

MEDICAL BREAKTHROUGHS **RESEARCH SUMMARY**

TOPIC: COATED CATHETER DECREASES INFECTIONS AND CLOTS
REPORT: MB #4793

CATHETERS: A catheter is a thin, flexible tube that puts fluids into your body or takes them out. If you have trouble urinating or can't control when you urinate, a urinary catheter that goes into your bladder can get rid of urine for you. If you need blood or medicine, your doctor might use an intravenous catheter that's connected to one of your veins with a needle. There are many polymers that are used for the construction of catheters, including silicone rubber, nylon, polyurethane, polyethylene terephthalate (PET), latex, and thermoplastic elastomers. Silicone is a common implantable choice because it is inert and unreactive to body fluids and a range of medical fluids with which it might come into contact. On the other hand, silicone is weak mechanically, and several serious fractures have occurred in catheters. Polyimides are used to manufacture vascular catheters for insertion into small vessels in the neck, head, and brain. There are many different types of catheters for bladder problems. An intermittent catheter is made from polyurethane and comes in different lengths and sizes for men, women and children. The most advanced catheters have a thin hydrophilic surface coating. When immersed in water this coating swells to a smooth, slippery film making the catheter safer and more comfortable to insert. Some catheters are packed in a sterile saline solution.

(Sources: <https://www.webmd.com/urinary-incontinence-oab/catheter-types>,
<https://en.wikipedia.org/wiki/Catheter>)

CATHETERS CAUSE INFECTIONS AND BLOOD CLOTS: These are the most common problems with catheters. Catheter-related bloodstream infections result in as many as 28,000 deaths and more than \$2 billion in increased healthcare costs in the U.S. each year. The catheter may let germs into your body, where they can cause an infection of your bladder, urethra, urinary tract, or kidneys. Peripherally inserted central catheters are common for IV delivery of antibiotics, nutrition, chemotherapy, and other medications. But these catheters more than double the risk of dangerous blood clots especially among patients who are critically ill or who have cancer. Catheter-acquired urinary tract infections (UTI) are one of the most common healthcare acquired infections. The odds of acquiring a bacterium while a catheter remains in is three to seven percent each day. Infection in individuals with a urinary indwelling catheter is usually a result of biofilm formation along the catheter. The least common ways for acquisition of bacteria include the introduction of bacteria directly into the bladder at the time of catheter insertion, reflux of infected urine from the drainage bag or tubing into the bladder because of inappropriate catheter management.

(Sources: <https://www.webmd.com/urinary-incontinence-oab/catheter-types>,
<https://www.sciencedaily.com/releases/2013/05/130519191412.htm>,
<https://www.infectiousdiseaseadvisor.com/home/decision-support-in-medicine/infectious-diseases/urinary-tract-infection-uti-in-the-catheterized-patient/>, <https://www.ucf.edu/news/ucf-developed-technology-could-reduce-risk-of-death-infections-from-catheters/>)

NEW TECHNOLOGY: A University of Central Florida researcher is helping develop a new coating material for catheters and other medical devices that resists infections, blood clots and biofilms. Current commercial catheters have coatings that either reduce the risk of bacterial infection or prevent blood clots, but not both. The UCF-developed material is planned to be multifunctional so that it can resist both infections and blood clots, as well as stop biofilms, or the accumulation of bacteria or organic matter that can spread disease. Elizabeth Brisbois an Assistant Professor in UCF's Department of Materials Science and Engineering and the

principal investigator of the research says “The ultimate goal of this project is to develop new intravascular catheter materials that can simultaneously prevent clotting and eradicate microbial infections,” she says. “If these materials are successful, they could also have significant benefits for other blood-contacting devices beyond catheters, such as complex extracorporeal life support, hemodialysis, vascular grafts and more.”

(Source: <https://www.ucf.edu/news/ucf-developed-technology-could-reduce-risk-of-death-infections-from-catheters/>)

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If this story or any other Ivanhoe story has impacted your life or prompted you or someone you know to seek or change treatments, please let us know by contacting Marjorie Bekaert Thomas at mthomas@ivanhoe.com