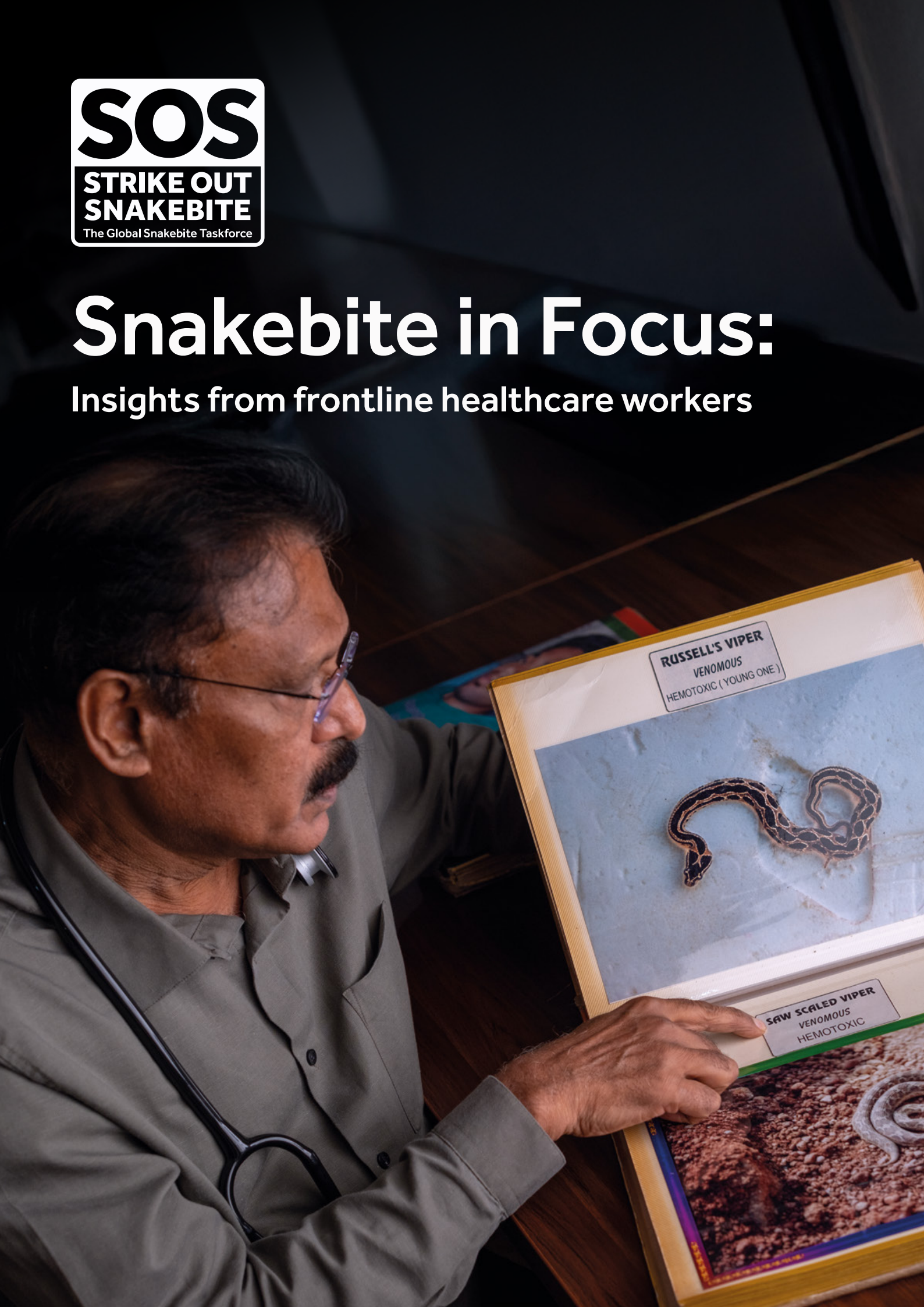
SOS
STRIKE OUT SNAKEBITE
The Global Snakebite Taskforce

Snakebite in Focus:

Insights from frontline healthcare workers



The Four Pillars of Impact

PILLAR A **RESEARCH & DEVELOPMENT: Reinventing Antivenom Through Next Generation Science**

Transforming antivenom discovery, development, and diagnostics by investing in venomics, recombinant antibodies, small molecule inhibitors, improvement of serum-based antivenoms, and Low- and Middle-Income Countries (LMICs)-centred R&D ecosystems.

