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COMING //

- **THROUGH FEBRUARY 15:** For every technological advance in modern warfare, new types of injuries force medicine to advance in step. "War and Medicine," an exhibit at London's Wellcome Collection that explores this relationship, includes a 1917 film of British soldiers suffering from shell shock, WWII health posters and plaster casts of disfigured veterans' faces.
- **MARCH 30:** Most of the lucky first class of the University of Central Florida College of Medicine will have been chosen. The school will cover tuition, fees and living expenses for all 40 students throughout their four years.



MANDEL NGAN/AFP/GETTY IMAGES

FOCUS // **IN JULY, THE ONE-MILLIONTH** "long-lasting insecticide-treated mosquito net" was distributed in southern Sudan. The nets, draped around sleeping areas, kill female anopheles mosquitoes, the prime carriers of malaria. By eliminating insects in one home, the nets can reduce the overall number of mosquitoes in an area, even in nearby homes without nets. Along with artemisinin-based combination therapies and the spraying of insecticide indoors, the nets have contributed to a 50% decline in malaria incidence and deaths in 29 nations during the past seven years.

INTERVIEW //

Should I Be Worried?

■ BY LINDA KESLAR

Despite headlines about salmonella outbreaks, the health risks of cell phones and the threat of a flu pandemic, this isn't a particularly hazardous time for most Americans, says David Ropeik, an independent risk consultant and former television reporter who lives in Concord, Mass. Still, he admits, our anxiety about such threats isn't surprising, given humans' highly evolved survival instinct. But unlike our ancient ancestors, who knew when to run from predators and when it was safe to run after them, today we face what seems to be an endless stream of risks we find difficult to assess. Ropeik, who co-wrote the 2002 book Risk: A Practical Guide for Deciding What's Really Safe and What's Really Dangerous in the World Around You, argues that Americans' health worries are largely misplaced.

Q: Don't people have good reason to be worried when there's a new headline every week about another potential threat?

A: It's an oversimplification to say people worry too much. But it's true that the way people assess risk isn't wholly rational, and as a result we may be too afraid of lesser risks and not concerned enough about bigger ones.

Q: What are some examples of this misperception?



A: The greater the potential pain and suffering, the greater the fear, regardless of the odds. We consider cancer an excruciatingly painful way to go, so we fear it more than heart disease, even though heart disease kills 20% more people than cancer does every year. Feeling that we can exert control over a dangerous situation also matters; it's why we fear plane crashes more than car crashes, despite the fact that cars are vastly more dangerous.

After September 11, many people were terrified to fly and decided to drive instead. During the six months after 9/11, according to studies at the University of Michigan and Cornell, roughly 1,000 more people were killed in motor vehicle crashes than expected in that time period.

Q: Is the media exacerbating our fears?

A: The media is a reflector and a

magnifier of human nature, but not a creator; whatever instinctively feels more worrisome to you or me seems like a better story to journalists because greater worry generates more attention. And in turn, when something worrisome is in the news, it's higher on our radar screens.

Q: You also say it's simply our nature not to fret about chronic concerns.

A: That's right. Heart disease, for example, is the result of actions—

■ **She was not told that those treating her would be wearing full lead suits or that the big black pill she had to take would be carried to her in a heavy metal canister.**

eating one cheeseburger, smoking one cigarette—that, individually, aren't especially dangerous but when repeated throughout the years can have deadly consequences.

Q: So if the media can't change how people react, can the health care system?

A: It can, and must, impress upon the public the danger of the big killers: heart disease, cancer, stroke and diabetes. But the health care system must tackle another major challenge: to communicate more effectively the risks the system itself poses. I've had eight surgeries and I find that hospital staff pay woefully little attention to how they communicate. A friend had to take radioactive medication after her thyroid was removed. She was not

told that those treating her would be wearing full lead suits or that the big black pill she had to take would be carried to her in a heavy metal canister and would be handled with special tongs. This protocol suggested there was something scary inside that pill, which caused her a lot more worry than the information she had been given.

Q: You're also concerned about the multiple-page consent forms patients must sign before surgery.

A: Consent forms are the antithesis of good risk communication. They are largely a list of possible negative outcomes, and patients simply don't read the whole form. The wording should be changed to make the information not only clearer but also relevant to patients' emotions. A simple phrase such as "As you consider the trade-off between the risks and benefits of this procedure" makes the patient feel that the person who wrote the form is on their side; that feeling could prompt the patient to pay more attention and be more likely to supply correct information, which in turn could reduce medical errors. That is key, because such errors pose an enormous risk: They cause more deaths each year than automobile accidents, breast cancer or AIDS. ■

BY THE NUMBERS //
Legal Leaves



3,500 Approximate number of years since the *Ebers Papyrus*, an Egyptian medical textbook, described the use of cannabis for medicinal purposes

1 Weeks per month during which Queen Victoria steeped cannabis in her tea to calm menstrual pains

12 Approximate number of conditions, including cancer, multiple sclerosis and Alzheimer's disease, for which the medicinal use of cannabis has been studied; though chiefly known for easing pain, it also suppresses nausea and may help protect the central nervous system.

