

# Glass-coated catheters could wipe out infections and save NHS millions

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Scientists at Aston University in Birmingham have developed a new technique to eradicate life-threatening urinary tract infections among

hospital patients needing catheters, potentially saving the NHS nearly £100million per year.

Urinary tract infections (UTIs) caused by catheters—flexible tubes which are attached to a bag and inserted into the bladder to empty it and collect urine—are one of the most common healthcare associated infections (HCAI), responsible for up to 35 percent of cases in U.K. hospitals.

But in a new study published in the journal *Materials Science & Engineering C*, Aston University researchers used a [phosphate glass](#) compound containing small amounts of the metallic element [zinc oxide](#) to achieve a "complete kill" of the deadly bacterial infections E.coli, as well as a near-complete kill of Staphylococcus aureus (the drug-resistant form of which is MRSA).

The scientists say it would be possible to insert a cartridge filled with antimicrobial [glass](#) carrying zinc oxide into the [catheter](#) tube to kill off bacteria before they reach the patient. This could stop the majority of infections taking hold inside the body, avoiding discomfort and complications for patients which can be fatal.

Catheters are needed by around 25 percent of hospital patients, typically elderly people and post-operative patients. Although sterile when inserted, when the collection bag is filled it is possible for bacteria to multiply and climb back up the catheter into the bladder, causing a UTI. These can be difficult to treat with antibiotics and are the second biggest cause of septicaemia ([blood poisoning](#)).

According to NHS guidelines on healthcare associated infections, UTIs caught by hospital patients using catheters cost the health service around £100 million per year in delayed discharge from hospital, antibiotic treatment and staff resources.

Lead researcher, Dr. Richard Martin of Aston University's School of Engineering and Applied Science, said the findings had significant implications and could lead to large savings for the NHS and healthcare systems globally.

He said: "Zinc oxide coated phosphate glass, inserted into catheters, has to potential to eradicate the most common bacteria in catheter-associated? UTI—E.coli and Staphylococcus aureus.

"This is great news for patients requiring catheters, who would be at a much-reduced risk of contracting a potentially life-threatening UTI during a hospital stay. It is also good for healthcare systems, which could save millions in the costs associated with these infections."

Researchers moulded [glass rods](#) laced with trace amounts of zinc oxide in a furnace heated to over 1,000°C, before slowly cooling it down to room temperature. The rods were then cut into small glass discs and put into contact with bacteria in [petri dishes](#).

The glasses contained varying concentrations of zinc, providing a controlled release of antimicrobial ions as they dissolved. At the highest concentration, the glass completely eradicated E.coli within 24 hours, with a "complete kill". S.aureus levels were "significantly" reduced after 24 hours.

Although phosphate glasses have been known about for some time, this is the first study to show that zinc-doped phosphate glass is effective in fighting specific micro-organisms, without causing any toxic effects to the bladder lining, and has the possibility of reducing UTIs associated with catheter use in [hospital patients](#).

**More information:** Farah N.S. Raja et al. The antimicrobial efficacy of zinc doped phosphate-based glass for treating catheter associated

urinary tract infections, *Materials Science and Engineering: C* (2019).  
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