

Berg is the word.

MARTHA RIAL

SCIENCE'S CHOICE

BERG TO EDIT VAUNTED JOURNAL

The University of Pittsburgh's Jeremy Berg, a PhD, has begun a five-year term as editor in chief of the *Science* family of journals. He was unanimously elected by the American Association for the Advancement of Science's (AAAS) Board of Directors and appointed to the position July 1.

Those who know Berg say his energy, curiosity, and creativity make him a natural fit for the high-profile role. Though he'll be commuting to Washington, D.C., during his *Science* tenure, he will continue as Pitt's associate senior vice chancellor for science strategy and planning in the health sciences, Pittsburgh Foundation Professor, and professor of computational and systems biology and of chemistry. He'll transition from director to a senior advisor of Pitt's Institute for Personalized Medicine.

As former director of the National Institute of General Medical Sciences at the National Institutes of Health, Berg was well known for encouraging multidisciplinary collaboration and for dismantling research silos. Adds former NIH director and colleague, Elias Zerhouni, "Jeremy always listens to all points of view in an authentically kind and open way. He builds consensus around strong principles of scientific excellence without expedient compromise, which attracts universal respect."

Zerhouni says that Berg is a "great choice for *Science* and science."

The following Q&A appeared in the June 13, 2016 *Pitt Chronicle.*

—Introduction by Micaela Fox Corn
Interview by Jane-Ellen Robinet

What makes *Science* stand out among other journals?

Science has a long and distinguished history. The journal was founded in 1880 with financial support from Thomas Edison and became associated with the American Association for the Advancement of Science in 1900. Unlike most journals, *Science* publishes papers in a very wide range of scientific fields, and many of them are quite important scientifically. For example, Eric Betzig and colleagues published a paper showing that individual molecules could be imaged using special microscopic techniques, and he shared the Nobel Prize in Chemistry about a decade later. Publishing in *Science* is also very competitive. Only about 7 percent of the submitted manuscripts are accepted for publication. Its weekly readership is estimated to be 1 million.

Science is also a major forum for science news and for discussions of scientific policy issues, both national and international. The journal is unusual, if not unique, in that scientists, administrators, congressional staffers, and other diverse groups read or are at least aware of *Science.*

What appealed to you about this opportunity?

First, I have had an interest in science policy since relatively early in my career. Before coming to Pitt, I spent almost eight years as director of the National Institute of General Medical Sciences, the component of the NIH that is most focused on basic science. The position as editor in chief of *Science* is a tremendous vantage point for following developments in the science policy arena and for contributing to the discussion from an influential position.

Second, I have very broad scientific interests, and this role is a tremendous opportunity to learn about cutting-edge science in many fields.

Third, publishing, including scientific publishing, is facing many exciting challenges. For example: How can one find the right balance between wide accessibility and sustainable business models? How can one take advantage of modern media to communicate science at all levels? I will have the opportunity to work with others at *Science* and AAAS on these and other issues.

Finally, I am drawn to public service. This position provides a great opportunity to serve the scientific community and the public. A robust scientific enterprise is crucial to solving some of society's most pressing problems, including economic development.

What do you hope to accomplish during your editorship?

I do not have a highly specific agenda at this point. I need to learn more about initiatives already under way at AAAS. In addition to *Science,* I will be responsible for three other journals (*Science Translational Medicine*, *Science Signaling*, and *Science Advances*). AAAS is also launching two new journals, *Science Immunology* and *Science Robotics*, in the coming months. Maintaining or getting these journals on solid footing will be an important initial goal.

One theme that I expect to inform my editorship relates to interactions between different scientific disciplines and sectors. Of course, there are often great scientific opportunities at interfaces between fields such as physics and biology, for example. Yet it is also striking how different the cultures of different disciplines can be.

What are three of the most significant issues facing the field of science today?

One of the biggest issues is public trust. Science and scientists had been one of the most trusted groups in the country in the past. Now, scientists are often regarded as a special interest group on par with many other groups. It will be crucial to enhance the public trust in science through effective communication and handling issues within the scientific community in a forthright way.

The second issue is sustainability of the scientific enterprise. This is particularly true for biomedical science, which underwent a period of rapid growth, driven in large part by a doubling of the NIH budget from 1998 through 2003. Since then, the NIH appropriation has lost considerable buying power when inflation is included, yet large numbers of graduate students and postdoctoral fellows have been (and are being) trained. The enterprise needs to transition from rapid to more slow and steady growth.

The final issue is data management. Many scientific experiments now generate vast quantities of data: images, genome sequences, analytical data, and so on. How can these data be effectively stored and shared? Should there be central repositories or should each individual laboratory or institution be responsible? These are complicated issues.

How will you address these issues during your tenure as editor?

The most important tools for addressing all of these issues and others are analysis and transparency. The scientific method can be applied to such questions of culture and policy. To what extent has public trust in science and scientists fallen? Why has it occurred? A good example involves recent discussions that many scientific results are not replicable, which came largely from some papers from industry investigators who had difficulty reproducing published results. However, further analysis reveals that the reasons for lack of reproducibility can be varied. . . . As with any ailment, it is important to get the diagnosis correct before deciding on a treatment. Transparency is key to this process. *Science* provides an important outlet for sharing the analyses, the data, and differences in interpretation or opinion to move toward effective resolution of such issues. ■



The author with her grandmother. "Gram" was like a second mother to her.