3,400 Approximate number of scientific studies published in 2007 on the National Library of Medicine's PubMed Website on medicinal uses of cannabinoids, the active substances in cannabis plants

13 Number of states that allow the medicinal use of cannabis, including Michigan, whose citizens voted for legalization in 2008

0 Number of prescriptions written for marijuana each year; because it is classified as a Schedule I controlled substance by the federal government, physicians in states where medical marijuana is legal may only recommend it to their patients.

10 Number of pages in an application to open a cannabis club, a dispensary protected by state medical marijuana laws, in San Francisco

200,000 Number of Californians who are card-carrying "doctor qualified" cannabis users ■

INFOGRAPHIC //

What's in a Name?

■ BY ANITA SLOMSKI // INFOGRAPHIC BY FLYING CHILLI

Drug naming is serious business for the pharmaceutical industry. A catchy name is essential not only to compete in a universe of 12,000 drugs but also to linger in the minds of consumers and practitioners long after the medication goes off patent (about 10 years after it goes to market). What's more, the value of a drug brand can run into the millions. Here's the long christening process.

First, a drug is given a chemical name that reflects the compound's structure and is used primarily by researchers.

7-chloro-1,3-dihydro-1-methyl-5-phenyl-2H-1,4-benzodiazepin-2-one

(a.k.a. Valium)

The drug enters clinical trials. Some companies apply for a name when the drug is still in the petri dish, while others wait until they have a potentially viable product.

Certain consonants are in high demand.



The manufacturer develops a blockbuster trade name.

After its basic safety is established, the drug is tested for efficacy on 100 to 300 people.



• does not begin with H, J, K or W (those sounds are not present in some languages).



conveys speed (Zyban).

LRS are soothing (Lunesta).

X leaves a high-tech impression (Xanax).

P, T, K connote effectiveness and power (Prozac).

Ideally, the name suggests what the drug treats so consumers will remember it.



• Lunesta, the sleep medication, conjures up the Latin word *luna*, for moon, and the Spanish *siesta*.



• Viagra, the erectile dysfunction drug, starts with *Vi* for *vigor* and *vitality* and rhymes with *Niagara* for a reason.



The names cannot

- imply medical efficacy. (Rogaine, the treatment for hair loss, was originally called Regaine, which was rejected as misleading.)

- promise more than they can deliver.

- suggest unapproved uses for the drug.

- be "of a fanciful nature." (The FDA nixed the name Bonviva; the osteoporosis drug then became Boniva.)

The FDA's Division of Drug Marketing, Advertising, and Communications evaluates the names.

The manufacturer may hire a medication safety consultant to ask doctors and pharmacists to write and speak the names (to determine whether they look or sound too much like those of other drugs).



• Lawyers conduct trademark searches in every country where the drug will be marketed, eliminating about 40% of the names.



Names that pass muster go to the Division of Medication Error Prevention Analysis, which does simulation studies of oral orders and written prescriptions and checks drug databases to rule out names that might be confused with those of other drugs.

BRAND X



Drugs with a new molecular formula—which are potentially more effective than previous ones—may get their trade names approved quickly, whereas other drugs may wait up to a year.



MILESTONES //

Lady Doctor



Once she graduated, to gain clinical experience Blackwell moved briefly to Paris, where she studied at the women's hospital La Maternité. It was there she contracted purulent ophthalmia from a young patient. After nearly going blind, she lost her left eye, effectively ending her ambition to become a surgeon. But Blackwell went on to study at London's prestigious St. Bartholomew's Hospital in 1850 and then returned to America.

On settling in New York City, Blackwell had a hard time attracting patients. In 1856 her younger sister Emily completed medical training at Case Western Reserve University in Cleveland, and with physician Marie Zakrzewska, the sisters established a hospital for women and children. A host of firsts followed—Rebecca Lee Crumpler, the first African-American female doctor, received her degree in 1864; six years later, the University of Michigan became the first state medical school to formally admit women—as did one notable last: In 1960 Philadelphia's Jefferson Medical College became the final school to accept female students.

By 2005, 47.1% of medical school graduates were women. Still, they often stick to fields traditionally associated with women: 70.1% of residents specializing in pediatrics are female, as are 75.6% of those in obstetrics and gynecology. What's more, women lag particularly in surgery, making up only 27.9% of surgery residents. The field, it seems, could use someone like Blackwell. ■

It was 160 years ago, in 1849, that a student who "could not bear the sight of a medical book" and who complained that "the very thought of dwelling on the physical structure of the body and its various ailments filled me with disgust" graduated from medical school to become the world's first female physician.