PILLAR B **ACCESS & REGULATION: From Lottery to Lifeline**

Ensuring consistent availability of safe, affordable, quality-assured antivenoms through effective regulation, predictable procurement, and sustainable regional manufacturing.

PILLAR C **PUBLIC HEALTH: Closing the Care Gap**

Reducing deaths through improved surveillance, prevention, clinical training, referral systems, and supportive care aligned with national health-system strengthening agendas, underpinned by culturally appropriate community engagement.

PILLAR D **ADVOCACY: Turning Neglect into Priority**

Building the political will, governance structures, financing coalitions, and partnerships needed to align action across all pillars and accelerate progress at national and regional levels.

More information on our Four-Pillar Framework for Strategic Action on Snakebite is available here.

Foreword

By Elhadj As Sy, Co-Chair of the Global Snakebite Taskforce and Chancellor of Liverpool School of Tropical Medicine.

Snakebite envenoming (SBE) causes up to 138,000 deaths every year (one person every five minutes) and **leaves a further 400,000 others with permanent disabilities.** And yet, for many global decision-makers, donors and funders, this crisis remains invisible. As Kofi Annan, former UN Secretary General, warned in 2015, SBE is "*the biggest public health crisis you have never heard of*". Today, that warning still rings true.

The Global Snakebite Taskforce (GST), the strategic arm of the Strike Out Snakebite initiative, exists to change that. Since the WHO set its ambitious target in 2019 – to halve mortality and disability from SBE by 2030 – the path forward has been clear. Many of the tools to achieve this goal exist, but what is needed is the political will, sustained momentum, and meaningful investment to turn commitment into real progress.

Too often, conversations on global health overlook those who shoulder the greatest burden: frontline healthcare workers. These are the individuals who treat snakebite victims every day, often from remote clinics, and frequently without the equipment, medicines, or support they need. But they continue to focus on saving lives in the most challenging environments.

This report shines a light on their perspectives, elevating the voices of healthcare workers in Brazil, India, Indonesia, Nigeria and Kenya – five of the countries with the highest burden of SBE. Their insights reflect the realities of those who confront this crisis every day, and their message to the international community is clear:

- Invest in antivenom research and development, and improved diagnostic tools
- Strengthen community education
- Support local production of affordable, high-quality antivenom

The GST's mission is to amplify their voices and convert their calls for action into global leadership, policy change, and resource mobilisation. Guided by their experiences, we drive forward our four pillars of impact: Research & Development, Access & Regulation, Public Health, and Advocacy.

In 2024, just **two funders provided 65% of all investment in snakebite research and development.** This is neither sustainable nor sufficient. New partners must step forward to drive innovation, expand access, and unlock solutions that will prevent needless suffering, death, and economic loss.

As Co-Chair of the GST, my mission is simple: to bring snakebite out of the shadows and demand the attention, action, and resources from the international community that this urgent crisis deserves. It is time for action – not sympathy, not statements, but action worthy of the scale of this crisis.

The solutions exist. The deaths are preventable. Frontline healthcare workers have spoken.

I invite you to listen. Stand with them.
And join us as we work to Strike Out Snakebite.

As Kofi Annan, former UN Secretary General, warned in 2015, SBE is

"The biggest public health crisis you have never heard of."

"Since most of the snakebite problems are in developing countries, I request that world leaders strengthen healthcare systems and supply the infrastructure and antivenom technology to save lives."

Dr Nagaraj, Anaesthesiologist,
Srinivasa Hospital, India

Introduction

Globally, snakebite envenoming (SBE) kills someone every 5 minutes. In the time it takes to read this report, it is likely that two people will have died from a venomous snakebite.

