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MINDSCAPES

MGH DEPARTMENT OF PSYCHIATRY NEWSLETTER FOR FRIENDS AND SUPPORTERS • FALL 2016

Looking into the Brain

The Expanding Role of Neuroimaging in Psychiatry Research

Heat ailments can be confirmed with a stethoscope or sophisticated scans. Diabetes is discoverable through simple blood tests. But psychiatric disorders that derail millions of Americans – depression, bipolar illness, and schizophrenia – are routinely diagnosed through clusters of debilitating symptoms rather than objective tests.

“Mental illness gets treated differently than other illnesses because you can’t see what’s broken in the brain. That contributes to stigma,” says Randy L. Buckner, PhD, director of the Psychiatric Neuroimaging Division at Mass General. “Neuroimaging helps make the invisible visible by allowing us to see the biological origins of mental illness.” At Mass General, researchers from more than 20 laboratories and affiliated groups are using advanced brain scanning technologies to understand brain structure and function to better understand and treat psychiatric disorders.

“By allowing us to see the biological origins of mental illness, neuroimaging techniques help make the invisible visible.”

— Randy Buckner, PhD

For example, magnetic resonance imaging (MRI) shows brain structures like the amygdala – a deep-brain region that reacts to perceived threats – or the cerebellum – a region long known to coordinate sensory input needed for physical actions, and recently discovered to participate in executive control and language. The more specialized functional MRI (fMRI) tracks real-time changes as networks of brain circuits communicate in response to tasks or emotions.

Other neuroimaging tools include positron emission tomography (PET), which probes molecular signatures like neurotransmitters that send signals between nerve cells, and magnetoencephalography (MEG), which captures rapid views of brain circuit activity.

FROM BIG DATA TO A SMALLER SCALE

One major undertaking of the Psychiatric Neuroimaging Division is the Brain Genomics Superstruct Project, reported in the Spring 2011 *Mindscape*s and now in its eighth year. Led by Mass General researchers collaborating with Harvard University and McLean Hospital, Superstruct seeks to illuminate how genes influence brain structures and brain circuitry that help shape mental health or

illness. The project leverages brain imaging scans done for various studies already underway in Boston by tacking on three steps with participant consent: a saliva sample provides DNA for gene tests; a set of tasks measures thinking, behavior and emotions; and several brief neuroimaging scans.



Thilo Deckersbach, PhD, Daphne Holt, MD, PhD, and Randy Buckner, PhD

Already, Superstruct data gathered from more than 4,200 participants has been used to map intricate connections linking the cerebellum and cerebral cortex – a first in neuroscience – and to create composite snapshots of the well brain and the disordered brain. The MGH Brain Genomics Library holds these data, which are used in numerous Mass General psychiatry studies and made available to scientists worldwide for far-ranging research on mental illness.

Because brain states fluctuate in individuals as psychiatric disorders ebb and flow, another exciting use of neuroimaging synergizes with real-time information from mobile technologies. Hoping to zoom in on markers of brain disturbances in great detail, the Buckner Lab is studying individuals with bipolar illness and college students in their freshman year, a stressful transition point in life and often a period when major mental illness first appears.

(Continued on page 7)

From the Chief

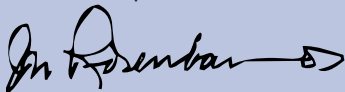
At long last we in Psychiatry are closing in on what our colleagues in other specialties of medicine have had for decades, the ability to observe the function of the specialty's organ of interest, in disease and health, and in real time. As is reported in the cover article on neuroimaging, we can do it at the "gross anatomy" level by watching the whole brain work to think, remember, and feel, and are now appreciating that brain function relevant to life is organized into distributed networks of connections, into circuits whose balance and unbalance, communication and disruption, underlies what we call psychopathology.

And we can now turn to the microscopic as well and grow networks of neuronal cells in dishes, and create mini-brain replicas of the brains of those with psychiatric disorders or those without. And we can associate these differences with genetic and epigenetic changes. Knowing details of lives allows further analysis of how life experience both activates these genes to either lead to onset of disorders or protect against them.

What a time this is for our young people coming into this new world of psychiatry! Of the 1500 applicants who applied to our residency this year, of the 110 we will interview, 8 were from our Harvard Medical School alone, one indicator of the passion and enthusiasm the next generation of physicians have for this field of humanism and science, of complexity and promise, of suffering and relief of suffering, of decreasing stigma and increasing hope.