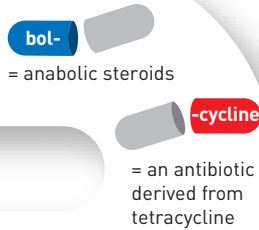
Elizabeth Blackwell, the daughter of an abolitionist and friend to another, Harriet Beecher Stowe, had long identified with causes of social justice but had not yet found her place in the world after graduating from college. When a terminally ill friend told her, "If I could have been treated by a lady doctor, my worst sufferings would have been spared me," Blackwell decided that the field of medicine must be opened to women. And, craving an alternative to the dull prospect of marriage, she decided to make the campaign her own.

After applying to dozens of schools, the 26-year-old was accepted by Geneva College in western New York. (When her application arrived, the administration asked the all-male student body to decide whether to admit her. Some students endorsed her admission because they believed it to be a practical joke.)

AP PHOTO

The U.S. Adopted Names Council assigns a generic name that

- contains a recognizable stem that groups it with other drug families that have the same therapeutic action. For example:



- is approved by the World Health Organization to ensure that it isn't too similar to generic names used elsewhere in the world.



Deadly Snafus

The U.S. Pharmacopeia, which sets standards in quality, purity, strength and consistency for all drugs sold in this country, found that 1,470 commonly used medications have been implicated in errors because of confusion over their names. The confusion can result between:

⚠️ **Generic names:** A 19-year-old nearly died when he took clozapine instead of olanzapine, which are both drugs for treating schizophrenia.

⚠️ **Brand and generic names:** Pain medication Toradol could be harmful if confused with tramadol, also an analgesic.

⚠️ **Brand names:** A 50-year-old woman had severe complications after taking Flomax (which treats enlarged prostate) instead of Volmax (for bronchospasm).

- Angeliq, a drug used to alleviate the effects of menopause, sounds feminine.



From a list of hundreds to thousands of potential names, marketing teams choose favorites.



Yet despite such care, some drug names end up being problematic (see "Deadly Snafus") and the FDA requires that they be changed.

SOURCES: WILLIAM TROMBETTA AND SUSAN PROULX

UPDATE //

Your Genes Have Been Scanned. Now What?

■ BY JENNIFER USCHER



When *Proto* published “Your Genome, Yourself” (Summer 2008), the trend of mail-order genetic tests—offered directly to consumers by such companies as 23andMe, Navigenics and deCODEme—was just emerging. Since then the hype has only grown; to celebrate dropping the price of its service from \$999 to \$399, 23andMe hosted a “spit party” (guests provided saliva samples for DNA testing) for New York glitterati during the city’s Fashion Week last September. What is also growing, on the part of some scientists and state regulators, is concern that such tests could prompt consumers to make poor health care choices—either by requesting unnecessary additional tests to investigate one of the risks their genetic tests have uncovered or by finding justification for not changing bad habits. Now several studies are examining how people respond to genomic testing and whether it inspires them to make positive lifestyle changes such as giving up cigarettes.

The Coriell Institute for Medical Research in Camden, N.J., plans to enroll 100,000 people in a long-term study (it has recruited 3,300 so far) on using DNA testing to manage and improve health care. Participants will be surveyed periodically about ways the tests have influenced their behavior: Have they found the information useful, opted for further testing or experienced anxiety?

Scripps Translational Science Institute, Navigenics, Microsoft and gene-chip maker Affymetrix are collaborating on another study that will periodically survey people who have received a genetic scan to examine the scans’ effects on their behavior, diet and psyche. In both this study and Coriell’s, participants will receive an analysis of their genetic risk for a variety of conditions that might be changed by lifestyle.

Meanwhile, researchers at the National Genome Research Institute are focusing on the more fundamental questions of whether healthy people even want to know their genetic risk for disease and whether they’ll seek additional information after receiving the results. For this study, 300 or so people were screened for genetic variants associated with eight common health conditions. They are being tracked to see whether they later seek more information by, for example, collecting a personal family health history. Before researchers can reveal the impact of genetic tests on behavior, says Colleen McBride, co-principal investigator of the study, “we have to find out whether people understand the tests. Can they appreciate that the tests are only part of the story? And do they seek out the fuller story?”

With little federal oversight of genetic testing, some state officials are continuing to take action. During the past year, the New York State Department of Health and the California Department of Public Health each sent letters informing online gene-testing companies that they are violating state laws. Both states require that tests be ordered by physicians and that the companies have valid permits. Most companies are working to achieve compliance (sometimes by proving that they employ physicians who review customer orders).