SBE is a crisis of inequality, where access to treatment is a privilege, not a right. It disproportionately affects agricultural workers and rural communities – people at the heart of industries such as farming, mining, and infrastructure. From the coffee we drink to the clothes we wear, the crisis of SBE is being experienced by the very people who grow, farm or supply so many aspects of our everyday life. As Dr Nagaraj, a doctor in India, explains: *"Most patients who are bitten by snakes are farm labourers, who are very poor. Snakes don't go to corporate offices and bite."*

Despite its scale, SBE remains one of the world's most neglected public health emergencies. **Each year SBE causes up to 138,000 deaths and more than 400,000 cases of permanent disability.**

This report draws on responses from 904 healthcare workers with hands-on experience of treating SBE, surveyed in November 2025 across four of the hardest-hit countries – Brazil (254 surveyed), India (250), Indonesia (150), and Nigeria (250), sampled proportionally to population size. Their testimony, supported by interviews in Brazil, Kenya and India, exposes frontline realities, underscores health system vulnerabilities, and outlines the urgent interventions needed from the international community to save lives.

Key findings reveal:

- **Shortages of appropriate antivenom at the point of care (cited by 35%)**
- **Insufficient training or clinical guidelines for frontline healthcare workers (37%)**
- **Poorly equipped clinics and hospitals (11%)**
- **Continued reliance on traditional medicines (53%)[1], with many people delaying treatment often until it is too late**
- **Consensus that priority action must focus on investing in antivenom R&D (36%), improving community education (43%), and ensuring local production of affordable, high-quality antivenom (40%)**

The international community must act urgently to respond to frontline needs and drive progress toward the World Health Organization's (WHO) target of halving mortality and disability from SBE by 2030. Deaths and disabilities from SBE are preventable, and many of the necessary solutions already exist. However, the current product landscape remains unfit for purpose, and without decisive action, avoidable suffering will continue.

Significant breakthroughs in research and development have already been achieved, yet progress is stalled by chronically low and fragile funding: **just £91 million has been invested in snakebite R&D over the past five years** *(G-Finder, 2025)*.

With **two funders accounting for approximately 65% of global investment in 2024** – and few new commitments emerging – the outlook is precarious. Broader, sustainable investment from new funders is urgently required.

Beyond R&D, immediate steps can be taken. This includes integrating SBE into health strategies and budgets, modernising health systems and infrastructure, prioritising antivenom regulation, and closing critical gaps in timely access to treatment.

This report outlines four major challenges faced by healthcare workers responding to SBE – from training and community education to access and effective treatment. These challenges can be overcome. But success requires national governments, global health leaders, philanthropists, investors, industry and implementing partners to mobilise at speed and scale.

TOGETHER, WE CAN – AND MUST – STRIKE OUT SNAKEBITE.

1 According to those who have experienced a patient who has had an avoidable delay in seeking treatment at their facility for snakebite envenoming

CHALLENGE 1

Training:
Closing the knowledge gap

Key insight: National investment into public health infrastructure must include improved clinical training for healthcare professionals.

Treating SBE is complex. Healthcare workers must make rapid, accurate decisions to save lives, yet identifying the snake species – critical for selecting the right antivenom – is often impossible because patients rarely know which snake has bitten them.

Nearly all surveyed **healthcare workers (99%) report challenges in administering antivenom[2], citing issues with availability (20%), quality of antivenom (6%) and clinical training.** Some **39% cited a lack of training** on monitoring dosing for signs of progression, and **22% around administration protocols. A third (33%) struggle with uncertainty over the snake species involved when administering antivenom**, while **32% lack training to prepare the correct dosage.**

Training must equip healthcare workers with knowledge of local snakes – which often includes species beyond WHO's global list of the most important medically relevant snakes (*Patikorn, 2022*) – and those from neighbouring regions. This need is growing, as climate change drives snakes into new areas. Robust surveillance is also essential, as official SBE statistics only capture cases reaching medical facilities, meaning the true scale of the crisis is likely underestimated.

