stat

COMING //

- **NOVEMBER 6–8:** Cancer Stories, a three-day symposium in Indianapolis, examines the idea that an individual's experience of the disease is influenced by the stories told about it. The event includes a presentation on the portrayal of cancer in comic books and a workshop on writing about illness.

- **JANUARY 1:** The Centers for Medicare and Medicaid Services will launch a yearlong pilot program for Medicare beneficiaries in Arizona and Utah to investigate whether personal health records spur patients to pay closer attention to their health and thus better manage their conditions.

MARK J. BARRETT

FOCUS // **CENTURIES OF HUMAN BREEDING** created this dappled steed's striking look , but its beauty comes at a cost. Research by Swedish geneticists on eight breeds of horses (including Icelandic and Arabian) has shown that the mutation in a gene group that causes horses to become gray, and eventually white, also leaves them vulnerable to melanoma, which may lead to premature death. Because humans and horses share this gene group, Australian scientists looked into whether common variants in the group cause susceptibility to melanoma in humans and found no risk.

08

INTERVIEW //

Dr. Exotica

■ BY BRUCE SCHOENFELD

Whereas most general practitioners find it challenging enough to treat the wide range of maladies they regularly encounter, Carlos Franco-Paredes has made a specialty of diagnosing diseases that few other physicians in North America have ever seen. A co-director of Emory University's TravelWell clinic in Atlanta, Franco-Paredes treats recent immigrants and other travelers with unusual symptoms who arrive at his office from far-flung places. Commonly called a refugee doctor, one of several hundred in the United States registered with the American Society of Tropical Medicine and Hygiene, he plies his trade at the intersection of cutting-edge medical advancement and the communications revolution.

LIVIA CORONA FOR *PROTO*

Q: What's the most important diagnostic tool you use?

A: The Internet. We rely on it heavily, probably more than other specialists do. Online, we access recent medical journals from all over the world, including *PLoS Neglected Tropical Diseases* and the *Journal of Infectious Diseases in Developing Countries*. They have really good articles written by people on the local level. But beyond that, we use the Internet to keep up on what's happening in various cultures. I read international newspapers and the Websites of the U.S. State Department and refugee organizations.

Q: Why is the cultural aspect so important?

A: Well, for example, I'm going to see someone tomorrow from southern Sudan, a gentleman of about 45. He came to me with complaints of abdominal and back pain. Now, we know that the Sudanese in particular have a high rate of parasitic infection—strongyloidiasis and schistosomiasis. Exposure to parasites through contaminated water and soil has been very common in their region, especially since the start of the civil war. But in the Sudanese man's case, we did the tests and everything came out negative. Then one day we were talking, and I learned that he has horrible nightmares about warriors piercing him with spears. It turned out that what he really

was experiencing was post-traumatic stress disorder.

Q: You started in this practice five years ago. How has the field evolved since?
A: Back then, a lot of attention was paid to HIV/AIDS and malaria, both major global health problems. These days there's a lot more interest in some of the so-called diseases of poverty—such as Buruli ulcer, leprosy, African trypanosomiasis and Chagas disease—that impede individuals and populations from reaching their full economic and social potential. These conditions are not necessarily associated with a high mortality rate but with disabilities. The notion is that there's likely to be a significant and rapid return in terms of preventing those disabilities if you invest in controlling the diseases now.

Q: How can you communicate with people who speak so many different languages?
A: We work through interpreters when necessary. But I've found that it's important to pose the questions correctly, especially if an interpreter is involved. You can lose the nuance that might mean the difference between treating someone successfully and not. Many Africans are lactose-intolerant, but if you ask them in their language, "Do you like milk?" the answer is often yes. I've learned to ask instead, "Does your stomach like milk?" and to that they'll often say no.

Q: What's the strangest disease you've come across?
A: Echinococcus disease, which comes from Iraq and parts of South America and Southeast Asia. It's carried by dogs. The result is large cysts or water-filled tumors in the abdomen, liver and lungs.

