EAST AFRICAN SNAKEBITE SYMPOSIUM

12 June 2025

Response-Med
REMOTE MEDICAL SUPPORT

amref health africa

EMERGENCY
MEDICINE KENYA FOUNDATION

GSI GLOBAL SNAKEBITE INITIATIVE

Snake Anti-Venom:
Poorly understood Essential Medicine

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What is Snake Anti-Venom(SAV)

- It is a form of artificial passive immunization used to protect life of a patient at short notice like in life threatening medical emergency.
- Anti-Venom is a preparation of intact or fragmented immunoglobulin G [$F(ab)_2$ or F(ab)] used for treatment of severe envenoming from the bites of venomous animals.
- These readymade venom specific antibodies are raised in animal models(Equines/Sheep).
- It is a TRUE LIFESAVER

Antivenom is the only specific , time tested and proven therapy available for treatment of snake envenomation.

SAV manufacturing process

1) Horse Procurement
2) Immunization
   (A)Primary immunization phase
      Increasing sub-lethal doses of venoms
   (B)Secondary immunization phase-Regular periodic boosters
3) Regular periodic Blood collection and Plasma separation
4) Plasma Fractionation
   Enzymatic Digestion to yield F(ab')2 fragments
   Separation of F(ab)2 fraction and concentration
6) Formulation, Vial filling & Lyophilisation
7) Quality checks and distribution

Usually it takes around 6-7 months to get product from animals after induction into program

How SAV acts

- Prompt administration of adequate dose of ASV is of paramount importance for neutralization of unbound circulating snake venom components for early response to treatment.
- SAV is most effective when given intravenously.
- Any delay in administration may result in increased dose requirement and decreased effectiveness.
- SAV is effective to prevent or reverse most of the harmful effects of snakebite envenoming.
- When administered early, SAV is not just life-saving, but can also spare patients some of the suffering caused by necrotic and other toxins in snake venom, leading to faster recovery, less time in hospital and a more rapid transition back to a productive life.

SAV is the only specific antidote for snake envenomation

PANAF-Premium™

(Snake Venom Antiserum-Pan-Africa)

Recommended for treatment of snakebites by

African Adders

Carpet vipers

Spitting cobras

Neurotoxic cobras

Mambas

WHO Risk-Benefit Assessment & Listing of Snake Antivenoms

- Process initiated in 2015
- It consisted of dossier desk review, independent laboratory evaluation of product, GMP verification audit of manufacturing facility.
- Manufacturing site approved by WHO in November 2019
- Bases on positive Risk-Benefit assessment by WHO, PANAF-Premium™ has been approved and recommended for treatment of 24 medically important snake species in Sub Saharan Africa in March 2023.

PANAF-Premium™

(Pan-African Polyvalent Antivenom)

- Specially developed in Lyophilized form to avoid cold chain requirements.
- Has shelf life of 4 years
- Snake venoms are sourced from Africa for immunization
- Distributed widely in Sub- Saharan African countries
- Post Marketing Surveillance studies undertaken in many countries

Dose recommendations

(1) Snake bite with Non-Neurotoxic Envenoming Syndrome-

Bites by **Carpet vipers** (Echis spp.)-Administer initial dose of **1-3 vials**

Bites by **African adders** (Bitis spp.)-Administer initial dose of **3-6 vials**

Bites by **African spitting cobras** (Naja spp.) - Administer initial dose of **20-40vials**

(2) Snake bite with Neurotoxic Envenoming Syndrome-

Bites by **Mambas** (Dendroaspis spp.)- Administer initial dose of **10-25 vials**

Bites by **Neurotoxic cobras** (Naja spp.)- Administer initial dose of **20-40 vials**

