you really saying?' "

University administrators are worried that the 20% limit on Shannon grants may signal some broader intentions on Healy's part to try to force universities into more cost-sharing type of agreements. Not so, says Healy. "This is not full funding, this is a co-investment in this individual." But she does believe that the federal government must take a hard look at who is actually paying for the infrastructure associated with university research, particularly with regard to industry support, which frequently involves little of no indirect cost money.

The universities' concerns about Healy's attitudes toward indirect costs are heightened by the fact that she is trying to make herself a key player in sorting out overall Administration policy on the issue. She has been meeting regularly with Health and Human Services Inspector General Richard P. Kusserow and assistant secretary for management and budget Kevin E. Moley to discuss how the department might change the way it funds research. They proposed a cap of 28% on administrative costs plus charges for libraries and student services. The White House Office of Management and Budget ultimately decided on a 26% cap covering administrative costs only. Healy believes this is a good start, but more moves will be needed.

Others worry that even with the best intentions, moving NIH into the indirect cost arena may prove hazardous. "How much leadership and common sense can she inject into something which has got a lot of other players?" Thier asks rhetorically. "The potential cost of moving out ahead on something which you don't really control may be very high." Thier worries most that any money saved by cutting indirect cost expenditures would go into improving the federal government's balance sheet rather than back into research.

For the moment, Bernadine Healy is walking a bit of a tightrope: garnering goodwill and headlines with some quick, flashy proposals and keeping her broader program plans close to her vest. Whether she can always control consequences of what she starts, it is clear that "moving out ahead" is very much part of Healy's style. The NIH is emerging from a 2-year holding pattern and starting on a new course, and Healy is so far showing no signs of shirking her command. ■ JOSEPH PALCA

MRI—Safety Issues Stimulate Concern

Magnetic resonance imaging, or MRI, which has come into widespread use in medicine in the last 10 years, is of tremendous value to clinicians because it provides previously unseen anatomical detail in soft tissues—and in three dimensions. What's more, until recently it was thought that these dramatic results came without risk to patients. But there are now indications that the latest MRI machines may not be entirely hazard free: A year ago, two reports of peripheral nerve stimulation in volunteers undergoing MRI by a new ultrafast technique sparked some concern.

A recent meeting, perhaps the first to specifically address MRI's biological effects, brought together physicists, engineers, physicians, and physiologists to discuss how safe the fast MRI methods—which rely on time-varying magnetic fields and have been commercially available for only 4 months—really are.* The consensus at the meeting was that MRI is probably safe, but researchers were unable to offer precise magnetic field limits for the new techniques that would provide adequate safety margins. The Food and Drug Administration (FDA) may eventually come up with new regulations, but not until more clinical information is available.

MRI exposes patients to three types of electromagnetic radiation: static magnetic fields, pulsed radiofrequency (RF) electromagnetic fields, and gradient (time-varying) fields. In these fields, atoms resonate at characteristic frequencies, giving off radiofrequency signals. Since the precise frequency depends on the molecule's tissue environment, MRI scanners can convert the emitted RF signals into images that show different types of soft tissue.

Through the use of a gradient field that can be spatially encoded, the new ultrafast imagers can gather enormous amounts of data in milliseconds compared to 10 minutes or more with a conventional MR imager. But that's not the new method's only advantage. Because scan times are in the millisecond range, the resulting images are not blurred by the patient's body movement or heartbeat. Such speed reduces the patient's time in the magnet, which allows more efficient use of instruments and may reduce the incidence of claustrophobia.

Gradient fields, however, present problems not seen with static fields: They induce electric currents in the body and thus have the potential—at least in theory—to trigger unwanted electrical events such as cardiac arrhythmias. The peripheral nerve stimulation events reported so far, however, have been merely annoying. For example, at Massachusetts General Hospital (MGH), in studies using a high-speed scanner produced by Advanced ANMR Systems of Woburn, Massachusetts, three reports of mild "twitching or itching" appeared in some 15,000 applications, Michael Rohan of ANMR told the conference. Although researchers do not know whether these reports constituted actual stimulation events or experiences unrelated to MRI, studies in those three subjects were terminated. Said Mark S. Cohen of MGH: "Such incidents have created no special concern on our part."

But that doesn't rule out more serious effects of nerve stimulation, particularly in patients who are already medically compromised in some way; for example, a patient with heart disease or a seizure disorder. "There is some concern that certain types of cardiac pathologies may alter thresholds of nerve stimulation," said J. Patrick Reilly of the Johns Hopkins University Applied Physics Laboratory, who reported on theoretical models he has been developing to try to predict excitation thresholds of peripheral and cardiac tissues for patients undergoing MRI. But Reilly is nowhere near a definitive conclusion. "There is so much uncertainty here," he says.

In light of the uncertainties, some at the meeting expressed concern that the FDA might impose guidelines that could restrict development of the technology. But T. Whit Athey, of the electrophysics branch of the FDA, who was present at the meeting, said regulatory agencies would probably wait to revise guidelines until more clinical information had been gathered. Athey did raise the possibility, in the future, of a two-tier standard, with one limit for the unhealthiest patients and a higher limit for generally healthy people. For the moment, however, the main task seems to be to find out what effect these high-tech medical wonders actually have on living tissue. ■ LISA BAIN

*"Biological Effects and Safety Aspects of Nuclear Magnetic Resonance Imaging and Spectroscopy," sponsored by the New York Academy of Sciences, held in Bethesda, 15–17 May.

Lisa Bain is a free-lance writer based in Philadelphia.