Beyond antivenom administration, healthcare workers need skills to manage the full impact of SBE, including emergency care. In rural communities, often hours from a well-equipped clinic, this means knowing how to intubate patients or prevent infection after amputation. Despite this, **only half (50%) of healthcare workers surveyed felt their facilities were fully equipped** to provide emergency care for snakebite envenoming beyond antivenom administration.

Key takeaway:

Clinical training can save lives and prevent disability. With **37% of surveyed healthcare workers citing lack of training or clinical guidelines** as their biggest daily challenge in treating SBE, national investment in public health must prioritise equipping healthcare professionals with the skills they need and investing in point of care diagnostics.

"The biggest challenge in snakebite treatment is a lack of knowledge and the fear of doctors giving antivenom. I've seen clinicians shy away from giving it for fear of adverse reactions."

Dr Eugene Erulu, medical doctor and snakebite specialist, Watamu Hospital, Kenya

2 Reverse of those who selected 'No challenges'

COUNTRY STATISTICS

BRAZIL

- **400+ SPECIES**
- **~15% VENOMOUS**
- **ANTIVENOM** UNDERPINNED BY CLINICAL DATA AND REGULATORY RIGOUR **EXISTS FOR ALL MAJOR SNAKES** AND IS **FREE AT POINT OF CARE**

INDIA

- **300+ SPECIES**
- **~15-17% VENOMOUS**
- **ANTIVENOM EXISTS** FOR **FOUR SPECIES** THAT **CAUSE 90% OF SBE** BUT NOT OTHERS

INDONESIA

- **350+ SPECIES**
- **~20-22% VENOMOUS**
- **LIMITED ANTIVENOM,** WITH THE NATIONALLY PRODUCED ANTIVENOM EFFECTIVE AGAINST JUST THREE SPECIES

NIGERIA

- **29 SPECIES**
- **41% VENOMOUS**
- **LIMITED ANTIVENOM**

Statistics taken from African Snakebite Institute, Snake Population by Country 2025 and Taprobanica (*Anita, 2025*)

CHALLENGE 2

Education: Protecting life and livelihoods

Key insight: Improved community education will save lives and livelihoods, empowering communities to protect themselves and get lifesaving treatment more quickly.

Every second counts when you have been bitten by a venomous snake. Delays in treatment can lead not only to death, but also to severe disability – amputation, lifelong mobility issues – and the loss of livelihoods. And every life-changing incident of SBE exacerbates cycles of poverty and lost productivity, deepening inequality.

Despite this, **49% of healthcare workers** surveyed say their greatest challenge to treating SBE is the timely arrival of patients for treatment. Some **77% have seen at least one patient postpone seeking treatment** before coming to them, most often **due to reliance on traditional remedies (53%).**

Community education programmes are vital. They must cover both the importance of seeking rapid medical treatment and practical steps for SBE prevention. Simple changes can reduce the likelihood of being bitten in the first place:

- Wearing appropriate clothing and shoes
- Sleeping under a well-tucked mosquito net at night
- Taking a torch when walking at night
- Trying to avoid disturbing spaces where snakes are likely to be

Education must be culturally sensitive and adapted to context. Programmes must be developed in partnership with locally influential voices, including elders and traditional healers. Advice should consider occupational hazards and be coupled with appropriate and available tools, such as an adequate supply of affordable protective footwear for farmers.

Improving education will not just save lives, it will reduce the number of permanent disabilities reported each year. Many of those suffering from SBE are agricultural workers, who have had to give up their livelihood because of their injuries. Education does not only improve the chance of physical survival, but economic survival too.

Key takeaway:

Death and disability from snakebite are both avoidable and preventable. Lives and livelihoods can be protected through stronger public health systems and community education – improved surveillance, prevention, clinical training, referral systems, and integration of SBE into national health plans.

> "A snakebite is a medical emergency, and anytime it happens you need to deal with it urgently and with the right treatment. But 70-80% of patients first go to traditional healers. If you delay [treatment], you lose the patient."

