Antivenoms for snake bites: Combatting market failure and neglect with research

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Venomous snakes are widely distributed, but most snakebites occur in rural areas of the tropics. Although data are notoriously poor, in Africa, there are an estimated 1 million snakebites, 500 000 envenomings, and up to 30 000 deaths annually.

The venom of any single snake may contain more than 100 different toxins and enzymes, so the clinical result for victims can differ as well. Three major families of toxicities exist: local cytotoxicity (tissue necrosis), neurotoxicity (paralysis), and hematotoxicity (pro-coagulant and anti-coagulant).

Snakebite patients with evidence of envenoming should be promptly treated with antivenom. The choice of antivenom depends on the local epidemiology of snakebites and the availability of antivenoms. If given with minimal delay, antivenoms can drastically reduce mortality associated with snakebite, particularly for hematotoxic envenomings, which typically cause death many hours or days after the snakebite.

Antivenom production is onerous and has changed little since the 19th century. In brief, venom is harvested from snakes and small amounts are injected into a mammal (usually horses). After several months, the equine serum is collected and purified, and anti-venom specific antibodies are collected, and sometimes digested into fragments. Some commercially available antivenoms are species-specific, others are polyvalent.

FAV-Africa (Sanofi Pasteur) is a polyspecific antivenom which covers 10 different species of snakes. It has been the primary antivenom used by MSF across Africa for many years. Its production ended in 2013, and the last doses produced expired in June 2016. Several new antivenoms have entered the market in recent years, but with insufficient data supporting their safety and efficacy. In several settings, MSF is facing challenges over the choice of antivenom (or antivenoms) to use to replace FAV-Africa. Epicentre is conducting studies in the Central African Republic and South Sudan to evaluate and document the use of new products.

Snakebite is a major health problem in rural Africa. Although there are several antivenoms available, there is insufficient data to support their safety and efficacy.