We would not be where we are without you. There are so many metrics that underscore the generosity of the Department's donors. For example, we count 19 Harvard and MGH Chairs in our department now and when I began as Chief, we had none. Every instance of support has been translated into advances either in care delivery or in the science leading to better care in the future. And we are in some ways just beginning. Thank you for all you make possible.

May the holidays ahead bring you peace, comfort and joy and renewed hope for the future.



Jerrold F. Rosenbaum, MD
Psychiatrist-in-Chief



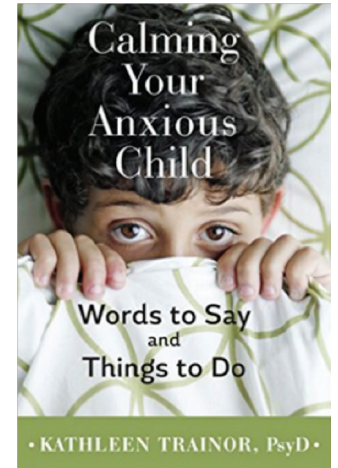
Faculty Books

CALMING YOUR ANXIOUS CHILD, WORDS TO SAY AND THINGS TO DO

By Kathleen Trainor, PhD
Johns Hopkins University Press
May 2016

Ten million children in the United States – two million of them preschoolers – suffer from anxiety. Anxious children may be afraid to be out of their parents' sight; they may refuse to talk except to specific people or under specific circumstances or they may insist on performing tasks such as brushing teeth and getting ready for bed in a rigidly specific way.

Combining family stories with practical advice and support, "Calming Your Anxious Child" teaches parents and caregivers how to empower their children to overcome their worried thoughts and behaviors. Children who have generalized anxiety, OCD, social anxiety, separation anxiety, phobias, or PTSD can all benefit from Dr. Trainor's method, which also helps parents move from feeling controlled by their child's anxiety to feeling that they are in control of their family's future.



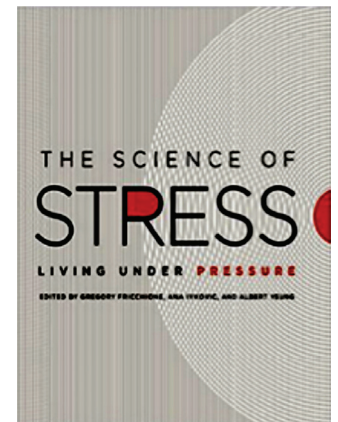
THE SCIENCE OF STRESS: LIVING UNDER PRESSURE

Editors:

Gregory L. Fricchione, MD
Ana Ivkovic, MD
Albert S. Yeung, MD
University of Chicago Press
October 2016

Our jobs and families; the deluge of e-mails, texts, and calls; the constant pinch on our time and money; the screaming match of politics and the threat of terrorism and war – there is no doubt about it, we are completely stressed out. Most of the time, we just shrug it off, but as neuropsychiatrists Gregory L. Fricchione, MD, Ana Ivkovic, MD, and Albert Yeung, MD, gently remind us in this book: stress can be really, really bad for our health.

Offering innumerable insights on the personal and social causes of stress and the physiological effects they have, "The Science of Stress" serves as an essential guide on how to alleviate stress and properly take care of ourselves. In doing so, it offers a crucial first step toward meeting the biggest health challenge of this century.



Combining Care for Cancer and Mental Illness

Innovative program helps patients who are dually affected

When diagnosed with cancer, many people with severe mental illness do not receive the cancer treatment they need. Changing that is the goal of a program led by Kelly Irwin, MD, a psychiatrist at the Mass General Cancer Center. Known as the Collaborative Care and Community Engagement Program, Dr. Irwin seeks to ensure intensive collaboration of specialists from oncology and psychiatry to best treat this underserved population.

People with severe mental illness who are diagnosed with cancer are two to four times more likely than others to die of the cancer.

Currently, people with severe mental illness who are diagnosed with cancer are two to four times more likely than others to die of the cancer. Increased cancer mortality is a key reason that people with severe mental illness are dying 15–25 years younger than the general population. Dr. Irwin's research shows that having a psychiatrist involved from the time cancer is diagnosed is an important predictor of which patients will adhere to and complete cancer treatment.



