

Biomedics Speak Out on Common Design Flaws

Biomedical equipment technicians and clinical engineers are on the front lines of making technology work in today's healthcare environment. They help users who encounter problems with devices, fix what gets broken, and investigate the accidents when something terrible goes wrong. In this article, biomedics—uniquely situated to flag design flaws that lead to problems—speak out on issues they've seen.

The equipment doesn't seem to be designed for the users but more for what parameters and gadgets it can offer. The manufacturers really need to get more front-line staff in their research and development labs working through the best way to design equipment for use at the bedside. They need fewer buttons to push. The numbers or characters on the displays need to be bigger and easier to read for us 40-somethings.

—**Vicki Snyder**, manager of biomedical engineering at Fairview University of Minnesota Medical Center



I've seen issues with electronic connections that look like they should fit on the same make and model of equipment, but don't—especially on a life support medical device. Manufacturers, if you make a change in the specifications or voltage output to a medical device, then please, use a connector that is completely different.

—**Troy Gillette**, director, clinical engineering and patient equipment logistics at Robert Wood Johnson University Hospital



We were recently discussing the increase in home medical equipment usage in class. I was a bit facetious when I told the class, if it was me, I would design a black box with a big green button that says "Start," and a big red one that says "Stop." I would include a speaker for an audible alarm that screamed "Call 911" for life support units.

Another hazard to consider in the home environment is interconnecting issues. After all, if a professional can mistakenly hook up a feeding pump to an intravenous line, what might happen at home?

—**Steve Bezanson**, biomedical technology instructor, Dakota County Technical College



The flow of information regarding equipment design (good or bad) from clinicians and biomedics to manufacturers is critical to improving the effectiveness of medical equipment.

—**Ken Maddock**, vice president of clinical engineering and telecomm services for Baylor Health Care System



I have noticed undue wear and tear as a result of moving devices. On a ventilator, for example, there may not be a handle located on the machine in such a manner as to make it intuitive and obvious for a user to grasp the machine when moving it while mounted on a cart. As a result, users may grasp the machine's LCD display to move it. This puts stress on the touchscreen, cables, and mounting hardware which will eventually lead to failures.

On some infusion pumps, it is possible for a user to touch and activate buttons which control the infusion rates when moving the device and inadvertently change a setting, potentially resulting in a patient injury.

Awareness of these issues is a factor in performing service and maintenance on equipment. We look specifically for wear and tear on touchscreens and cables related to improper handling of equipment while it is being transported. We have added additional strain relief devices to cabling on equipment that is subject to mishandling and failure, for example, on the data cables used to connect ultrasound and C-arms to the PACS (picture archiving and communication system) network jacks.

—**John M. Wolken**, CBET, Children's Hospital and Medical Center, Omaha, NE



One of the issues I've seen with equipment having rechargeable batteries (such as feeding pumps, vital signs monitors, and intravenous infusion pumps) is a failure to keep the equipment plugged in to keep the batteries charged.

—**Sarah Jacks**, CBET, senior BMET, St. John's Regional Medical Center

