

The battle to bring antivenoms to Africa

March 19 2019, by François Ausseil



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Snake antivenoms have been around for 125 years, are effective and can be produced cheaply at scale. Yet Africa, with its abundance of deadly snakes, has an alarming shortage of the life-saving medicine.

Experts and campaigners blame a combination of weak production capacity, feeble policy and oversight, high prices and a general lack of concern for the plight of people in poor, remote areas of the world.

Complex process

The method of antivenom production has changed very little since it was first developed by French immunologist Albert Calmette in the late 19th century. It remains a painstaking, time-consuming process, although researchers are working to develop synthetic alternatives.

First, a technician has to milk a snake's venom in a dangerous manoeuvre that sees it holding the animal's head still while it bites a cup covered in plastic film, releasing its poison—a small amount each time—into the container.

Small venom doses are then injected into a large domestic animal, usually a horse, to trigger an immune response and the production of toxin-attacking antibodies.

After several doses over a period of about a year, the horse produces so many antibodies that it becomes immune to the venom, at which point blood can be taken from the animal.

In a lab, antibodies are then separated from the blood, to be given to snakebite victims—who may need several doses.

An antivenom usually works only for a specific species, or small group of species of snake.

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A 'shameful failure'

Already patchy, availability of antivenoms in Africa was thrown into disarray when French laboratory SANOFI stopped production in 2014 of its FAV-Afrique drug, which was effective against a number of species, including some of the most dangerous on the continent.

The last available doses expired mid-2016.

SANOFI was moved mainly by financial considerations. The prohibitive price of a single dose—more than \$100—rendered sales in Africa unprofitable.



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according to the World Health Organization

The failure to use antivenom "to save tens of millions of lives... is a shameful failure. Nowhere in the world is this more confronting than in Africa," says the Global Snakebite Initiative, adding in a report on its website that the "collapse of the snake antivenom market in Africa" was a "medical tragedy".

The cause is multifold.

In a vicious circle, unaffordability leads to lower demand and falling sales, which result in reduced production, higher costs, and raised prices for consumers.

Even an antivenom produced on the continent and effective against multiple snake species, is nigh impossible to find further north than South Africa, where it is made, a 2018 study by the Liverpool School of Tropical Medicine found.

"The market remains volatile because they are small producers and the African antivenom market is limited," said Julien Potet, an expert in neglected tropical diseases with aid group Doctors Without Borders.

Inconsistent quality standards and lacking oversight have also seen an infiltration of counterfeit and "inappropriate" antivenoms developed for different snake types in other countries. Using the wrong antivenom can be dangerous, even deadly.

Doctors Without Borders, which describes Africa's antivenom shortage as a public health crisis, has launched its own survey of available antivenoms.

Most were brought to the market "without any clinical information, without any data on their efficacy or safety in humans," said Potet.

A further problem: even if antivenoms were available, people most likely to be bitten by a venomous snake live prohibitively far from a clinic or hospital, some of which have no refrigeration capacity, and with medical staff that have never been trained in treating snakebites.

Half a million bites

"We are losing around 1,000 people in Kenya each year from snakebites," said Royjan Taylor, director of the Bio-Ken snake farm and research centre on the country's east coast.

This is out of 81,000-138,000 worldwide.

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"Governments and the international community therefore should really pick that up... What I would like to see over the next five to 10 years, maybe even 15 years, is for an antivenom to be produced for each area of the world that has a problem and that antivenom should be provided to those people free of charge," Royjan said.

The WHO has launched a massive review of the availability, efficacy and safety of snakebite serum available in Africa, where the majority of countries have no effective or affordable antivenom at all.

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