Q: Do we need to worry about refugees and other travelers bringing unusual diseases like that to America?
A: The risk is very small. Most tropical infections that we deal with in immigrants and refugees from exotic places are generally not transmissible. Among those that could be transmissible—such as SARS, avian influenza or viral hemorrhagic fevers—most are introduced into the United States not only by refugees or immigrants but by all other kinds of travelers. Also, diseases such as tuberculosis and leprosy, frequently found among immigrants and refugees, are already here in the United States. ■

Tending to recent immigrants and other travelers, Franco-Paredes diagnoses diseases that few other physicians in North America have ever seen.

BY THE NUMBERS //

Dirty Laundry

42 Length, in feet, of a state-of-the-art tunnel washer, the type used in commercial laundries, to clean hospital linens

5,200 Pounds of laundry per hour handled by such washers

1 In a *Modern Healthcare* survey, rank held by laundry for being the most frequently outsourced hospital service

27,200 Pounds laundered per day for the Massachusetts General Hospital, a 900-bed facility, in 2007

82 Percent of MGH laundry that is patient linen (the remainder: scrubs and linen used during operations)

1910.1030 (d)(4)(iii)(A)(2)(i) Occupational Health and Safety Standard stating that laundries must make available containers for the safe disposal of "sharps" (such as hypodermic needles and surgeons' tools) found in dirty linens

160 Lowest water temperature, in degrees Fahrenheit, recommended by the Centers for Disease Control and Prevention for disinfecting hospital laundry

301 BTUs of energy consumed during one drying cycle—the amount of energy it takes to run a 75-watt lightbulb for just over an hour

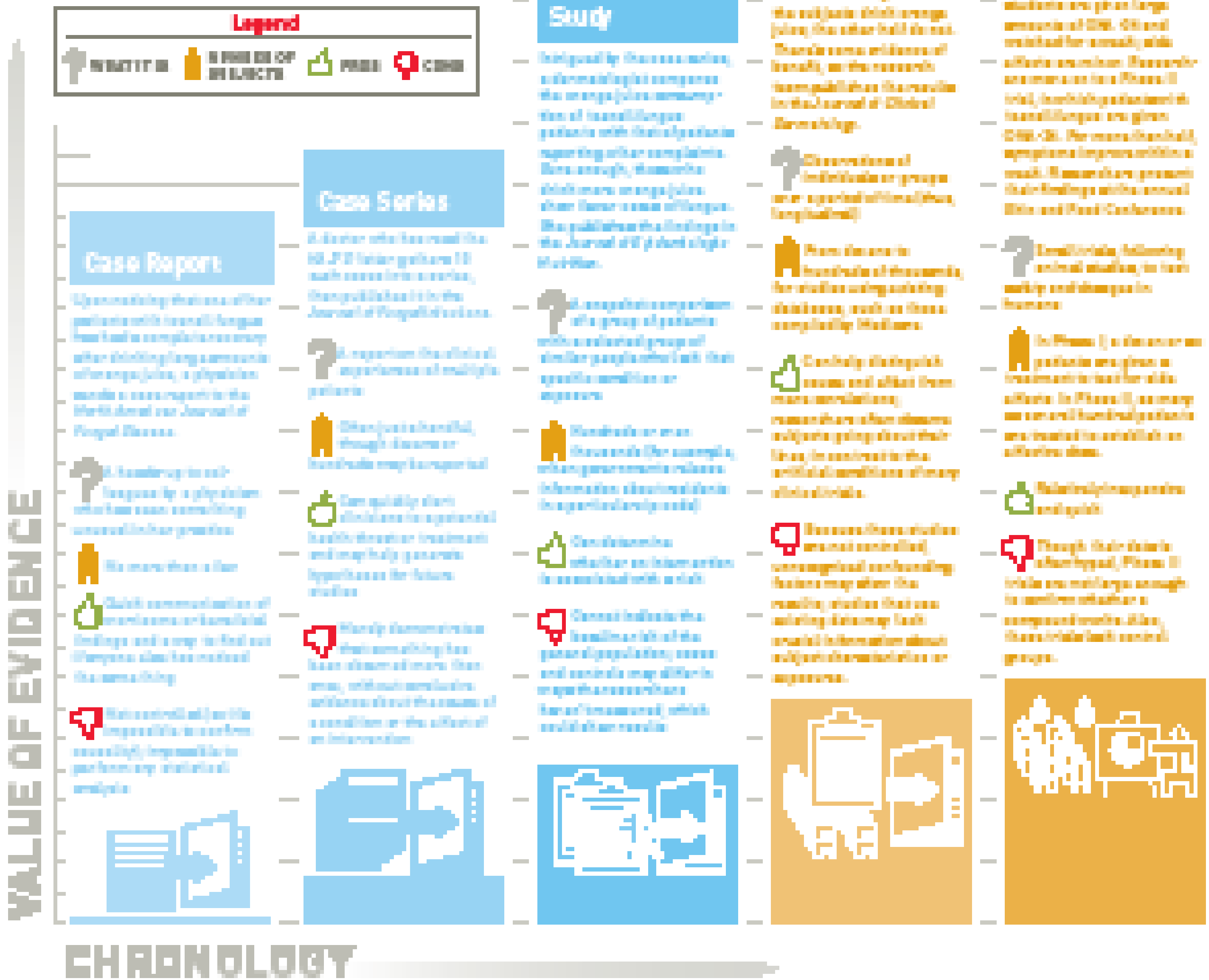
6330856 U.S. patent number of a scrubs vending machine installed in hundreds of hospitals to reduce replacement and laundering costs by limiting access to scrubs and forcing authorized users to exchange soiled items to get a clean set ■