Yet skeptics contend that even using a physician as a filter is of little benefit. “It’s becoming easy to figure out risk,” says James Evans, a professor of genetics and medicine at the University of North Carolina at Chapel Hill. “What’s difficult is figuring out how to use those risks to improve health.” ■

ADVANCES //

Flexing Senior Muscles

GOOGLING MAY IMPROVE brain function, scientists at the University of California, Los Angeles, have found. In a study in which 24 healthy adults ages 55 to 76 performed Internet searches, those familiar with the Web showed increased brain activity in areas that control decision-making and complex reasoning, areas not stimulated when the subjects engaged in reading tasks. The brain activity registered two times higher in Web-savvy adults than in those with little Internet experience, suggesting that surfing the Net is a worthwhile exercise for aging minds. The study is to appear in a spring issue of *The American Journal of Geriatric Psychiatry*.

GENE THERAPY RESTORED SOME VISION

to blind mice afflicted with degeneration in the rods and cones, the light-detecting cells in the retina. Researchers at the Massachusetts General Hospital used a virus to deliver the gene that encodes melanopsin, a light-sensitive protein, to retinal ganglion cells, which relay light signals from the rods and cones to the brain. Within a month, 10% of the cells were producing melanopsin, enabling treated mice to differentiate between dark and light areas. Researchers think a similar

approach might someday partially reverse blindness in people with retinitis pigmentosa and macular degeneration. pnas.org/content/105/41/16009.abstract

CHOCOLATE MILKSHAKES are less pleasurable to individuals with fewer dopamine receptors than is the norm, according to an Oregon Research Institute study. Pleasure from eating comes from the release of dopamine, the body's feel-good hormone; when it is decreased, some people may eat more to feel satisfied. After tracking the body mass indexes of adolescent girls and college-age women for a year, the Oregon researchers found that those with less activation in the dorsal striatum—where dopamine is interpreted and the gratifying sensations are processed—were more prone to weight gain. sciencemag.org; search for "chocolate milkshake"

THE BEE GEES' "Stayin' Alive" helps people correctly perform CPR and remember the technique five weeks later, say researchers at the University of Illinois College of Medicine at Peoria. The study of 10 doctors and five medical students was presented at a recent conference of the American

College of Emergency Physicians. Use of the song as a timekeeping benchmark for CPR is nothing new (Alson Inaba, a pediatric emergency medicine specialist at the University of Hawaii, first made the claim in 2005). But the study provides the initial evidence that the 1970s pop hit—with its throbbing 100 beats per minute, an almost perfect pace for performing chest compressions—aided recall of the emergency procedure.

AGE-RELATED FRAILITY might be reduced by a pill, researchers at the University of Virginia Health System have found. In a two-year study of 65 people ages 60 to 81, muscle mass (a correlate of strength) in the arms and legs of those who took a daily dose of the drug MK-677 increased by 20%, with no serious side effects. By mimicking ghrelin—a peptide that stimulates receptors for the growth hormone secretagogue—MK-677 boosted growth hormone and growth factor 1 to levels usually found in healthy young adults, which in turn combated muscle mass loss associated with aging. Further study into the drug's efficacy and long-term safety are next. annals.org/cgi/content/full/149/9/601 ■

THE CUTTING EDGE //

Accordions for Heart Repair

When the heart beats, all of the muscle's cells contract in unison in one smooth movement. Re-creating such synchronized motion in a petri dish (both for research and therapeutic purposes) poses a particular challenge, one that a research team from the Harvard-MIT Division of Health Sciences and Technology and the Draper Laboratory in Massachusetts met by taking inspiration from the humble accordion.

The researchers first tried tissue scaffolding (an ultrathin, biodegradable grid) with square- and rectangular-shaped pores, into which they seeded the heart cells from a newborn rat. Both pore shapes disappointed: Cells in the square pores didn't grow in one direction as natural heart tissue does, whereas cells in the rectangular pores, despite aligning properly, were too stiff to move like normal heart tissue. The researchers then tried a design they named accordionlike honeycomb scaffolding, which combined the cell alignment of the rectangular design with the vertical and horizontal stiffness required to beat strongly and consistently. The cell-seeded scaffold mimicked natural heart tissue when electrical current was applied. The researchers don't yet know why the accordion shape fosters more natural alignment than others.

Initially the team plans to use the scaffolding to grow artificial heart tissue with which to test new heart drugs. But damaged hearts are the real target of this technology; scaffolding impregnated with stem cells (which are able to proliferate, unlike adult heart cells) could be shaped into patches and, thanks to its flexibility and ability to disintegrate over time, placed on the heart's surface, leaving the new, healthy cells to repopulate the damaged area. ■

