



Intuitive Grasp: Catheter Connections Uses Industrial Design to Differentiate DualCap™

By Michael O'Malley of USTAR

Don Solomon is a self-described “lousy patient.”

While recovering from recent knee replacement surgery, he watched from his hospital bed as a nurse began to change his intravenous (IV) bag. “One, she didn’t wash her hands when she came in the room. Two, she didn’t swab the needleless injection site (NIS) with alcohol. Three, the IV line male luer connection bumped against the bed and the IV pole, picking up more germs. I said, ‘Hold it right there.’”

Solomon is president and chief operations officer of Catheter Connections Inc., and he is acutely aware of the conditions and missteps that can lead to costly and potentially deadly hospital infections. Headquartered in Salt Lake City, UT, Catheter Connections was incorporated in February 2008 to develop and commercialize vascular access infection control products designed to protect patients from acquiring infections during periods of infusion therapy.

The product Catheter Connections has developed, DualCap™, is engineered to help reduce intraluminal catheter-related infections, which account for nearly 65-75 percent of catheter related blood stream infections (CRSBIs) found in the hospital.

“There are nearly 500,000 cases of these CRSBI-caused infections a year in the U.S., and the morbidity of these infections is very high, in the range of 12-25 percent,” Solomon said. “It’s really one of the largest issues facing the medical community today.”

The firm has focused on the issue, including funding a recent study at a large mid-western Hospital. He cites research that indicates 31 percent of nurses do not swab NIS connectors when reconnecting IV lines to catheters. Those that do perform swabs rarely spend the 30 seconds recommended, thus reducing the alcohol’s effectiveness. These disconnected male luer and NIS connectors pick up unwanted bacterial “hitchhikers.”

“You have a very real potential of injecting a bolus of bacteria from the contaminated male luer into the line you’re about to hook back into the patient,” Solomon said.

Based on an idea that two infusion nurses came up with, Catheter Connections’ DualCap product seeks to greatly simplify the process and eliminate the human factor. “We’ve learned over the course of 30 years in the medical device business to respect nurses. We want to give them something that presents no barrier to use, a product that really is a

simple, self-contained, intuitive protocol. The product gives the nurse the same experience, each and every time a DualCap is used. We even trademarked the phrase “The product is the protocol.”

In April 2010, the U.S. Food and Drug Administration (FDA) granted the company 510(k) clearance to market DualCap. The device nests two disinfecting caps together, ensuring that both IV access points, the needleless injection site and the male luer at the end of the IV tubing, are automatically disinfected as the unit is twisted into place. “DualCap™ kills bacteria at the connecting point and protects from other bacteria entering the system,” Solomon said.

The internal engineering, which is patented, is one aspect of the product, Solomon said. The external look and feel is equally important. To solve the external aspect of product design, Catheter Connections worked with Salt Lake City-based Espiritu Design, an industrial design firm.

“We called Theodore Espiritu into the design process very early,” Solomon said. “Theodore and his team bring a different perspective than the engineers on our staff. We invited Espiritu Design to a series of meetings, and we all spent a lot of time analyzing feedback from nurses as we developed different iterations. We gave Theodore some tough requirements.”

The end result is a device that is pleasant to touch and hold, and has a color scheme that assists in the user’s quick understanding of how to use it properly. Additionally, user feedback characterizes the color scheme as “sterile,” “clean,” and “professional.”

“We spent a long time on colors,” Espiritu said. “Different colors mean different things in the clinical environment, and we wanted to avoid colors that would point users in the wrong direction.”

The contours of the device were also the result of considerable effort. In several design concepts, Espiritu sought an “organic look” for the product. “We made sure there were no hard points, or pinch points that would come near the patient.”

All told, the color scheme and other design aspects allow nurse supervisors to quickly and visually perform a quality check. “A nurse supervisor can’t see if an alcohol swab has been performed by hand on a standard catheter unit. With our product, the supervisor can see from across the room that the unit is in use properly.”

The distinctive color and shape also alerts the nurse quality managers to the fact that the connectors are disinfected and protected. There is no question as to whether the connectors have been disinfected properly – or at all, Solomon said.

The device is in the final phases of design control and will be on the market early 2011. “You look at the DualCap device, and you want to give it a twist,” Solomon said. “It’s very easy for the nurse to use, even without instruction. They get it. And the clear portion allows them to see inside and confirm for themselves the pieces are aligned correctly.”

Espiritu's firm has worked on other medical devices prior to working with Catheter Connections.

"I look at design the same way a film director looks at special effects," said Espiritu. "In a movie, effects should enhance the experience, not detract from the moment. When designing the product for Catheter Connections, the goal was to enhance the user-experience, not design for the sake of design. It doesn't matter if a product is attractive if it is not functional. Ideally, it is better to infuse both aspects."

Catheter Connections is a University of Utah start-up company and has offices at the new Accelerator business incubator in Research Park. USTAR has provided funding to launch the Accelerator. Over the last year, USTAR has assisted Catheter Connections with several business development projects.

For more information, visit: www.catheterconnections.com and www.espiritudesign.com.

About USTAR:

The Utah Science Technology and Research initiative (USTAR) is a long-term, state-funded investment to strengthen Utah's "knowledge economy" and generate high-paying jobs. Funded in March 2006 by the State Legislature, USTAR is based on three program areas. The first area involves funding for strategic investments at the University of Utah and Utah State University to recruit world-class researchers. The second area is to build state-of-the-art interdisciplinary facilities at these institutions for the innovation teams. The third program area involves teams that work with companies and entrepreneurs across the State to promote science, innovation, and commercialization activities. For more information, go to www.innovationutah.com or follow <http://twitter.com/Innovationutah>.

Dec. 3, 2010