FOCUS //

**THERE IT HURTS**, scribbled the German artist Albrecht Dürer five centuries ago on a postcard-size self-portrait he sent to a physician about his mysterious illness. Dürer’s symptoms included fever, nausea and pain, the site of which he marked with a yellow oval. Though it’s not known whether the drawing was of help, or even what the doctor’s diagnosis was (later theories ranged from malaria to tuberculosis to poisoning), Dürer’s practical masterpiece is the first known instance of a pain map. Simple outlines of the body on which patients pinpoint where it hurts, pain maps can help clarify, for instance, whether pelvic pain originates from internal organs or a musculoskeletal source. Most pain maps, like Dürer’s, involve pen and paper; however, researchers are developing 3-D computer versions to track pain more accurately, aiming to create software for chronic pain patients to chart the location and quality of their pain throughout the day.
Why do some people take their own lives—as many as 36,000 each year in the United States alone—and why do warning signs go unheeded? Though suicide is the 10th leading cause of death in the United States (after kidney disease and influenza/pneumonia), answers have been elusive, in part because collecting adequate numbers of subjects who’ve attempted suicide has been difficult. Matthew Nock, a Harvard psychology professor and faculty member at the Massachusetts General Hospital Academy who was recently awarded a MacArthur Fellowship for $500,000, is involved in the first large-scale international study of suicidal behavior and an investigation of suicides in the U.S. Army. He will use his MacArthur money to refine methods he has developed to assess suicide risk. Already, his computer tests, which use word associations, have been good predictors of who will attempt suicide—more accurate than what clinicians or patients themselves predict.

Q: How have physicians tried to determine if someone is suicidal?
A: In really primitive ways. We basically ask people: Are you going to kill yourself? If they say yes, we lock them up until they can convince us they are no longer at risk. But studies show that the week after those who’ve attempted suicide leave the hospital, there’s a huge spike in their suicide rates. In other words, we can’t rely on what patients tell us.

Q: Is suicide a bigger problem now, given societal pressures such as the recession?
A: No. The U.S. suicide rate is about the same now as it was 100 years ago. The good news is that more people are getting treated for suicidal thoughts and behaviors now compared with just 10 years ago.

Q: Yet there have been persistent reports of a spike among baby boomers.
A: Suicide rates fluctuate slightly from year to year, and these ups and downs are more pronounced when you look at small subgroups. The most marked change in the past 15 years has been a decrease in the suicide rate among men 65 years old and older, which is the group currently at highest risk for suicide death.
Q: Isn't depression the biggest risk factor?
A: Depression is important in predicting the onset of suicidal thoughts, but it doesn’t predict which people with such thoughts go on to make an attempt. Disorders characterized by anxiety, agitation and poor impulse control, and particularly a combination of these, are better predictors.

Q: How can we get better at predicting suicide?
A: One thing we need to do is develop more objective methods. We’ve adapted the Implicit Association Test, which was created, using word pairs, to evaluate subjects’ unconscious biases. In our test, patients are asked to classify words related to life (like breathing) and death (dead), and me (mine) and not me (them). Quicker responses to death/me pairings than to life/me combinations suggest a stronger association between death and self. In one of our studies involving 157 patients in the MGH psychiatric emergency department, we found that those who associated themselves with suicide-related words were six times likelier to attempt suicide again within six months than the others.

Q: You also use a variation of the Stroop test, which requires subjects to name the color of a printed word (red or blue) and measures their reaction time. Why is this useful?
A: We hypothesized that people who are thinking about suicide show greater attention to suicide-related words. We asked 124 patients being treated in the MGH emergency department to identify the randomly assigned ink colors of suicide-related words like funeral, negative words like alone or rejected, and neutral words like museum or paper. We found that people who have recently made a suicide attempt are significantly slower to name the color of a suicide-related word—presumably because it captures their attention and interferes with their ability to respond. Other studies show a similar effect among combat veterans with post-traumatic stress disorder when responding to combat-related words.

