[68%]), (3) quality of life vs end-of-life care (29 [62%]), (4) medical futility (24 [51%]), (5) patient autonomy (18 [38%]), and (6) advance directives (12 [26%]). Less common ethical issues were allocation of resources, legal issues, family conflicts, and religious and cultural issues.

We conducted further analysis of the cases in which the ethics consultations addressed the withholding or withdrawal of treatment (eg, mechanical ventilation, enteral nutrition, surgery, hemodialysis, pacemakers). This issue was addressed in 68% of the consultations involving patients with neurological diagnoses but only 52% of those involving the entire study group. Notably, of the 47 consultations involving patients with neurological diagnoses, 17 (36%) addressed the appropriateness of enteral nutrition (eg, placement of a permanent feeding tube) after stroke or brain injury. In contrast, of the 208 consultations involving patients with a nonneurological diagnosis, only 17 (8%) addressed the issue of the appropriateness of enteral nutrition. In 35 of the neurological cases (74%), the assembly of the entire multidisciplinary ethics consultation was not necessary because ethical issues were resolved by education of involved parties, intensified efforts at communication, and exploration of core issues. This result is similar to the result for the overall group (70%).

A number of inferences can be drawn from these findings. First, the ethical issues that prompt ethics consultations for patients with neurological diagnoses are similar to those for patients with nonneurological diagnoses. Second, these patients were diagnosed as having relatively common neurological conditions (eg, ischemic stroke and intracranial hemorrhage). Media attention paid to the Terri Schiavo saga[1] and similar cases might lead one to believe that, among patients with neurological diagnoses, those who have persistent vegetative states account for most ethics consultations. In fact, none of our patients had these diagnoses. Third, ethical issues related to enteral nutrition appear to be more common among patients with neurological vs nonneurological diagnoses. Despite relatively clear guidelines regarding the benefits and burdens of such treatment,[2] this finding suggests that clinicians involved in the care of patients with neurological conditions should become more familiar with these guidelines. Finally, as with our entire study group, knowledge of clinical ethics varied among clinicians, and education played an important role during the ethics consultation process. The ethical issues involving most of our patients with neurological diagnoses resolved during the ethics consultation process, which typically entails the discernment of ethical issues and concerns as well as ethics education of patients, clinicians, and other relevant parties.

Keith M. Swetz, MD
Virginia Commonwealth University Health System
Richmond, VA

Mary E. Crowley, MA
C. Christopher Hook, MD
Paul S. Mueller, MD
Mayo Clinic
Rochester, MN

1. Hook CC, Mueller PS. The Terri Schiavo saga: the making of a tragedy and lessons learned. *Mayo Clin Proc*. 2005;80(11):1449-1460.
2. Koretz RL, Avenell A, Lipman TO, Braunschweig CL, Milne AC. Does enteral nutrition affect clinical outcome? a systematic review of the randomized trials. *Am J Gastroenterol*. 2007;102(2):412-429.

Clinician Attitudes Toward Biostatistics

To the Editor: The article by West and Ficalora[1] on clinician attitudes toward biostatistics raises important issues regarding training and continuing education of physicians in statistics. The authors found that more than two-thirds of their respondents at Mayo Clinic Rochester disagreed or strongly disagreed with the statement that "the current level of medical training in biostatistics in medicine is adequate."

Appropriate training is particularly important for physicians who do not pursue additional training through a Master of Public Health degree or a research fellowship. For these physicians, the only required training in statistics could be a short unit in medical school reinforced by some additional exposure during their residency (using, it is hoped, the integrated approach of teaching in the context of clinically relevant medical discussions proposed by West and Ficalora). Matthews and McPherson[2] caution that "Innumerate doctors…are doomed to have to accept without reservation the statements made in summaries, discussions, or conclusions, and their clinical practice may thus be altered on the basis of flimsy or inconclusive evidence."

