



OAKLAND, Calif.--Robotics are already helping doctors perform surgery, but special robotic limbs could someday soon be assisting those who can't walk or those who can't lift. At a demonstration day put on Thursday by Kaiser Permanente, the health care giant gathered about 100 physicians and health care professionals to check out, and give feedback on, future technologies being evaluated for rollout.

Kaiser Permanente, a private nonprofit organization, held the event at its [Garfield Health Care Innovation Center](#) in Oakland, Calif. Questions to the organizers and administrators about the financial aspects of the new technologies on display were met with on-message replies along the lines of, "We don't have to worry about shareholders. It's about improving health care for the patient." Or, as Kaiser's executive director, Jack Cochran, said, "Science has to be ahead of the sale."

It's also, clearly, about improving efficiency, not just in terms of money but information processing, and the busywork and overhead that currently dogs health care. Before the few journalists at the event got a look at the cool robotic technologies at the center, we were toured through a dummy hospital floor in which an autonomous courier bot was delivering pretend drugs and supplies. The carefully designed hospital rooms featured new modular headboard systems that had the various power and gas and data ports arranged in a new, clear way, alongside the bed instead of directly above the patient's head, as is now often the case.

The demo room we saw also had a prototype of a wireless patient-monitoring system. It used Doppler radar to measure respiration, instead of requiring the patient be wired up and connected to a recording device. Kaiser is also testing a simple fall sensor that could be clipped to patient

clothing; falls are one of the leading preventable events for patients.

But the real attraction at the demo day was the robotic limb exhibits. First up, [Berkeley Bionics' eLegs](#) system, a motor-driven exoskeleton that gives mobility to those without use of their real legs. We saw test-driver Ted Kilroy, a young man who became a paraplegic in a motorcycle racing accident, walk across the room while strapped into this device. The eLegs system uses attached walking canes as input devices. It reads the intent of the operator by the position of the canes: whether they are resting on the floor, which way they're tilted, and so on.

Company VP John Fogelin is projecting that the eLegs system will be available for home use in 2013. Currently it's in testing only, and after that he says it'll be used as a rehabilitation aid. He thinks a set of eLegs will cost about \$100,000, and is of course hoping that Kaiser and insurance carriers will find a way to underwrite the purchase of the devices.

Berkeley Bionics also makes the hydraulically powered [HULC exoskeleton](#) for the military. It's a very different system, designed to augment the strength and speed of able-bodied people.

Canadian company [Kinova](#) was at the Garfield Center as well, showing the Jaco robotic arm. CEO Charles Deguire said Jaco could be attached to a wheelchair and controlled by the same joystick or other input device (like a chin controller, for quadriplegics). Like the eLegs system, the Jaco can help people do what they might not otherwise be able to -- in this case, feed themselves, or pick up a book, or open a door. But the technology is simpler than leg replacement, and the system is already in use in some Scandinavian countries. The Jaco is not yet approved for insurance reimbursement in the U.S.

I drove the Jaco arm and found it easy and intuitive. The team has done a good job in making a single three-axis joystick (side-to-side, back-and-forth, and twist) a simple input device for navigating a hand in three dimensions.

Finally, [SRI International](#) was demonstrating [telepresence robotics](#) for surgery. The demo at the Garfield Center was not of new technology; the U.S. military has been evaluating the same hardware we saw at the center; and the SRI spinoff [da Vinci Surgery](#) has been selling similar systems for prostate cancer surgery. Kaiser is evaluating the system for more general surgery. In addition to making it possible for remote specialists to beam in to operating rooms as needed, the tele-surgery setup can help doctors do fine manipulations by "tiny-izing" their movements. Laparoscopic surgery can also get more effective and precise when surgeons are controlling

[Medical robotics come to Kaiser \(photos\)](#)



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precise actuators inside a patient's body, instead of, essentially the knives on long sticks that they're using now.

I also had a chance to take control of this system from its hooded, stereoscopic glasses. Slipping my hands into the controls, I was able not just to see my remote pincher hands working on the fake skin across the room from me, but to feel the small demo objects that I grasped and the tautness of the suture I held. Surgeons do have to be trained to use this technology, but as SRI director Thomas Low said to me, "They're already surgeons. This is just a new tool."

Expect the prosthetic robotics to start showing up as options for the disabled in the U.S. within a few years. Telepresence for surgery is already in limited use here.

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Rafe Needleman writes about start-ups, new technologies, and Web 2.0 products, as editor of CNET's Webware.

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