Q: What’s the next step for your research?
A: We’re working to modify these tests so that they not only diagnose but also treat suicidal thinking. We’re using one of the tests in the MGH inpatient psychiatry unit to see if we can train participants who have attempted suicide to disengage more easily from thinking about suicide-related words. By training subjects to just let the words come and go, we hope to decrease the likelihood that they’ll harm themselves.

“Suicide words” appear to capture the attention of people who have recently made a suicide attempt.

BY THE NUMBERS //
Comprehension Test

12 Estimated percentage of American adults who can adequately apply reading and analytical skills to understand and use health information effectively—skills ranging from following prescription instructions to using a table to calculate an employee’s share of health insurance costs

2011 Year in which a systematic review of studies concluded that low health literacy was consistently associated with more hospitalizations, greater use of emergency care, poor ability to take medications properly, and, among elderly people, poor overall health status and high mortality rates

30 Approximate percentage of patients at a Los Angeles hospital who were unable to identify the date of their follow-up appointment from a standard appointment slip

39.4 In one study, percent mortality rate after six years among patients aged 65 and older who demonstrated inadequate health literacy; those with adequate skills experienced a mortality rate of 18.9%

2:1 Increased odds that a type 2 diabetic patient with low health literacy will experience retinopathy, even after adjustment for sociodemographics, diabetes education, treatment regimen and duration of diabetes

1,000 Users, including hospitals, HMOs and state Medicaid offices, of the Health Literacy Advisor, a software program that suggests plain-language alternatives for difficult medical terms and phrases in Website copy, consent forms, patient education materials and medication inserts—such as heart attack for myocardial infarction, swelling for edema, and fever for pyrexia.
Insurers have actuarial reasons for charging some groups of people more than others—old more than young, smokers more than nonsmokers—and even for refusing to grant insurance to people with pre-existing conditions. One disparity causing particular ire is that between women and men of the same age. Women don’t choose to be born female, so why, ask critics, do insurers of individuals penalize women by charging them premiums that are higher than what men the same age pay, and hit small companies with higher fees for their female employees? Says Judy Waxman, vice president of health and reproductive rights for the National Women’s Law Center, “We should be sharing the risk across genders, just as we do across races.”

The Affordable Care Act prohibits gender rating beginning in 2014. But the U.S. Supreme Court is due to decide in June whether some of the law’s provisions are unconstitutional—and a ruling against the law could mean insurers’ gender ratings are here to stay.

The Insurers’ Justification

- **38%**
  - of women report having a chronic medical condition

- **41%**
  - more than men on physician visits

- **60%**
  - of best-selling plans charged a 40-year-old female nonsmoker a higher premium (as much as 63% higher) than a 40-year-old male smoker in 2009

- **16%**
  - of insurers’ payouts, more than reimbursements for cardiovascular disease, diabetes and asthma combined

**The Cost of Being Female**

- **84%**
  - The amount more than a 25-year-old man that a 25-year-old woman must pay in some states in plans that don’t even include maternity coverage

- **13%**
  - of plans sold to women in the individual market provide maternity coverage, leaving the rest to pay out of pocket to have a baby

**States of Inequality**

States that ban or restrict gender rating

- Only Montana prohibits insurers from gender rating in all markets: policies in which individuals deal directly with insurance companies, those provided to employees of small businesses, and those provided to employees of large businesses

- **Banned in all groups**
- **Banned in small groups**
- **Restricted in small groups**
- **Banned in the individual market**
- **Restricted in the individual market**
- **No restriction on any group**
Evening the Score

Typical ratio for gender rating:
Today: 2 to 1 (i.e., women pay twice as much)
2014: 1 to 1

Typical ratio for age rating:
Today: 5 (older person) to 1 (younger person)
2014 (enactment of Affordable Care Act): 3 to 1

MILESTONE //

The Newborn Score

Sixty years ago, Virginia Apgar confessed her disappointment to the annual Congress of Anesthetists meeting. “Seldom,” she said, “have there been such imaginative ideas, such enthusiasms and dislikes, and such unscientific observations and study about one clinical picture” as of the newborn in crisis. Doctors and nurses who delivered babies lacked a common language to decide whether a newborn would require more than routine medical care.