Joan Archibald and her son, Jonathan.

INNOVATIVE PROGRAM

The symptoms of severe mental illness can impact cancer treatment, explains Dr. Irwin. It can be hard to trust doctors. A patient may initially refuse needed care without understanding the life and death consequences. Cognitive symptoms can make it challenging to understand a new diagnosis. Many patients with severe mental illness are coping with poverty, homelessness and low social support, which make it harder to navigate cancer treatment.

Through the Collaborative Care and Community Engagement Program, patients and caregivers can access a social worker case manager, who advocates for the patient and coordinates care. “With cancer you can't wait,” Dr. Irwin says.

BUILDING TRUST

The effort can take hours of trust building and communication, as it did with Jonathan Archibald. Jonathan died in March 2016 at age 42 after two years with colorectal cancer

and 28 years with schizoaffective disorder, which includes delusions and paranoia as well as bipolar states of mania and depression. As his medical issues worsened, so did his psychiatric issues. His thinking was erratic.

It was never easy, his parents Henry and Joan Archibald say. “He didn't want to come to the hospital and sometimes it was an all-day effort to get him here,” Henry says. “But no one gave up on him.”

Through the persistence of his parents, Dr. Irwin and his oncologists, Jonathan agreed to have surgery and try chemotherapy and radiation. “We had so many angels at Mass General, people like Dr. Irwin who went above and beyond to help Jonathan,” Joan adds.

With intensive medication adjustment, Jonathan's thinking cleared. As his cancer progressed, Jonathan said he wanted to focus care on relief of suffering. Close collaboration between Dr. Irwin and the oncology team ensured that Jonathan's wishes were supported, and he moved to the inpatient hospice service at Mass General.

In his mother's words, “As he was dying, Jonathan was peaceful and able to communicate his values and choices. I was able to stop being his caregiver and be his mother.”

HUGE UNMET NEED

Based on the program's initial favorable impact on patient care, Dr. Irwin and team are seeking philanthropic support to maintain its unique services and reach more patients. Much of what team members do, such as home visits and care coordination, are integral to caring for this population but are not reimbursed by health insurance. By establishing a second opinion service, Dr. Irwin can also increase access to cancer care for patients with severe mental illness in the community. “It's been a gift to me to be able to help people like Jonathan,” Dr. Irwin says. “It's a huge unmet need.”

Adapted from an article written by Ellen Barlow and first published at giving.massgeneral.org/combined-care-cancer-mental-illness/, July 2016.



Kelly E. Irwin, MD

Leadership Council Visiting Day • June 20, 2016



Denis Cardone, Jerrold F. Rosenbaum, MD, and Anne Cardone



Peter L. Slavin, MD



Aude Henin, PhD, and Jennifer Dolins



Gail Lobkowicz



Michele Kessler and Carroll Carpenter



Daniel A. Geller, MD, and George Ryan



Lee S. Cohen, MD

THE MGH LEADERSHIP COUNCIL FOR PSYCHIATRY FIFTH ANNUAL VISITING DAY

Chief of Psychiatry, Jerrold Rosenbaum, MD, and Mass General President, Peter Slavin, MD, welcomed more than 100 guests who participated in a day of seminars presented by 15 psychiatrists, psychologists and neuroscientists on the topics of Anxiety, Child and Adolescent Psychiatry, Depression, Complementary Medicine and Family Relations. A lunch plenary session at the Liberty Hotel brought doctors and patients together for 'Stories of Recovery'. The day ended with dinner for Leadership Council members at a local restaurant.



Marguerite White, Nancy Crate and Virginia Guest Valentine



Miranda Donnelley, John B. Herman, MD, and Robert Donnelley



Victoria Greenleaf Kempner and Valerie Post

THE EATING DISORDERS CLINICAL AND RESEARCH TEEN MENTOR PROGRAM • JULY 25, 2016

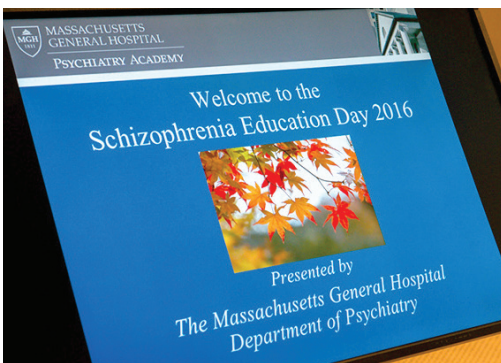


Lazaro Zayas, MD, Lucy Lyman, Mila Camargo, and Kathryn Coniglio



Matina S. Horner, PhD, Jennifer J. Thomas, PhD, Kamryn T. Eddy, PhD, and Debra L. Franko, PhD

