FirstRand

The Robin Hood of science

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Professor Bavesh Kana owns a bycocket. It was presented to him by his research team in recognition of one of his many special attributes. For those of you who might not know, a "bycocket" is more commonly known as a "Robin Hood Hat". It's that soft pointy hat with a wide turned-up brim and a large feather that features in films and books celebrating the mythical English medieval hero. "Robin Hood" has come to symbolise a special type of philanthropist and doer of good deeds. He "robs from the rich to give to the poor". Kana's colleagues thought him worthy of a bycocket since he truly is a "Robin Hood of science".

Bavesh Kana is the descendant of farmers who came to South Africa from India in the 1940s. His father made a meagre living as a tenant farmer, moving from farm to farm with a trusted team of workers. As a child, Kana remembers noticing that each year one or two of these workers didn't return from their annual family leave. When he asked about these missing team members, he was told that they "were sick with TB". They never returned. He had no idea what TB was, and no one explained, but he decided that he would devote his life to ending this terrible disease.

Growing up in the 1980s, he dreamed of becoming a doctor, which depended on him scoring top marks in school. Achieving this under the Apartheid education system was a battle against the odds, and it did not happen. He registered instead for a general BSc degree programme at Wits University in the early 1990s. His first year of study was hugely disappointing. He failed maths and had to repeat it. He barely passed his other subjects. He seriously thought about dropping out and joining his father as a farmer.

But then – as has often happened in his life – he benefited from the kindness of strangers. One day, staring gloomily at his latest batch of dreadful marks on a noticeboard at Wits, a PhD student saw him and offered to help. She and other senior students clearly saw his huge potential, and devoted hours each week to tutoring him with no expectation of remuneration. By the end of that year, he achieved excellent results. He went on to become one of the university's star science students, graduating as the top student in the Department of Biology. By 2002 he had completed a PhD at Wits in mycobacteriology – the family of bacteria responsible for TB. He also had the opportunity to spend periods of time doing research at famous universities around the world. He could now begin to realise his childhood ambition of joining the battle against the disease that accounts for most deaths in South Africa.

TB research is so broad and diverse that one must specialise. Kana decided to focus on diagnosis. In treating patients, a doctor's most important first step is to make certain that the patient does indeed have TB. They take a sample of the saliva and mucus a patient coughs up and send it to a lab. But then what? Kana's interest lies in what exactly happens to the sample after being sent to the lab.

Standard practice 20 years ago involved growing cultures and peering through a microscope. This is slow – it takes several weeks – and comes with significant risks to those working in the lab with highly contagious and dangerous live TB bacteria. We also need to pause and think about what such a "test lab" looks like. While some are in major cities and may be sophisticated and modern, there are many good reasons to locate diagnostic capacity close to the clinic or hospital where the sample was taken. In many parts of South Africa – and most developing countries – these "labs" look nothing like the movie set from the popular TV series CSI. They have only the most basic equipment, are understaffed and overworked, and often have water and electricity supply disruptions. About 15 years ago DNA testing was added to the standard diagnostic arsenal. With it comes another piece of high-tech equipment that needs to be set up and maintained.

Kana directs a Centre of Excellence and a research laboratory at Wits, with the aim of improving TB diagnostics and treatment. He made it clear to his team when he took charge that his lab would be different. It was not only about the science of TB research. He was determined to make an impact on how things happened in the world around him. He

wanted to see changes in TB testing labs in South Africa and around the world. Over the next few years, working with colleagues including Professor Lesley Scott and Dr Edith Machowski, he developed world-changing innovations in how TB labs test samples. One of these innovations solves the problem of how to ensure that test equipment is correctly set up, and how the quality and accuracy of tests might be improved.

Setting up equipment and test procedures to deal with ever-changing variants of the bacteria requires a "reference standard" against which samples from patients are compared. Normal practice was to send these reference standards as live – and dangerous – TB bacteria to far-flung and poorly equipped labs. Kana's innovation was that he managed to reduce the genetic information of these standards to a safe and stable format. It is deposited as a "smart spot" on a card – similar to the way in which an Instant Lotto "scratch card" works. It can be dispatched safely to labs and used to calibrate equipment. This method has dramatically changed how test labs are managed and run. Kana's diagnostic innovation, and its use in the field, has been endorsed by the World Health Organisation (WHO) and the Centers for Disease Control (CDC). Recently he also developed reference samples for HIV, breast cancer and COVID-19 testing.

As I said at the start, Bavesh Kana has many special attributes. Instead of seeing his invention as a route to personal fame and fortune, he rolled up his sleeves and worked tirelessly to give it away to those who needed it. From his small operation at Wits, he and his team prepare reference standards and provide these to SmartSpot, a company spun out by Wits, who then dispatch reference samples to test labs in 52 countries for TB testing and 23 countries to enable Covid-19 mass testing. Like Robin Hood, Kana has ensured that those labs most in need can benefit. While he doesn't "rob from the rich", he has found ways to run his operation in a manner that spreads costs and resources creatively to support those with limited resources.

Listening to Bavesh Kana speak; one can hear the voice of the young child who was deeply concerned when each year some of his father's workers became "sick with TB". He still promises himself and the world that he will play his part in ending this terrible disease. Sporting his bycocket, this Robin Hood of science is undoubtedly destined for even greater things.