Apgar’s solution was a numerical scale that could predict which babies were likely to thrive and which needed immediate resuscitation. The following year, she published her scoring system in Current Researches in Anesthesia and Analgesia, revolutionizing neonatal care the world over. Virtually every baby born in a hospital today undergoes the Apgar test. The simple checklist assesses five physiological categories: hear rate; breathing; reflexes, particularly to irritating stimuli like a bulb syringe in the mouth to clear the airways; muscle tone and movement; and color (babies are born bluish but should turn pink as their heart pumps blood through their body). The score later was acronymsized to APGAR: Appearance, Pulse, Grimace, Activity, Respiration.

For each of the five categories, a score of 0, 1 or 2 is possible, allowing for a maximum score of 10. Babies who receive a total score of three or less are in serious trouble; most newborns scoring in this range have high levels of acid in their blood, a condition that can lead to brain damage or death. Mechanical ventilation or even life support might be required.

“In the past, attention was concentrated on the mother’s survival,” says Linda Polley, a past president of the Society for Obstetric Anesthesia and Perinatology. “Apgar’s system focused attention on the condition of the newborn.”

Born in 1909, Apgar entered the emerging field of anesthesiaology in the 1930s at a time when it was still largely the domain of nurses and male physicians. In 1937 she accepted a position at Columbia University’s Presbyterian Hospital to lead the new division of anesthesia.

An idea as effective yet simple as the Apgar score was destined to gain traction beyond the labor and delivery unit. A recent study in the journal Anesthesiology, for example, found that a modified Apgar score predicted mortality for patients undergoing most types of operations. In other words, a patient undergoing surgery might well owe a double debt to Apgar’s insight. Apgar is reported to have declared: “Nobody, but nobody, is going to stop breathing on me.”
At the next visit to the pediatrician, parents of children ages 9 to 11 might be in for a surprise: a cholesterol test. Though heart attacks usually strike after age 60, powerful evidence now indicates that atherosclerosis—the accumulation of cholesterol, fats and other substances in the arteries that causes most heart attacks—often begins in childhood. Armed with that knowledge, an expert panel supported by the National Heart, Lung, and Blood Institute recommended in November that physicians perform baseline screening of cholesterol and other lipids in all children ages 9 to 11. Though some argue that this dramatic—and controversial—change to current recommendations will save lives in decades to come, others see it as pointless and even dangerous.

Routine screening in children will accomplish two goals, says Johns Hopkins University School of Medicine lipidologist Peter O. Kwiterovich, a member of the NHLBI panel. First, it will help identify the one in 500 children with familial hypercholesterolemia (FH), an inherited condition that causes an increased risk of heart attack before age 50. Universal screening will also identify the roughly one in four children in this age bracket who have elevated cholesterol associated with factors such as obesity, poor diet and lack of exercise.

In the past, most physicians checked a child’s cholesterol only if there was a family history of FH or early heart disease, or if the child was obese (about 40% of obese children have lipid problems). But research shows that using these parameters misses too many kids with unhealthy lipids, notes Kwiterovich, citing several studies that link high cholesterol in childhood to clinical evidence of cardiovascular disease in early adulthood.

Yet critics warn that some children diagnosed with high cholesterol will be given statins even though there has never been a clinical trial showing that taking statins in childhood prevents heart attacks decades later, or that cholesterol-lowering in kids is safe. “What is the advantage of treating high cholesterol in a 10-year-old versus a 20- or 30-year-old? Nobody knows,” says H. Gilbert Welch, a professor of medicine at Dartmouth Medical School and co-author of Overdiagnosed: Making People Sick in the Pursuit of Health.

Moreover, Welch notes that cholesterol is a vital component of androgens and estrogens, the sex hormones. He worries that using drugs to block production of cholesterol in children who have not yet gone through puberty may put them at increased risk for health problems.