SCHIZOPHRENIA EDUCATION DAY • NOVEMBER 5, 2016



Joshua L. Roffman, MD



Corinne Cather, PhD



Daphne Holt, MD, PhD, and Oliver Freudenreich, MD

THE LOUIS V. GERSTNER III RESEARCH SCHOLAR AWARD PROGRAM • NOVEMBER 14, 2016



Mai Uchida, MD, Amy M. Yule, MD, Franziska Plessow, PhD, A. Eden Evins, MD, MPH, Alysa E. Doyle, PhD, and Benjamin G. Shapero, PhD



Kara V. Klein, Janet R. Wozniak, MD, Lee S. Cohen, MD, Louis V. Gerstner, Jr., Elizabeth R. Gerstner, MD, and Timothy E. Wilens, MD



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Fall 2016 Vol. 9, No.2

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Mindscapes is published for friends and supporters of the Massachusetts General Hospital Department of Psychiatry.

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Food for Thought

The Science of the Family Dinner

As a family therapist, I often have the impulse to tell families to go home and have dinner together rather than spending an hour with me. And 20 years of studies in North America, Europe and Australia are backing up my enthusiasm for family dinners. It turns out that sitting down for a nightly meal is great for the brain, the body and the spirit. That nightly dinner doesn't have to be a gourmet meal that took three hours to cook, nor does it need to be made with organic arugula and heirloom parsnips.

BRAIN FOOD

For starters, researchers found that for young children, dinnertime conversation boosts vocabulary even more than being read aloud to. The researchers counted the number of rare words – those not found on a list of 3,000 most common words – that the families used during dinner conversation. Young kids learned 1,000 rare words at the dinner table, compared to only 143 from parents reading storybooks aloud. Kids who have a large vocabulary read earlier and more easily.

“This daily mealtime connection is like a seat belt for traveling the potholed road of childhood and adolescence and all its possible risky behaviors.”

— Anne K. Fishel, PhD

Older children also reap intellectual benefits from family dinners. For school-age youngsters, regular mealtime is an even more powerful predictor of high achievement scores than time spent in school, doing homework, playing sports or doing art. Other researchers reported a consistent association between family dinner frequency and teen academic performance. Adolescents who ate family meals five to seven times a week were twice as likely to get A's in school as those who ate dinner with their families fewer than two times a week.

DOES A BODY GOOD

Children who eat regular family dinners also consume more fruits, vegetables, vitamins and micronutrients, as well as fewer fried foods and soft drinks. And the nutritional benefits keep paying dividends



even after kids grow up: young adults who ate regular family meals as teens are less likely to be obese and more likely to eat healthily once they live on their own.

Some research has even found a connection between regular family dinners and the reduction of symptoms in medical disorders, such as asthma. The benefit might be due to two possible byproducts of a shared family meal: lower anxiety and the chance to check in about a child's medication compliance. It isn't just the presence of healthy foods that leads to all these benefits. The dinner atmosphere is also important. Parents need to be warm and engaged, rather than controlling and restrictive, to encourage healthy eating in their children.

All bets are off if the TV is on during dinner. In one study, American kindergartners who watched TV during dinner were more likely to be overweight by the time they were in third grade. The association between TV-watching during dinner and overweightness in children was also reported in Sweden, Finland and Portugal.

SOUL FOOD

In addition, a stack of studies link regular family dinners with lowering a host of high risk teenage behaviors parents fear: smoking, binge drinking, marijuana use, violence, school problems, eating disorders and sexual activity. In one study of more than 5,000 Minnesota teens, researchers concluded that regular family dinners were associated with lower rates of depression and suicidal thoughts. In a recent study, kids who had been victims of cyberbullying bounced back more readily if they had regular family dinners. Family dinners have been found to be a more powerful deterrent against high-risk teen behaviors than church attendance or good grades.