TOUGH TALK

DIFFICULT CONVERSATIONS IN THE ICU AND BEYOND

BY ROBYN K. COGGINS

When my grandma had a sudden catastrophic stroke, her emergency physician, thankfully, did not mince words. I was the first family member to arrive at the hospital, so at just 18 years old, I became her medical surrogate. A nurse led me to a family consultation room where the doctor said in no uncertain terms that Gram would not survive the night and, because she'd requested no heroic measures, there was nothing more to do. Did I think she'd want a priest to visit her? Were there other family members on their way?

I wasn't sure how to answer whether my grandma wanted a chaplain. She wasn't religious . . . but a prayer couldn't hurt, right? As I sat next to Gram later, stroking her arms, holding her hand, speaking my last words to her, the only things that troubled me were the brown fluid draining from her catheter and the hose snaking from her mouth. She hadn't wanted either of those interventions, I later learned, but the doctors had inserted them as a kindness to us, her family, so we could say goodbye. I've never begrudged them that judgment call. She spent less than 12 hours in the hospital and made it to 88—an end-of-life circumstance that's hard to beat.

My grandma had signed a do not resuscitate order and left instructions for where paramedics would find it (rolled into a plastic tube in her freezer). Thus, unlike so many of her contemporaries, she didn't receive rib-cracking CPR; she wasn't whisked away to futile surgery or noisy intensive care. Maybe she was uncomfortable in the hospital, but nearly her entire family was able to attend her death, and I don't think she would have minded that trade-off.

It's hard to know, even when a patient is conscious, what exactly the right move is during a serious illness. The brain tumor is no longer treatable—what next? Your options are to take opioids that make you nauseated or be in pain—which do you choose?

Such decisions get at one ultimate question: What does the patient and her family value, and how can medicine align with that answer? In many cases, it's hard to articulate exactly what you or your loved one wants, which demands that the physician become an interpreter and a guide.

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"The same thing we do in medicine is what you do when you analyze a novel—you look for what's there, what's said," says Douglas White, an MD, who holds the UPMC Chair of Ethics in Critical Care Medicine at Pitt. It's the doctor's job to examine the person's character and consider, "What is the patient complaining of? What are they not complaining of? How are they saying it? And what clues might we get as to what's going on?"

White says his undergraduate literature degree prepared him for his work as director of Pitt's Program on Ethics and Decision-making in Critical Illness because he's always been asking those kinds of questions. As a doctor, he's spent his entire career researching the different ways health care providers approach situations that resist easy analysis. Lately, his focus has been on divergent prognosis perceptions in the ICU. About 500,000 deaths per year in the United States occur in ICUs and "things don't often go well," which he calls "a perfect recipe for something worth studying."

In a study of doctors and surrogate decision-makers in four ICUs, published in the *Journal of the American Medical Association* this May, White and colleagues found that in more than half of cases, doctors and surrogates substantially differed in how they perceived the patient's prognosis. (Interestingly, both groups' estimates were better than chance, though the doctors' were overall still more accurate.)

All patients were adults in the ICU for at least five days, on mechanical ventilation, and unable to make decisions for themselves.

PHOTOGRAPHS COURTESY ROBYN K. COGGINS

To determine prognosis estimates, White's team separately asked doctors and surrogates, on a scale of 0 to 100 percent, "What do you think are the chances that the patient will survive this hospitalization if the current plan of care stays the same?" (Ultimately, 57 percent did survive.)

They also asked the surrogates, "If you had to guess, what do you think the doctor thinks is the chance that your loved one will survive this hospitalization if the current plan of care stays the same?" If the surrogate's and doctor's estimates differed by more than 20 percent, the team marked them as "discordant." Just over half of the prognoses were discordant, with surrogates being more optimistic than the physicians in 80 percent of those cases.

Some earlier research had suggested that family members don't accurately understand the doctor's explanations of prognosis, leading to this discord. To see whether this hypothesis was correct, White's team also interviewed the surrogates, asking them to elaborate on their prognosis answers. This is where things got interesting.

One of the most common answers among optimistic family members was that the doctor didn't understand. One surrogate said, "I feel that my brother's a fighter, and I know him [better than the physician]." Others felt they needed to keep hope alive, a kind of magical thinking like willing your plane not to crash during a turbulent flight. Some surrogates held religious views—a belief that God is ultimately in charge or that a miracle could happen—or they felt the doctor was too pessimistic.

"This finding," White et al. write, "raises concerns that one of the fundamental assumptions of shared decision-making—agreement between parties about the likely outcomes of treatment—is often not achieved."

But what does a little positive thinking or prayer hurt?

"If this were just a coping mechanism that didn't have consequences for anyone else, it would be fine," White says. But "one of the strongest predictors of families having a very difficult time with the grieving process—having a disorder called complicated grief—is that they felt that they were not prepared for the possibility that the patient would die."