Kwiterovich estimates that only about 1% of children identified as having high cholesterol through universal screening will meet the NHLBI’s criteria for receiving a statin or other lipid-lowering drug. Yet some observers are convinced that a far greater number of children will eventually be given prescriptions. Inevitably, predicts Michael L. LeFevre, a professor of family medicine at the University of Missouri School of Medicine, some physicians will prescribe drug therapy for children unable to bring down their cholesterol with lifestyle changes.

“The pressure is there to try to do something,” says LeFevre.

Kwiterovich finds it ironic that some of the same pediatricians who dutifully perform annual physical exams—which rarely uncover anything important—bristle at the suggestion of uncovering a potential heart concern in about 25% of patients. Kwiterovich is pleased that testing is in place. “That’s the most important thing,” he says, “rather than doing nothing.”
Among the trillions of bacteria that populate us, most reside in the gastrointestinal system, where their species number in the thousands. But the variation in the number of species between individuals is so great that scientists were beginning to despair of ever detecting a significant pattern to the diversity. Then a study published in May 2011 found that gut flora cluster into three basic patterns of species—a finding that surprised researchers within MetaHIT, the European project cataloguing and analyzing bacteria in the human intestinal tract. It’s one more example of evidence turned up in the past year of these bacteria’s close intertwining with our physiology, a line of research Proto explored in its infancy (“Our Native Flora,” Summer 2010). Resident microbes help extract energy from food, stimulate the immune system and provide a buffer against invading pathogens, among other important tasks. Only recently have scientists managed to link imbalances in our microbial makeup to cancer, inflammatory bowel disease and obesity.

Each of the three “enterotypes”—named Bacteroides, Prevotella and Ruminococcus after their most abundant species—produced different vitamins and processed energy differently. Already scientists are attempting to correlate the enterotypes to diet and other factors. Gary Wu, a gastroenterologist at the Perelman School of Medicine at the University of Pennsylvania, and his team sampled the gut flora of people who had provided long-term dietary information, finding that the Bacteroides enterotype was correlated with animal protein and saturated fat intake, whereas Prevotella was associated with carbohydrate-rich diets. Researchers are now working with human gut bacterial species and so-called germ-free mice—mice with no flora of their own—to see what happens to these bacterial communities as the mice consume diets with varying amounts of protein, starch, sugar and fat.

Yet since Proto reported on the microbiome, researchers have begun to move beyond the connections between gut flora and metabolism to look at how our microbes might interact with our brains. The early evidence suggests that they exert a powerful influence on a mouse’s emotional state and its brain development. Rochellys Diaz Heijtz and her colleagues at the Karolinska Institute in Stockholm discovered that germ-free mice grow up more active and exploratory than those with an intact microbiome, who are more cautious and anxious. It remains to be seen whether the same effect occurs in humans—and just what else the microbes that outnumber our own cells 10 to 1 are doing to us.

Defined //

**parsimonious care** [pər-sə-mən-əs] n: a practice encouraged by guidelines from the American College of Physicians, lauded by some as a high-profile acknowledgment of the need to control skyrocketing medical costs but criticized by others as an opportunity for physicians to withhold care.

In January, when the ACP published its new ethics manual for its 132,000 members (it is the second-largest physician group after the American Medical Association), interest was piqued by one passage: “Physicians have a responsibility to practice effective and efficient health care and to use health care resources responsibly. Parsimonious care that utilizes the most efficient means to effectively diagnose a condition and treat a patient respects the need to use resources wisely and to help ensure that resources are equitably available.”

In an accompanying editorial, physician and bioethicist Ezekiel Emanuel of the University of Pennsylvania deemed the guideline “truly remarkable”: “These positions on efficiency, parsimony and cost-effectiveness constitute an important shift, if not in ethics then in emphasis.”

Yet some physicians and bioethicists are uncomfortable with the shift, not least because of the ACP’s word choice. Though the first dictionary definition of parsimonious may be “careful with money or resources,” it’s followed by a decidedly negative connotation: “especially: frugal to the point of stinginess.” Critics express concern that some physicians, under pressure to control costs, will withhold a test or treatment despite clear benefit, and foresee that the debate will help fuel already heated discussions about health care spending.