INFOGRAPHIC //

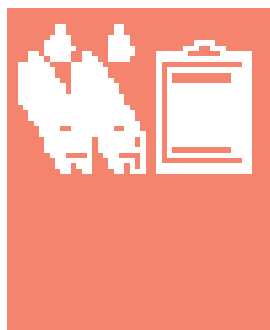
Body of Evidence

BY IVAN ORANSKY AND ANDREW HOLTZ // INFOGRAPHIC BY FLYING CHILLI

When a headline shouts "New Study Shows...," many readers accept the story that follows as fact and expect the latest medical finding to translate quickly into treatment. But the reality is that the quality of studies' evidence can vary widely, and the journey from discovery to clinical application is a long, hard slog. Here, in a hypothetical example, we describe how research progresses through the medical literature—and how evidence stacks up along the way.

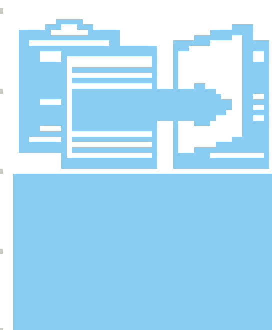


Randomized Controlled Clinical Trial

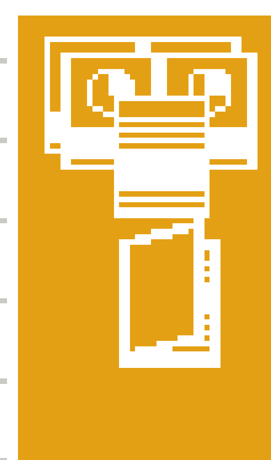


Editorial

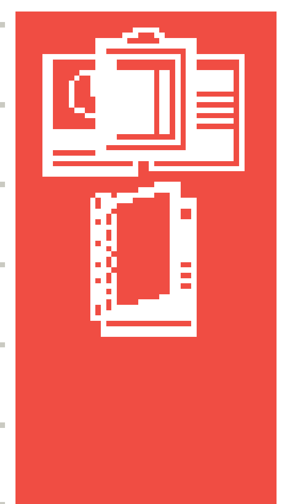
Review Article



Meta-Analysis



Evidence-Based Review



POLICY WATCH //

Of Labels and Liability

BY DEBORAH ABBEY KELLY

On April 7, 2000, guitarist Diana Levine sought relief from a severe migraine in a Plainfield, Vt., emergency room. Levine was given an IV push injection of Wyeth's antinausea drug, Phenergan. But the needle was placed in an artery instead of a vein, causing gangrene that eventually led to the amputation of her right forearm, according to documents filed by both sides in *Wyeth vs. Diana Levine*, a legal dispute that has worked its way up to the U.S. Supreme Court. Scheduled to hear the case in early November, the court will determine, according to Wyeth's petition, "whether the prescription drug labeling judgments imposed on manufacturers by the Food and Drug Administration... preempt state law product liability claims."

At the original trial, Levine's lawyers argued that the drug's label should have more forcefully warned of the heightened risk of IV push administration—even though the risk of gangrene from inadvertent arterial injection was mentioned in multiple sections of Phenergan's FDA-approved packaging.

