

Medical smart jacket tackles misdiagnosis of pneumonia

By [Kate Hodal](#)

12 Jan 2017

Ugandan undergraduate Brian Turyabagye was studying engineering when his friend's grandmother fell seriously ill. He accompanied her to hospital and was present when doctors diagnosed malaria and prescribed various treatments. Only as she lay dying did the doctors realise their initial diagnosis was wrong. Pneumonia was killing her.



Brian Turyabagye and his team have developed a biomedical kit for early diagnosis and continuous monitoring of pneumonia patients. Photographs by Brett Eloff for the Royal Academy of Engineering Photograph: Brett Eloff/The Royal Academy of Engineering

Turyabagye, 24, was so shocked by the circumstances of her death that he began searching for ways to diagnose pneumonia. To his surprise, he discovered that the illness affects far more children than it does adults. According to the United Nations' Children's Fund (Unicef), [pneumonia kills 500 000 children under five in sub-Saharan Africa every year](#), with the region accounting for half of all global deaths from pneumonia in children under five.

"Many of those deaths are because of misdiagnosis," says Turyabagye. "In the villages and remote areas, children get sick and the first reaction is to treat them for malaria. Most people are aware of malaria, and the signs for malaria and pneumonia are very similar, so it is difficult for health professionals to differentiate."

Even when a correct diagnosis is made, treatment is often unavailable. According to the Uganda Paediatrics Association, fewer than [20% of children with pneumonia receive antibiotics](#), which cost less than \$1.

So Turyabagye began designing a biomedical "smart jacket" and he has developed a prototype that can identify

pneumonia's symptoms — the temperature, breathing rate and sound of the lungs associated with it — and eliminate most of the human error. It is also able to diagnose pneumonia three to four times faster than a doctor.

He has named it Mamaope — mother's hope — [a reference to the 27,000 children who reportedly die of pneumonia](#) in Uganda every year.

"We focused on the distinguishing signs of pneumonia," he says. "One of the processes that most doctors use is a stethoscope to check the lungs. But it [pneumonia] tends to be on side points around the body, not just in the chest or back. Its [Mamaope's] accuracy of being able to diagnose what is healthy and what is not is very encouraging."

The prototype is undergoing an official national medical investigation and it is likely to be certified for use in health centres and hospitals by about September.

The jacket could be a major boon to diagnosing, treating and preventing pneumonia in sub-Saharan Africa. Despite international progress in tackling measles, HIV and tetanus, funding earmarked for the eradication of pneumonia is extremely low: for every dollar spent on global health in 2011, Unicef says, only two cents went to pneumonia.

"Although sub-Saharan Africa accounts for half of pneumonia deaths among children under five worldwide, funding for pneumonia prevention, management and treatment in the region remains low," said Mark Young, a senior health specialist for Unicef, in a [statement](#).

"More resources and more commitment at the highest level will bring us closer to stopping this disease from being a major child killer."

The Mamaope jacket was shortlisted for this year's £25 000 Africa prize for engineering innovation, and Turyabagye hopes this could help to jumpstart mass production of the jacket for use on the continent.

"Really, we are looking to help the next generation," he says. "Pneumonia has such a high rate in [Uganda](#) and our neighbouring countries; if we were able to distribute in those countries, we could save a lot of people."

This feature was originally published as part of [The Guardian's Global Development](#) project

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