Dr Eugene Erulu, medical doctor and snakebite specialist, Watamu Hospital, Kenya

CHALLENGE 3

Access and Infrastructure: A geographical lottery

Key insight: We must integrate SBE into health strategies and budgets, modernise health systems and infrastructure, and close critical gaps in access to treatment.

SBE is a crisis of inequality, where access to treatment is a privilege, not a right. Patients face barriers at every step: the cost of treatment, ability to reach a clinic, availability of antivenom and whether facilities have the infrastructure and clinical skills to treat SBE beyond administering antivenom.

Access is also shaped by transport networks – rural communities and agricultural workers, the most affected, often travel long distances to urban centres when local clinics lack the necessary resources. Among surveyed healthcare workers who have seen patients delay treatment, **44% cite long travel distances as a key reason.**

In Brazil, antivenom is free, but often only available at urban hospitals (*Sachet, 2024*). In the Amazonas region – one of the most impacted parts of Brazil – **nearly a third (32%) of medical facilities lack antivenom stocks.** As a result, rural healthcare workers must refer patients to distant urban facilities, sometimes over 24 hours away, delaying treatment and increasing health risks (*Feitosa, 2023*).

Among healthcare workers who have encountered at least one patient with an avoidable delay in seeking treatment, **36% report that concern about treatment costs contributed to the delay.** Costs vary from country to country, and low-paid workers often cannot afford health insurance or treatment. In Sub-Saharan Africa and South Asia, national health insurance schemes typically cover only public sector employees – leaving the most vulnerable to pay out of pocket, which many simply cannot do (*Gutiérrez, 2021*). There are reports of people resorting to unregulated, often ineffective 'treatments', frequently selling possessions to pay for them (*Gutiérrez, 2021*).

Delays caused by cost or travel have devastating consequences. Nearly **half (45%) of healthcare workers who experienced a patient delay seeking treatment for SBE said this directly contributed to serious complications** – such as the **need for surgery or amputation (44%), mobility issues (35%), and extended recovery times (41%).**

Even when patients reach a facility with antivenom, challenges persist: **more than half (56%) of surveyed healthcare workers cite inadequate infrastructure** as their biggest day-to-day obstacle. Health systems must be resilient – not only to manage acute envenoming but to provide supportive care, safely operate, amputate or intubate, to save lives and prevent long-term disability.

Key takeaway:

To end the "geographical lottery" of SBE care, every healthcare facility – urban or rural – must have the resources, infrastructure, and antivenom needed to save lives. This requires urgent investment, political will, and partnerships to ensure that cost and distance never prevent timely, effective treatment.

"One of the greatest challenges we face is reaching specific populations like riverine and indigenous people and then transferring those patients to hospital. We turn three-hour distances into 20-30 minutes, and this is very important in cases of snakebite."

Eduardo Fernandes, Technical Director, SAMU Manaus, who provides a river ambulance and helicopter service for riverine communities in Brazil

CHALLENGE 4

Treatment:
The race for the right antivenom

Key insight: Funding must be secured to transform antivenom discovery, development, and diagnostics whilst decentralising manufacturing to secure reliable, local access to appropriate treatments.

Effective treatment for SBE depends on having the right antivenom – available, affordable and accessible at the point of care. This requires innovation and a resilient supply chain to transform today's fragmented product landscape into one fit for purpose. Currently, antivenoms are often scarce, costly, and sometimes ineffective or unsuitable for local needs, with risks of serious side effects such as anaphylaxis and serum sickness. The urgency is clear: **36% of healthcare workers call for investment** in antivenom R&D, and **40% want local production** of affordable, high-quality antivenom.

One-third of healthcare workers say access to broad-coverage antivenom would significantly improve patient outcomes. They call for modernised formulations that are easy to administer, better diagnostic tools and rapid distribution systems to ensure the right antivenom reaches the right place at the right time.

While these challenges are global, each country faces unique obstacles. In Indonesia, for example, dozens of venomous species are spread across its islands, yet only one polyvalent antivenom (SABU) exists – covering just **three of 77 species** (*Tan, 2016*). Unsurprisingly, a **third (33%) of healthcare workers** there cite access to the right antivenom as a major problem.