The Vermont jury sided with Levine, as did the Vermont Supreme Court, noting that FDA label approval is merely a "first step" that sets minimum safety standards. The court added that unilateral changes to drug labels are permitted under another FDA regulation "whenever the manufacturer believes it will make the product safer." Wyeth then petitioned the U.S. Supreme Court to hear its appeal.

Critics charge that a Wyeth victory would hand the industry near-blanket immunity from responsibility. "It would bar all cases related to drug defects and the manufacturer's failure to warn," says Christopher A. Seeger, co-lead counsel in the Vioxx litigation that obtained a $4.85 billion settlement for patients who suffered heart attacks and strokes after taking the Merck arthritis drug.

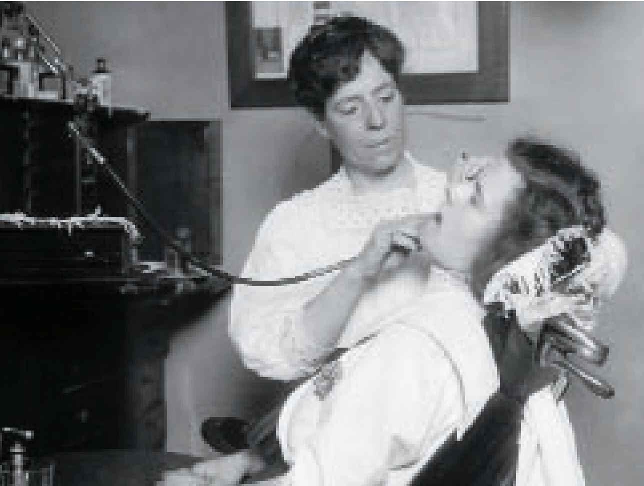
Proponents of preemption, including President Bush and the FDA, counter that Congress gives the FDA the authority to regulate safety standards and drug labels. Its decisions shouldn't be second-guessed by juries with limited scientific expertise. "The public health is not served if tort litigation has the unintended consequence of decreasing or eliminating access to a beneficial product," explained Randall Lutter, the FDA's deputy commissioner for policy, in a statement made during a congressional hearing held on May 14 by the House Committee on Oversight and Government Reform.

Then–U.S. Solicitor General Paul D. Clement said in an amicus curiae brief that the FDA must carefully balance safety and efficacy. Painstaking consideration is given to choosing which warnings to include, "in part because overwarning can do more harm than good." According to Lutter's statement, "overwarning can cause patients not to use beneficial medical products and doctors not to prescribe them."

In a recent preemption case involving a medical device, *Riegel vs. Medtronic, Inc.*, the Supreme Court ruled in favor of the manufacturer, meaning such companies can no longer be sued except in extremely rare cases. Even so, opponents of preemption are optimistic that patients will prevail in the *Wyeth* decision. The medical device case rests on specific language that expressly preempts certain state actions.

