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HEALTH

MAPPING THE SPREAD OF KILLER BACTERIA

When antibiotics fail to kill bacteria, bacteria can quickly kill people. Johann Pitout, a Calgary physician and microbiologist, saw this as a young doctor in 1992, when five children died after drugs failed in the South African hospital ward where he was in training. This did more than teach Pitout a medical lesson, however — it launched a globe-spanning career probing the pathways in which drug-resistant bacteria travel through communities, countries and continents.

After stops in the United States and the Middle East, Pitout was hired in 2001 to do research for Calgary Laboratory Services (CLS), which operates one of the biggest, most centralized diagnostic labs in the world. Since then, he has used the city of Calgary as a gigantic laboratory, making a medical breakthrough with a major geographical connection.

Pitout studies bacteria that are resistant to almost all antibiotics due to their ability to produce a drug-resistant enzyme known as extended-spectrum beta-lactamase, or ESBL. ESBL-producing bugs killed the kids in his ward in South Africa and have since grown into a formidable public health threat and one of the hottest topics in medical research.

In a series of recent papers based on evidence collected from thousands of Calgary residents, Pitout revealed that ESBLs had somehow jumped from hospitals — where they had long been isolated — into the community at large. The discovery of a "rapid increase" in ESBLs among Calgarians is important, says Michael Mulvey, the top ESBL investigator at the Public Health Agency of Canada in Winnipeg, and it raises the question of where the ESBLs are coming from.

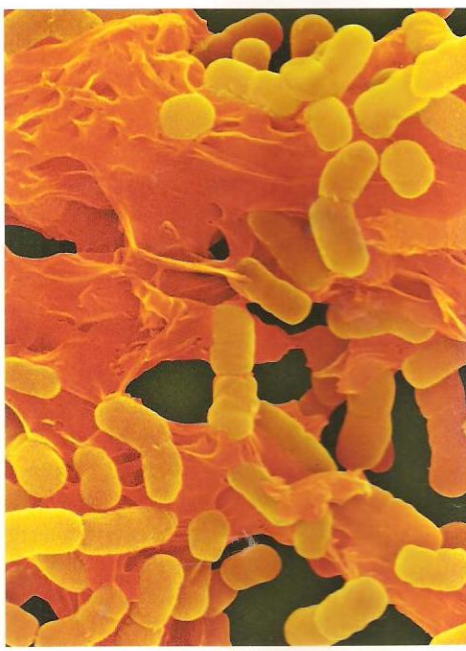
"The large increase observed could be due to direct human-to-human contact," explains Mulvey, "or the source could be a contaminated food, either domestic or imported, or a water source."

In a follow-up study published last year, Pitout, Kevin Laupland and their CLS colleagues revealed a key clue. Among the Calgarians who sent ESBL-bearing specimens to the lab, international travel was a common risk pattern. That finding was matched with a map indicating the areas of Calgary where the specimen donors reside. Neighbourhoods with high percentages of people who travel to India and Pakistan were found to be hot spots for ESBLs.

It's a finding that makes sense, considering the lack of control over antibiotic use in India, which has a huge population and an overextended health-care system, according to David Livermore, director of the Antibiotic Resistance Monitoring and Reference Laboratory at the UK Health Protection Agency in London. ESBL-induced drug resistance in much of the subcontinent, including India, Pakistan and Bangladesh, has become common, says Livermore, who specializes in mapping the global spread of drug-resistant bacteria.

Calgary has yielded an entirely unexpected key insight with the revelation that antibiotic-resistant bacteria are jumping from continent to continent at the speed of travel. "We thought the risk factors might be consumption of water or food. I even thought it could be exposure to pets," says Pitout. "But we didn't think travel would stand out as a risk for ESBLs."

Paul Webster



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