An additional complication to consider is the increasing sophistication of statistical methods used in the medical literature. Our review of original articles published in the *New England Journal of Medicine* found a marked increase in the complexity of statistical methods.[3] For example, the use of multiple regression increased from 14% in 1989 to 51% in 2004 to 2005.[4] Multiple regression is an important concept to communicate to all physicians because it is key to understanding confounding variables, effect modifications, and interactions that arise in many articles that communicate clinically important research findings. The current level of statistical education in medical schools and residency programs might not provide students with a working knowledge of these and other intermediate-level statistical topics.

Medical educators, journal editors, and statisticians should be encouraged to implement and disseminate more of the innovative educational approaches that West and Ficalora describe. It might also be time to revisit proposals to require statistical training as a prerequisite to medical school.

Nicholas J. Horton, ScD
Smith College
Northampton, MA

1. West CP, Ficalora RD. Clinician attitudes toward biostatistics. *Mayo Clin Proc*. 2007;82(8):939-943.

2. Matthews DR, McPherson K. Doctors' ignorance of statistics [editorial]. *Br Med J*. 1987;294(6576):856-857.
3. Horton NJ, Switzer SS. Statistical methods in the journal [letter]. *N Engl J Med*. 2005;353(18):1977-1979.
4. Emerson JD, Colditz GA. Use of statistical analysis in the *New England Journal of Medicine*. In: Bailar JC III, Mosteller F, eds. *Medical Uses of Statistics*. 2nd ed. Boston, MA: NEJM Books; 1992:45-57.

In reply: I fully agree with Dr Horton's comments concerning biostatistics in the current medical literature. As he notes, the statistical methods used in modern research reports are becoming increasingly complex, compounding the problem of poor clinician understanding of basic statistical concepts. Furthermore, there is compelling evidence that researchers often apply statistical techniques inappropriately, perhaps as a result of their own incomplete comprehension of the methodology.[1] As neatly stated by Altman,[2] "the main reason for the plethora of statistical errors is that the majority of statistical analyses are performed by people with an inadequate understanding of statistical methods. They are then peer reviewed by people who are generally no more knowledgeable."

This unfortunate inadequacy of knowledge on the part of both consumers and producers of the medical literature is inconsistent with medicine's goal of optimal decision making for patient care. Alternative approaches to statistical education are required, and I am hopeful that renewed attention to this problem will result in innovative efforts that aid practicing clinicians, researchers, and our patients.

Colin P. West, MD, PhD
Mayo Clinic
Rochester, MN

1. Altman DG, Bland JM. Improving doctors' understanding of statistics. *J R Stat Soc [A]*. 1991;154(pt 2):223-267.
2. Altman DG. Statistical reviewing for medical journals. *Stat Med*. 1998; 17:2661-2674.

CORRECTIONS

Incorrect use of initial: In the article by Guyatt et al entitled "Exploration of the Value of Health-Related Quality-of-Life Information From Clinical Research and Into Clinical Practice," published in the October issue of *Mayo Clinic Proceedings (Mayo Clin Proc*. 2007; 82(10):1229-1239), Dr Alonso prefers to use only his first initial: **J. Alonso**.

Incorrect name of institution: In the article by Agarwal entitled "Effects of Statins on Renal Function," published in the November 2007 issue of *Mayo Clinic Proceedings (Mayo Clin Proc*. 2007;82(11):1381-1390), the name of Dr Agarwal's institution was printed incorrectly. It should read as follows: Richard L. **Roudebush** VA Medical Center, Indianapolis, IN.

The Editor welcomes letters and comments, particularly pertaining to recently published articles in *Mayo Clinic Proceedings*, as well as letters reporting original observations and research. Letters pertaining to a recently published *Proceedings* article should be received no later than 1 month after the article's publication. A letter should be no longer than 500 words, contain no more than 5 references and 1 table or figure, be limited to no more than 3 authors, and not be published or submitted elsewhere. It is assumed that appropriate letters submitted to the Editor will be published, at the Editor's discretion, unless the writer indicates otherwise. Priority is given for the importance of the message, novelty of thought, and clarity of presentation. The Editor reserves the right to edit letters in accordance with *Proceedings* style and to abridge them if necessary.