Rep. Henry A. Waxman, the California Democrat who chairs the oversight committee, says, "It appears the FDA is doing the bidding of the pharmaceutical and medical device industry at the expense of injured patients." For decades, the FDA held that state liability cases helped the agency regulate drugs and medical devices by providing further information about their dangerous side effects. "But under the Bush Administration, [the] FDA has reversed course," said Waxman at the May 14 hearing. Without the threat of liability, he noted, one of the most powerful incentives for safety would vanish. ■

CHRIS RUBINO



MILESTONES //

Drilling for a Century

When plagued with a tooth worm (as toothaches were called until the Middle Ages), one could do as the Romans did and attempt to fumigate the supposed maggot with henbane. One could pray to Apollonia, patron saint of dentistry, martyred in 248 when her jaws were broken and her teeth knocked out before she was burned to death. Or one could submit to the more certain solace of the dental drill.

The unprecedented level of dental care we now enjoy dates back 100 years to 1908, when most dental offices had electricity and plug-in electric drills finally became available. This turning point in dental technology had been, to say the least, a long time coming.

Remains found by archaeologists in Pakistan feature two molars punctured with perfect, tiny holes, suggesting that dental decay may have been treated as early as 9,000 years ago. In 1516, Giovanni da Vigo, a surgeon and dentist to Pope Julius II, mentioned using a drill to treat putrefied teeth. By 1728, Pierre Fauchard, father of modern dentistry, was using a bow drill, an unwieldy jeweler's device operated by hand crank. And a significant breakthrough was Amos Westcott's ring drill, designed in 1846. By attaching the drill to the index finger, the shaft could twirl between thumb and forefinger, allowing dentists for the first time to hold their drills with one hand.

But it was James Beall Morrison's invention of the foot-powered drill, in 1871, that truly transformed the practice of dentistry. Most early drills were slow, cumbersome devices. Morrison's, which reached a then-impressive 700 rpm, was driven by a belt controlled with a foot treadle (an innovation allegedly cribbed from the Singer sewing machine). Three years later, George F. Green introduced electricity to the device. Green's electromagnetic-motor-powered drill was effective, but it was heavy and too expensive for most practices.

Forty-five years after the introduction of the plug-in drill, the modern air-turbine-engine dental drill was developed in 1953, increasing rpms to 50,000. Current drills can reach speeds of 800,000 rpm, but even the fastest are now looking a bit old-fashioned. Since 1991, lasers such as Millennium Dental Technologies' six-watt PerioLase have been used to vaporize cavities with virtually no pain. Now Israeli company Tactile Technologies has developed a robotic dental drill to assist dentists in inserting implants. The company's Website states, "Recent technological advances in composite materials, three-dimensional radiographic imaging and miniaturized robotic control are now changing the dental landscape." Take that, tooth worms. ■

THE CUTTING EDGE //

Constant Kidney Care

People with kidney failure have two treatment options: Visit an outpatient dialysis facility for three or four hours, three days a week, or receive home treatment several times a day. Yet for all the time dialysis takes and the inconvenience it poses, it can't strip waste from the blood constantly, as a real kidney does. Between treatments, dialysis patients can feel fatigued or even die (the highest mortality rates for dialysis patients occur on Mondays, after forgoing weekend treatment).

Researchers from UCLA and the Veterans Affairs Greater Los Angeles Healthcare System are developing a device that would not only free patients from regular dialysis appointments and cupboards full of dialysis supplies but also run 24/7. The automated wearable artificial kidney (AWAK) is a six-pound vest that bears two pouches, one for hardware—a battery, sterilizing filter, pump, valves and tubing—and the other for a cartridge that filters dialysis fluid. The fluid circulates from the body through a catheter to the cartridge, where wastes are removed and a solution containing glucose and electrolytes is added, and the filtered fluid is then pumped back into the body for a repeat cycle. The AWAK performs at least four cycles per hour, and patients replace the cartridge every eight hours.

If clinical trials show benefit and the FDA approves the AWAK, researchers anticipate a market launch in 2011, offering patients true mobility. ■

FROM TOP: BROWN BROTHERS; COURTESY AWAK TECHNOLOGIES PTE LTD, SINGAPORE