
2. Binkley N, Krueger D, Cowgill CS, et al. Assay variation confounds the diagnosis of hypovitaminosis D: a call for standardization. J Clin Endocrinol Metabol 2004;89:3152-7.
3. Lips P, Chapuy MC, Dawson-Hughes B, Pols HA, Holick MF. An international comparison of serum 25-hydroxyvitamin D measurements. Osteoporos Int 1999;9:394-7.
4. Carter GD, Carter R, Jones J, Berry J. How accurate are assays for 25-hydroxyvitamin D? Data from the international vitamin D external quality assessment scheme. Clin Chem 2004;50:2195-7.
5. Pal BR, Marshall T, James C, Shaw NJ. Distribution analysis of vitamin D highlights differences in population subgroups: preliminary observations from a pilot study in UK adults. J Endocrinol 2003;179:119-29.

Footprints

TO THE EDITOR: In their Clinical Problem-Solving article "Footprints" (Sept. 30 issue),[1] Kassutto and Daily present the case of a patient with erythema nodosum, bilateral hilar lymphadenopathy, and a positive purified-protein-derivative (PPD) test. The diagnosis, primary tuberculosis, was based on an assumed recent PPD conversion. There had been no previous PPD testing. Löfgren's syndrome with latent tuberculosis is an equally probable diagnosis.[2] The evaluation, although thorough and thoughtful, missed the opportunity to obtain a diagnosis by omitting bronchoscopy. Bronchoscopy with transbronchial lung biopsy, transbronchial needle aspiration, or both has a high diagnostic yield in sarcoidosis (83 percent in stage 1).[3] The finding of noncaseating granulomas with negative cultures for acid-fast bacilli and fungi would strongly support the diagnosis of Löfgren's syndrome, and a latent infection with *Mycobacterium tuberculosis* would explain the positive PPD test. The identification of *M. tuberculosis* (by means of cultures or the polymerase chain reaction) would be diagnostic of a primary infection with *M. tuberculosis*. Positive cultures would allow for sensitivity testing and document the degree of sensitivity to isoniazid. This would justify the authors' approach of observation and chemoprophylaxis against primary tuberculosis. If the bronchoscopy were nondiagnostic (i.e., if there were no granulomas and negative cultures), a reaction to treatment with a sulfa drug would be probable, and the patient should be advised accordingly.

Khaled Al-Khasawneh, M.D.
Peter White, Jr., M.D.

University of Arkansas for Medical Sciences
Little Rock, AR 72205
alkhasawnehkhaledr@uams.edu

1. Kassutto S, Daily JP. Footprints. N Engl J Med 2004;351:1438-43.
2. Mana J, Gomez-Vaquero C, Montero A, et al. Lofgren's syndrome revisited: a study of 186 patients. Am J Med 1999;107:240-5.
3. Morales CF, Patefield AJ, Strollo PJ Jr, Schenk DA. Flexible transbronchial needle aspiration in the diagnosis of sarcoidosis. Chest 1994;106:709-11.

THE AUTHORS REPLY: We agree with Al-Khasawneh and White that bronchoscopy and biopsy would have been an equally reasonable approach to the management of this case. The clinicians and the patient chose to forgo a more invasive procedure, given her clinical improvement, her presumed recent exposure, and the probable diagnosis of primary tuberculosis. The diagnostic yield of bronchoscopy and biopsy is indeed high for sarcoidosis (especially if done before corticosteroid treatment