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## Australian startup wages war on drug-resistant superbugs

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Author: Myles Gough

Photography: Michael Amendolia

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The emergence of superbugs, immune to existing antibiotics, is a significant global public health problem. An Australian biomedical company, co-founded by Alison Todd, is developing world-leading diagnostic technologies, which will be critical to better managing this growing threat.

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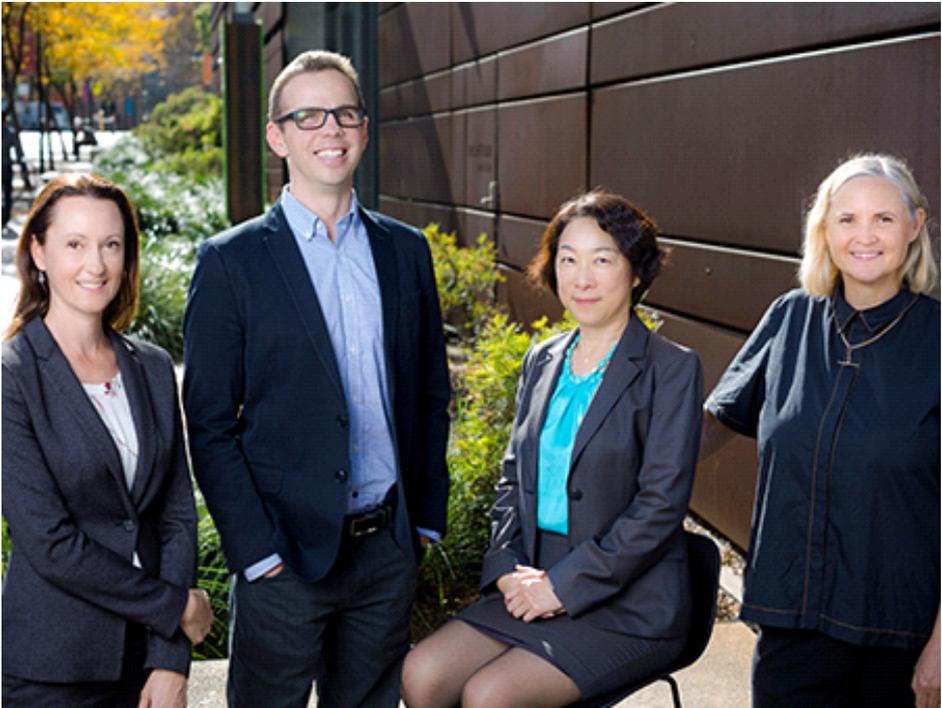
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Since the discovery of penicillin in 1928, antibiotics have transformed disease control and saved millions of lives. However, their indiscriminate use has led to a global public health crisis: antibiotic resistance.

“The rate at which new antibiotics are coming to market is not keeping up with the rate that bugs are mutating and escaping the current drugs,” Australian inventor and molecular biologist Alison Todd says. “You have the potential to have superbugs that are untreatable. That’s the real danger ahead, and it’s particularly true for sexually transmitted infections (STIs).”

Todd is the co-founder and chief scientific officer of Speedx, a Sydney-based biomedical company which has developed world-leading diagnostic technologies for genetic mutations in cancer cells, as well as a range of STIs, including two potential superbugs in gonorrhoea and *Mycoplasma genitalium* (MG).

The technologies, which are already being used in Australia, New Zealand, Europe and the US, are helping to curb the spread of drug-resistant pathogens.

## Detecting ‘bugs’ and resistance markers

Todd's diagnostics leverage a technique known as quantitative polymerase chain reaction (qPCR), which is widely used in molecular biology to make many replicas of DNA segments.

What sets Speedx technologies apart is the ability to detect an infectious pathogen, while simultaneously identifying specific genetic mutations it might have, which indicate whether the bug is resistant or susceptible to a particular antibiotic.

Todd says these are the first tests of their kind for STIs, and have been designed to work with standard instrumentation installed in pathology labs worldwide, making them universally and immediately deployable.

With a single, rapid and cost-effective test, clinicians can tailor treatment plans for individual patients and make smarter decisions about which antibiotics to use. In some cases, the diagnostic tools may enable the safe reintroduction of no-longer-recommended antibiotics, extending their lifespan, Todd says.

These are drugs to which some resistance has evolved, but are still effective for treating the majority of the population, she says.

SpeedX is already beginning to drive clinical change in the way STIs are managed: One of the company's main products (known as ResistancePlus MG), which detects the MG bacterium and five genetic markers of resistance, has, according to Todd, already demonstrated "improvements in patient cure rates and reduced infection times" at clinics where it has been trialed.

## Becoming an "accidental entrepreneur"

Todd discovered a knack for inventing after completing a PhD at the University of Sydney and the Royal Prince Alfred Hospital. She took this talent to Johnson & Johnson Research labs in Sydney, where she spent 17 years developing diagnostic technologies and working on personalised medicine.

While there, she supervised PhD student Elisa Mokany, who would eventually become her colleague, co-inventor and business partner. Their foray into entrepreneurship, however, was not the realisation of a dream, but a matter of necessity: "The bottom line is that we lost our jobs," says Todd.

It was an "absolutely devastating" consequence of the Global Financial Crisis (GFC), but one that presented an opportunity: "We knew we had great technology...So we put SpeedX together as a vehicle to commercialise it."

The "accidental entrepreneurs" managed to raise venture capital during the height of the GFC and, from 2010 to 2014, earned revenue from licensing their diagnostic technology that detects genetic mutations in cancer cells and enables tailored treatments for melanoma, lung and colorectal cancer.

In mid-2014, SpeedX began developing, manufacturing and selling new diagnostic tests and expanding to overseas markets. Today, the Australian company has grown from four to 40 employees, with satellite offices in the UK and the US, and 70 patents and 25 market-specific products in its technology portfolio, which are mostly sold to major pathology labs.

Todd says it is in the process of getting FDA approvals to sell its Resistance Plus MG product line in the US, and has plans to expand globally beyond that.

## Talented team and world-class tech drive success

A passionate advocate for women in STEM and retaining more female graduates in the STEM industries by addressing the gender pay gap, Todd is proud that women comprise nearly 70 per cent of the SpeedX workforce.

She credits the success of her company to its "top notch" team and also its world-leading innovations, which she says have "completely changed the ballpark in terms of the number of mutations you could look at or detect at a single time".

"Regardless of whether you're interested in cancer, or antibiotic resistance mutations we can give you more information faster with very elegant technology."

While the company's impact and outlook are global, Todd says Australia was the ideal place to build SpeedX

and launch its technology, as the country consistently “punches above its weight” with medical advancements and has a thriving startup ecosystem.

Since its inception, Speedx has been supported by – and headquartered at – Cicada Innovations, a deep technology incubator in Sydney. It has also attracted more than A\$5 million in combined grants from the NSW Medical Device Fund and the Commonwealth Government’s Accelerating Commercialisation program, while benefiting from the R&D Tax Incentive program.

Read more about [SpeedX](#).

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