Venoms sourced from multiple origins

Snake Venom	Venom origins
Bitis arietans	Namibia, Kenya,South Africa,Togo,Tanzania
Bitis gabonica	Tanzania, DRC,South Africa,Zimbabwe
Bitis nasicornis	Ghana, Uganda,Togo,DRC,Tanzania
Bitis rhinoceros	Ghana,Togo
Echis leucogaster	Niger, Ghana, Mali
Echis ocellatus	Nigeria,Togo, Ghana, Cameroon, Benin
Naja haje	Egypt, Morocco, Burkina Faso,Tanzania
Naja melanoleuca	Togo, DRC, Uganda, Zimbabwe, South Africa,Tanzania, Cameroon
Naja nigricollis	Togo,Tanzania, Cameroon, Ghana, Niger
Dendroaspis polylepis	South Africa,Tanzania, Kenya
Dendroaspis jamesoni	Uganda, DRC
Dendroaspis viridis	Benin,Togo, Ghana
Dendroaspis angusticeps	Zimbabwe,Tanzania, South Africa

Extensive Pre-clinical assessment by independent research groups

1. Preclinical evaluation of three polyspecific antivenoms against the venom of Echis ocellatus: Neutralization of toxic activities and antivenomics: Toxicon 119 (2016) pp 280-288

2. The medical threat of mamba envenoming in Sub-saharan Africa revealed by genus-wide analysis of venom…: Journal of Proteomics; August (2017)

3. Preclinical antivenom-efficacy testing reveals potential disturbing deficiencies of snakebite treatment capability in East Africa: PLOS-Neglected Tropical Disease-October 18, (2017)

4. Assessment of quality, safety, and pre-clinical toxicity of an equine polyvalent anti-snake venom (Pan Africa): Determination of immunological cross-reactivity of antivenom against venom samples of Elapidae and Viperidae snakes of Africa: Toxicon 153 (2018) 120–127

5. Harnessing the Cross-Neutralisation Potential of Existing Antivenoms for Mitigating the Outcomes of Snakebite in Sub-Saharan Africa: Int. J. Mol. Sci. (2024), 25, 4213.

PANAF-Premium™
(Pan-African Polyvalent Antivenom)

Name of snake species with common name	
Naja annulifera (Snouted cobra)	*Dendroaspis polylepis* (Black mamba)
Naja guineensis (Black forest cobra)	*Dendroaspis jamesoni* (Jameson's mamba)
Naja haje (Egyptian cobra)	*Dendroaspis angusticeps* (Eastern green mamba)
Naja melanoleuca (Forest cobra)	*Dendroaspis viridis* (Western green mamba)
Naja mossambica (Mozambique spitting cobra)	*Bitis arietans* (Puff adder)
Naja nigricollis (Black-necked spitting cobra)	*Bitis nasicornis* (Nose-horned viper)
Naja nigricincta (Western barred spitting cobra)	*Bitis gabonica* (Gaboon viper)
Naja pallida (Red spitting cobra)	*Bitis rhinoceros* (Rhinoceros viper)
Naja peroescobari (São Tomé cobra)	*Echis ocellatus* (West African carpet viper)
Naja savannula (West African banded cobra)	*Echis leucogaster* (White-bellied carpet viper)
Naja senegalensis (Senegalese cobra)	*Echis pyramidum* (East African carpet viper)
Naja subfulva (Brown forest cobra)	*Echis romani* (Roman's carpet viper)

Additionally it has shown cross-neutralization of venoms of N.ashei, N.nubiae, N.nivea and N.woodi

(Khochare, S.; Jaglan, A.;Rashmi, U.; Dam, P.; Sunagar, K.:Harnessing the Cross-Neutralisation Potential of Existing Antivenoms for Mitigating the Outcomes of Snakebite in Sub-Saharan Africa. Int. J. Mol. Sci.2024, 25, 4213. https://doi.org/10.3390/ijms25084213

Status in Kenya

- PANAF-Premium™ is registered with PPB
- It has been supplied to KEMSA and widely distributed in health care facilities in Kenya.
- Training of Health Care Workers have been carried out at key locations
- Currently multicentric Post Marketing Surveillance study is going on in Kenya
- **Distributor in Kenya**

  Nairobi Enterprises,

  Saachi Plaza B-Wing 1, Argwings Kodhek Road, Kilimani, P.O.Box 42367-00100, Nairobi, KENYA.