WHAT'S SO MAGICAL ABOUT MEALTIME?

In most industrialized countries, families don't farm together, play musical instruments or stitch quilts on the porch. So dinner is the most reliable way for families to connect and find out what's going on with each other. In a survey, American teens were asked when they were most likely to talk with their parents: dinner was their top answer. Kids who eat dinner with their parents experience less stress and have a better relationship with them. This daily mealtime connection is like a seat belt for traveling the potholed road of childhood and adolescence and all its possible risky behaviors.

First published in theconversation.com, January 9, 2015. Dr. Fishel is director of the Family and Couples Therapy Program at Massachusetts General Hospital and an associate clinical professor of Psychology at the Harvard Medical School. She is the co-author of "Home for Dinner: Mixing Food, Fun, and Conversation for a Happier Family and Healthier Kids."



Anne K. Fishel, PhD

—Looking into the Brain

(Continued from page 1)

Daily online reports on behavior and mood from each participant are being linked with information from a wristband that records sleep, activity and other physiological feedback. Several times a month, a brief battery of neuroimaging tests is collected. This information is helping to create in-depth pictures of changes that occur in individual brains.

“We know so little about how brain networks go from robust regimes to dysfunctional regimes,” says Dr. Buckner. “We want to gain insights into how a person responds to inner and external stresses, and how he or she transitions into or out of illness.”

TARGETING TREATMENTS

Antidepressant medications, such as sertraline (Zoloft) and bupropion (Wellbutrin), are often used to treat major depression. Yet they can take four to six weeks to work – that is, when they work. No clinician can predict if a particular patient will respond to specific antidepressants. Often, patients must try different medications to gain relief.

EMBARC (Establishing Moderators/Biosignatures of Antidepressant Response- Clinical Care) is a four-site study supported by the National Institute of Mental Health and led at Mass General by Maurizio Fava, MD, executive vice chair of Psychiatry, that addresses these issues. Dr. Fava and colleagues are seeking biomarkers – via blood tests, brain scans, and other means – that help predict who will or won't respond to antidepressant medication. Study participants have a baseline fMRI scan before starting antidepressant medication or placebo, and another fMRI a week afterward. Changes in brain activity or connectivity that suggest a response to treatment – or no changes – might help predict whether a person should continue a medication or switch treatments. “Our goal is to find signs in the brain of medication effects weeks before any change in symptoms of depression are typically noticeable,” says Thilo Deckersbach, PhD, associate director of the Division of Neurotherapeutics, who is helping to run EMBARC at Mass General.

“With over 300 participants, EMBARC is the largest randomized study ever of neuroimaging biomarkers of antidepressant response in major depression,” Dr. Fava says. “It has found some novel neuroimaging biomarkers that may guide treatment decisions by identifying those who respond to SSRI treatment and those who do not.”

Neuroimaging is being used in numerous other psychiatric studies at Mass General. Certain memory problems are common with bipolar illness. “You can use fMRI to see which brain regions are involved and are not functioning correctly – for example, the dorsolateral prefrontal cortex,” says Dr. Deckersbach. Building on that information, his team is studying whether fMRI can accurately predict treatment response to supportive psychotherapy or cognitive behavioral therapy.

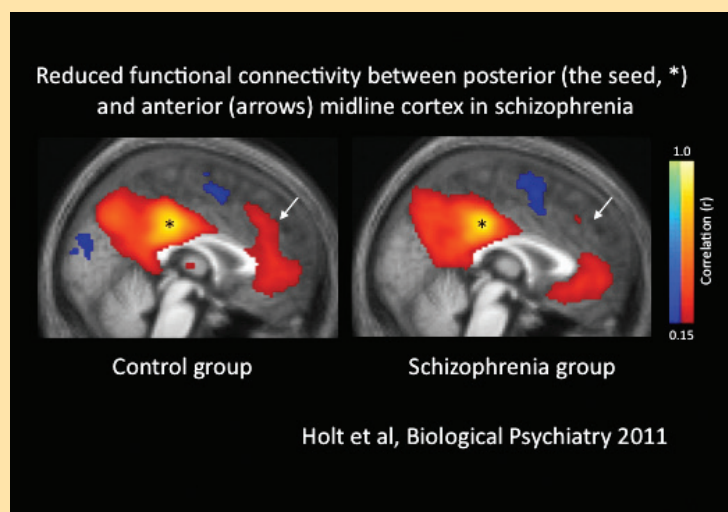
Determining a Person's Risk for Psychiatric Illness

Certain factors raise risk for developing psychiatric disorders by a small amount, including a family history of mental illness, great adversity or trauma early in life, and having early mild symptoms of specific disorders. To investigate whether neuroimaging can help identify which individuals with these characteristics have a high risk of becoming ill, Daphne Holt, MD, PhD, director of the MGH Resilience Enhancement and Prevention Program, has launched several studies involving college students.