Being too optimistic can be bad for the patient, too. "This lack of understanding or appreciation of the gravity of the prognosis may actually lead to more burdensome treatments at the end of life that those patients wouldn't choose for themselves," White says.

In another study, published last October in *JAMA Internal Medicine*, White and colleagues also found that the religious and spiritual needs of patients and family members are not being adequately addressed in the ICU. Of 249 recorded conversations between surrogates and doctors, only 16 percent broached the topic of religious or spiritual concerns—and those talks were usually spurred by surrogates. When spirituality did come up, most health care professionals deflected to treatment plans or didn't directly address the subject at all. One simply responded with a deep sigh.

"I try to take a somewhat charitable view of [this result], and I do not think these are physicians who are anti-religious or callous," says White, who describes himself as spiritual but not religious.

Rather, "I [think] these findings suggest that these physicians likely don't have a good set of skills to manage these very complex conversations. Religious conversations are very different from conversations about how to treat pneumonia. And they certainly are not the focus of medical education in any substantial way."

Why are these conversations so difficult, and why do doctors avoid them? For one, they're emotionally draining for everybody. Additionally, "doctors have a really hard time listening—they like to talk," says Winifred Teuteberg, an MD associate professor of medicine in palliative care and medical ethics. She arms colleagues with the strategies needed to initiate these discussions.

"[Goals-of-care] conversations are rewarding and important," Teuteberg says, "but they're tough. And imagine what it must be like for the patient, whose life is at stake." (It should be noted that palliative care—sometimes called supportive care—is not limited to end-of-life conditions: transplant and oncology patients, those on dialysis, patients with AIDS or sickle cell disease, among many others, can benefit from a decrease in symptom burden.)

Like many doctors, Teuteberg didn't learn how to talk to laypeople about subjects like code status in medical school, but once she became a resident, she was suddenly expected to know how to broach them. With a grant from the Beckwith Institute, Teuteberg started CardioTalk at Pitt—the nation's first-ever structured training program for cardiology fellows and faculty in palliative care communication skills, incorporating role play, simulation, and didactic lessons. (Pitt's Kathryn Berlacher, director of the cardiology fellowship program, and Eva

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Many people say, "I don't want to be a vegetable"—Gram backed that up with documentation. This photo was taken in the spring of 2004, shortly before she died of a stroke.

Reitschuler-Cross, both MDs and assistant professors of medicine, are her partners in developing CardioTalk.) Teuteberg says that just giving docs a few pointers makes them "horribly relieved" and more prepared to ask patients tough questions.

In addition to her training and inpatient consulting at Magee-Womens Hospital of UPMC and UPMC Shadyside, Teuteberg works at an outpatient clinic for heart-failure patients at UPMC Presbyterian. Because heart disease is the leading cause of death in America, this large population is especially in need of the symptom management that palliative care can provide.

"Let's say I was playing basketball, and I threw my knee out, and I go to see an orthopaedic surgeon. I'd want the surgeon to tell me what [she] thought—should I have surgery or not?" she says. With difficult decisions, such as those at the end of life, however, physicians often expect the patients to tell them what to do, in a well-meaning attempt at shared decision-making that could be seen as passing the buck.

"The patients don't know enough—they don't know enough detail about the options to make those decisions, plus you're then putting the full burden of the decision on the patient or on the family member: *Do you want me to pull the plug on your mother? Well of course I don't want to pull the plug on my mother—what's best?*"

Teuteberg's heart-failure patients are often anxious, depressed, and profoundly fatigued; they also need to come to terms with the life limitations their condition can bring. What she trains cardiology fellows and faculty to do is ask questions and listen: Which symptom is most bothersome to you right now? What's important to you in everyday life? How would you feel about having a feeding or breathing tube? Eventually, the mosaic of answers becomes a plan.

In a 2015 study published in *Gynecologic Oncology*, Teuteberg and colleagues found that a palliative care consultation improved patient pain, eating, fatigue, depression, anxiety, nausea, and breathing, often as early as the next day. Many other studies have found improvement in other populations, as well.

But there aren't enough palliative care doctors for every patient who needs them, so more providers need to come to the clinic equipped with these skills. Pitt's Julie Childers (MD '05), an assistant professor of medicine, leads system-wide communication training courses for oncologists, geriatricians, nephrologists, critical care fellows, surgeons—really any interested providers.

And Teuteberg is committed to improving care beyond individual conversations, too. As medical director for community supportive services at UPMC, she's "built fabulous technology solutions to try to help people do a better job after you've had the discussions," says Robert Arnold, an MD, medical director of the UPMC Palliative and Supportive Institute, the Leo H. Criep Professor of Patient Care, and professor of medicine and of psychiatry. (Arnold's also cofounder of VitalTalk—a broader educational communication program that became a model for CardioTalk.)

Beginning this summer in certain electronic health systems at UPMC, a pink tab with POLST (Pennsylvania Orders for Life-Sustaining Treatment), goals of care decisions, code orders, and the content of any related conversations will appear prominently in charts, so patients' wishes are more likely to be met.

A little guidance early on will go a long way, Teuteberg thinks; yet, she says, "There's always uncertainty. I think there always will be." ■