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| Explorer Moments |

Squashing Superbugs May Take a Superhero

Microbiologist Hosam Zowawi is developing testing to rapidly identify antibiotic-resistant bacteria.

Hosam Zowawi examines antibiotic-resistant bacteria at the University of Queensland's Centre for Clinical Research in Brisbane, Australia.

PHOTOGRAPH BY JULIAN KINGMA, ROLEX AWARDS

By **Gary Strauss**

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If clinical microbiologists were Hollywood superheroes, Hosam Zowawi would undoubtedly be Superbug Fighter.

In reality, Zowawi is more accustomed to wearing a white lab coat or, when playing his favorite sport, a polo uniform—his team is the Superbug Slayers.

But in the cloistered venues of bacterial research and the broader arena of health awareness, the Rolex Laureate is a leader in the combat against superbugs, the often deadly strains of bacteria and microbes immune to antibiotics.

Superbugs already claim an estimated 700,000 lives globally each year, but they could unleash a far deadlier health crisis. By some estimates, superbug-related deaths could mushroom to 10 million deaths annually by 2050, more than cancer.

Zowawi and his daughter, Laila, sort through educational posters about using proper hygiene to avoid bacterial infections.

PHOTOGRAPH BY JULIAN KINGMA, ROLEX AWARDS

Superbugs have made a swelling number of infections—including pneumonia, blood poisoning, tuberculosis, and gonorrhea—more difficult to treat with traditional antibiotics. And widespread “phantom” superbugs carrying antibiotic-resistant genetic material that can avoid routine detection are popping up in regions such as the Middle East. Moreover, new superbugs are routinely being discovered.

“The possible nightmare scenario of normally treatable infections not being treatable is a major threat to human health now and in the

future,” says Zowawi, who is developing diagnostic tests that would reduce the time to identify bacteria to just three to four hours—down from up to three days. That would potentially allow doctors to target bacterial infections more quickly and treat them with the proper medications rather than using trial-and-error methodology or prescribing antibiotics when they aren't required.

Zowawi discusses research with colleagues at the University of Queensland.

PHOTOGRAPH BY JULIAN KINGMA, ROLEX AWARDS

Zowawi's Rapid Superbug test searches bacteria for genes that make beta-lactamase enzymes, which allow bacteria to destroy antibiotics such as penicillin and carbapenems. He's also identifying a test that can find bacteria prone to developing antibiotic resistance.

Education is also key, says Zowawi, noting World Antibiotic Awareness Week November 16 to 22, a World Health Organization campaign designed to promote smarter use of antibiotics, boost awareness

of antibiotic resistance, and promote basic steps to prevent infection, such as washing hands thoroughly with soap.

Zowawi also plans to continue alerting the public about superbugs and hopes to reach up to 15 countries by 2017. In many parts of the world, antibiotics are available without prescription, allowing people to take the wrong antibiotics or take them when they aren't necessary. Misuse of antibiotics fuels bacterial resistance. "Health promotion and education can improve awareness of antimicrobial resistance," he says.

The Saudi native made superbugs a career focus while he was completing his microbiology degree at Saudi Arabia's Umm Al-Qura University. On an internship in a clinical lab and later as an infection control trainee at a Jeddah hospital, he began learning about patients infected with antibiotic-resistant bacteria. Some were in the hospital for routine operations and caught a superbug. Some became so sick that they died.

"The last thing they needed was a hospital-acquired infection given to them by health services that could lead to disability or death," says Zowawi, now working on his doctorate degree at Australia's University of Queensland.

Zowawi says fighting superbugs will take a super effort that goes beyond research and education.

"Even if we have new antibiotics, bacteria will figure out a way to overcome them," he says. "But I'm optimistic that we can tackle this."

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