In one of these, the Mass General team used fMRI to examine brain activity in 131 non-depressed young adults with or without a family history of depression. The researchers focused on a deep-brain region called the amygdala, which reacts to perceived threats and is known to function abnormally in depression. When a task invoked a mild threat, the researchers observed greater amygdala activity in those with a family history of depression. Amygdala overactivity was linked with lower resilience scores and, a year later, elevated symptoms of depression. These important findings suggest that measurements of amygdala function might help identify people who are at higher risk.

Further, the team also used fMRI techniques to measure connectivity between the amygdala and other brain regions. Abnormally high connectivity between the amygdala and visual cortex was found in students who reported more delusional beliefs, particularly persecutory beliefs, a hallmark of schizophrenia.

Once further validated, these techniques may ultimately allow clinicians to intervene at these very early stages. “Combined with other measures, neuroimaging markers like these may have a role in helping clinicians decide whether to monitor or intervene to prevent illness, or to simply share risk information with patients,” says Dr. Holt.



Brain scanning, also known as neuroimaging, illuminates different aspects of the function or structure of the brain. Above, scans of people with and without schizophrenia revealed significant differences in connectivity between brain regions thought to regulate emotion and memory. From a study led by Daphne Holt, MD, PhD, and reported in *Biological Psychiatry*, March 2011.



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Celebrating the Bell Foundation Directorship *Dr. Tony Weiner named inaugural director*

Anthony P. Weiner, MD, director of the MGH Older Adult Outpatient Psychiatry Program, was honored as the inaugural incumbent of the Millicent and Eugene Bell Foundation Endowed Director in Older Adult Outpatient Psychiatry at a celebration on November 3, 2016, at the Paul S. Russell, MD Museum of Medical History and Innovation. The chair was made possible through the generosity of the Millicent and Eugene Bell Foundation.



Anthony Weiner, MD, and Sally Edmonds

After 17 years as a geriatric psychiatrist in community hospital settings, Dr. Weiner came to Mass General five years ago with the mandate to expand and broaden services for the growing population of adults 65 years and older. He is also an instructor in Psychiatry at Harvard Medical School. Dr. Weiner's clinical practice involves caring for patients whose conditions intersect psychiatry, neurology and internal medicine, and whose care needs are often impacted by the presence of complicated medication regimens, and a social network that is changing as the patient ages.

The Bell Directorship will further Dr. Weiner's and the Department of Psychiatry's commitment to providing the highest quality of psychiatric care to older adults. "Many psychiatrists treat older adults," said Thomas J. Lynch, Jr, MD, CEO and chairman of the Massachusetts General Physicians Organization. "But caring for them in the most ideal way is another issue entirely. Older adults often have multiple chronic health concerns.

Mass General is one of only a few academic medical centers in the world that have a mental health program dedicated to the care of older adults. That care extends to training future geriatric leaders and advancing research in end-of-life care, geriatric depression and cognitive function."

"I am forever grateful that Dr. Weiner was part of our lives, and our family. His support made it possible for my husband's wish to die at home to become a reality." – Sally Edmonds

During the celebration, Mrs. Sally Edmonds, whose late husband George was a patient of Dr. Weiner's, shared her experience. "I am forever grateful that Dr. Weiner was part of our lives, and our family. I can't imagine what it would have been like without him. His support made it possible for my husband's wish to die at home to become a reality. To me he represents the very best in a noble profession. I am thrilled that the Bell Family and Mass General have chosen to honor him. I cannot think of anyone more deserving!"



Thomas J. Lynch, MD, Jerrold F. Rosenbaum, MD, and Thomas P. Jalkut, JD, Trustee, The Millicent and Eugene Bell Foundation