Similarly, in India, polyvalent antivenom is effective against the four snakes **responsible for 90% of SBE cases** (*Kumar, 2025*). But for bites from any of the other 60 venomous species, there is little help available. Continued, sustained investment is essential to develop new, effective and affordable antivenoms.

Key takeaway:

Transform antivenom discovery, development and diagnostics by investing in next-generation treatments and therapies – and remove dangerous, ineffective products from the market. Pair this with decentralisation and regional manufacturing to ensure adequate, locally appropriate supply of antivenom. Achieving this requires new funding partners and sustained commitment.

EXPLAINER: VENOMS

Snake venom falls into three main classifications based on its effects on the human body – and a single venom can belong to more than one category.

NEUROTOXIC VENOM:
attacks the nervous system, causing respiratory failure and paralysis

e.g. Cobras, mambas, kraits

CYTOTOXIC VENOM:
attacks cells, causing cell and tissue damage which may be irreversible

e.g. Rattlesnakes, puff adders, spitting cobras

HEMOTOXIC VENOM:
attacks the circulatory system, destroying red blood cells which causes issues with blood clotting, heart attacks and internal bleeding

e.g. Vipers, pit vipers

Definitions simplified from *Ferraz, 2019* and *Banerjee, 2025*

"Producing antivenom can take months. There is no other treatment that can neutralise the venom."

Dr Fan Hui Wen, Technical Director, Instituto Butantan, Brazil

Turning commitment into meaningful progress

Call to action: We must build political will, create partnerships and secure funding from new players to find sustainable solutions to SBE.

"The good news is that it's something that we can actually change."

Gerry Martin, co-founder, the Liana Trust, a conservation and education organisation in India

The overwhelming consensus from healthcare workers is clear: it is time to bite back on SBE and turn WHO targets into reality. Beyond better access to antivenom, protective equipment and stronger emergency care systems, they call for:

- **Investment in antivenom research and development (36%)**
- **Improved community education (43%)**
- **Affordable, high-quality antivenom manufacturing in high-burden countries (40%)**

There are rays of hope. India, which records the highest number of annual deaths and disabilities from SBE, has introduced a National Action Plan and reports cases to the Ministry of Health and Family Welfare to strengthen surveillance (*Kumar, 2025*). Nigeria has proposed a 'hub-and-spoke' model to link rural facilities with larger hospitals (*Gutiérrez, 2021*).

But plans and promises alone are not enough. Access to equipment, antivenom and infrastructure should never be a geographical lottery. To strike out snakebite, we need action – and we need it now.

The Strike Out Snakebite GST highlights four pillars of action:

- **RESEARCH & DEVELOPMENT:** Reinventing Antivenom Through Modern Science
- **ACCESS & REGULATION:** From Lottery to Lifeline
- **PUBLIC HEALTH:** Closing the Care Gap
- **ADVOCACY:** Turning Neglect Into Priority

Healthcare workers in Latin America, Africa and Asia are calling on the global community, governments and investors to listen to frontline experiences and prioritise investment to tackle this neglected crisis.

Deaths and disabilities from SBE are preventable with timely access to safe, effective treatment – and many solutions already exist. Now is the time to turn commitment into meaningful progress for health equity.

TOGETHER WE CAN – AND MUST – STRIKE OUT SNAKEBITE.

Methodology

This report is based on the findings of a survey undertaken by Censuswide of 904 medical professionals who treat snakebites / work in a facility treating snakebites (21+). This includes community healthcare workers, doctors and nurses, amongst other medical professionals. The healthcare workers are from four countries with high rates of SBE, namely Brazil, Nigeria, India and Indonesia.

The online survey was conducted between 14 November 2025 and 21 November 2025. Censuswide abides by and employs members of the Market Research Society and follows the MRS code of conduct and ESOMAR principles. Censuswide is also a member of the British Polling Council.

To complement the survey, interviews also took place with healthcare workers, traditional healers, those involved in the production of antivenom and survivors in Brazil, Kenya and India.

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