Every so often, airport screening personnel around the world have been greeted by a strange sight: A tall, red-haired Englishman carrying a clear plastic box with thin tubes and pulleys nestled inside.

“Yes, I have had some interesting experiences with that,” said Jason Launders, explaining his invention as he sat in a windowless lab in Plymouth Meeting. “Try to explain it to a bunch of Germans.”

The scientist created the motorized contraption, which the ECRI Institute uses to test the accuracy of high-tech CT scanners around the world by imitating the function of the human heart.

“You can slow it down to ‘dead patient’ and speed it up to ‘anxious patient,’” said Launders, director of operations for the health devices group at ECRI, which is essentially the medical technology world’s answer to Consumer Reports.

Launders and others at the 47-year-old nonprofit institute are engaged in an endless struggle to keep up with rapidly evolving technologies. These range from 3D-printed cranial implants and hospital disinfection robots to body probes that must be sterilized to protect against increasingly stubborn superbugs.

ECRI’s work includes:
- Evaluating medical devices and technologies for efficiency, safety, ease of use, and price.
- Investigating medical facility accidents.
- Compiling the annual “Top 10 Technology Hazards,” and other information for the public.

“They provide syntheses on a larger scale than any institution I know of,” said Craig A. Umscheid, director of the Penn Medicine Center for Evidence-Based Practice.

And as Medicare and other payers put greater emphasis on evidence-based medicine, ECRI’s influence is likely to grow, Umscheid said.

ECRI’s work is supported by some 5,000 hospitals and medical groups, including more than 300 overseas. ECRI has offices in Britain, Malaysia, and Dubai as well as Plymouth Meeting.

Input from members plays a large role in what ECRI decides to test, said James P. Keller Jr., until recently the group’s vice president for health technology and safety. “We have a good handle on what hospitals are buying and what they’re interested in buying,” he said.

After serious accidents, many hospitals call on ECRI for answers. In recent years, investigations have ranged from severe burns on a newborn in a Minneapolis hospital whose bassinet mysteriously caught fire to a hospital in the Western U.S. plagued by antibiotic-resistant infections in patients treated with endoscopes.

More routinely, ECRI researchers look for ways to make health-care equipment more user friendly and safer for patients. It cannot require implementing its findings. But from combating “alarm fatigue” that can keep harried nurses from sorting out the most critical problems shown on bedside monitors to reducing medica-
tion errors caused by infusion pumps, ECRI’s published evaluations are so influential its recommendations frequently are adopted.

In the late 1980s, accidents due to infusion pumps were far more frequent than they are today, said project officer Brad Bonnette. “It was just a cost of doing business,” he said.

ECRI gradually lowered the ratings of pumps lacking a key safety capacity, and by 2002, Keller said, only four of 25 models on the market lacked the feature. “We believe we moved the needle on that,” he said.

The Emergency Care Research Institute was founded in 1968 by Joel J. Nobel, a neurosurgeon shaken by the death of a 4-year-old boy in his arms after a defibrillator failed to work.

Three years earlier, as a resident at Pennsylvania Hospital, Nobel had developed the MAX Cart, a mobile resuscitation system that carried both medical equipment and the patient.

The institute’s first evaluation—of manually operated resuscitators—found only half of the 18 available brands were effective.

In the early 1970s, the group shortened its name to ECRI and broadened its work beyond emergency care. It now has almost 450 employees on a 12-acre research campus.

Few have been around as long as Mark Bruley, vice president of accident and forensic investigation. Since 1975, Bruley, a biomedical engineer, has been hired by hospitals to look into issues such as unexplained deaths and contamination.

Just in the last two years, ECRI has evaluated premium CT scan systems, surgical video systems, syringe pumps, motorized stretchers, electrosurgical units, specialized large-volume infusion pumps, surgical robots, and continuous low-acuity patient monitoring devices.

Frequently, improving medical devices is a matter of reducing the ways in which users can make mistakes. Keller estimates 75 percent of accidents ECRI investigates “involve human factors one way or another.”

In fact, starting next year, the FDA will require device manufacturers to test for human interaction—how the devices perform in actual use—as well as for mechanical soundness.

But as he sat at his desk fingering a yellowed newspaper clip, Bruley talked about a case in which a device was clearly at fault.

In January 2008, an 11-hour-old baby at a Minneapolis hospital was burned in his bassinet when it caught fire. The child survived because two nurses were there to examine him.

Bruley arrived days later and quickly suspected a quartz heater suspended above the bassinet had ignited it due to the presence of oxygen.

Bruley did some sleuthing and determined the crib heater had been the subject of a 1994 recall yet remained on the market. He found five instances in the FDA database in which bassinets connected to the devices showed burn spots on the mattresses, but no fires had broken out.

In 2009, ECRI proposed a worldwide recall, urging the heaters should be destroyed.

When he learned the devices were still being offered for sale on eBay, Bruley wrote the online auction site and asked it to take down the items. He noticed the offerings stopped.

“As a biomedical engineer,” he said, “to have an immediate effect on patient safety is certainly satisfying.”

ECRI next intends to focus on health devices used mainly by consumers, such as home blood-pressure monitors, Keller said. With Medicare, Medicaid, and other payers trying to reduce the length of hospital stays and, particularly, readmissions, it is becoming ever more important to keep tabs on patients at home, he noted.

So he expects it’s just a matter of time until ECRI is asked to get into home devices.

“The hospital has an incentive to keep people out,” Keller said. “It all comes down to the bottom line.”

As for Launder and his traveling CT-scan tester, he has a more immediate goal: Build a better box.

CT scans are now able to determine not just that plaque is clogging a patient’s arteries but what type of plaque. And the old box can’t detect that.

“As technology progresses,” he said, “the testing devices are left in the dust.”

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