Status in East African countries

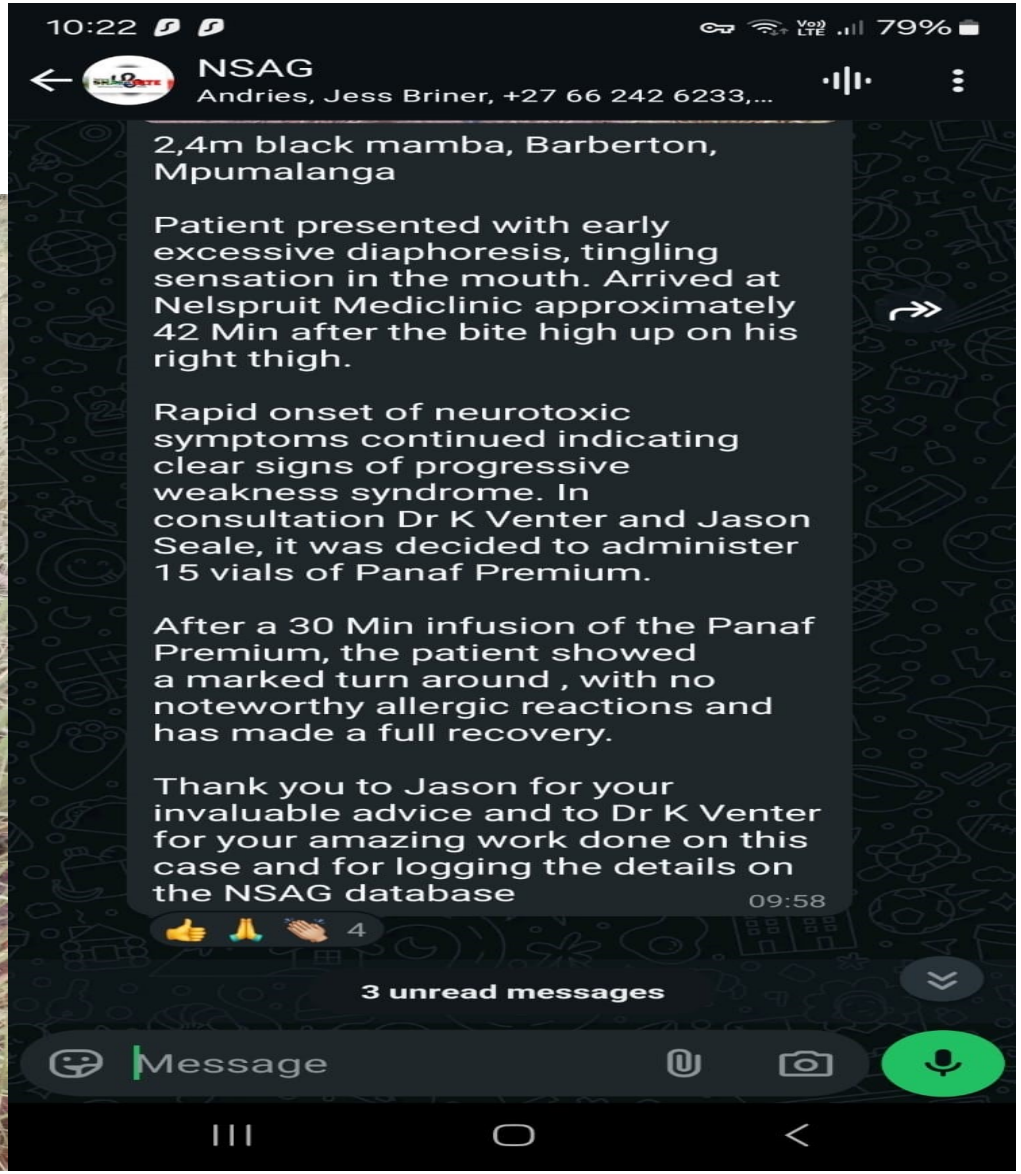
Name of country	Distributor 's name	Registration status	Remark
Burundi	**Alchem Industries SURL** 13, Rue Da La Victorie, B.P. 2491 Bujumbura, BURUNDI	Under Registration	-
Rwanda	**Depot Pharmaceutique Le Medical** P.O.Box 5353 Kigali, RWANDA.	Under Registration	-
South Sudan			Supply thro' WHO
Tanzania	**Kastipharm Ltd** Haidery Plaza, Plot 519/14 Block 14 Kistu/Upanga Street, Dar Es Sallam, TANZANIA.	Registered	-
Uganda	**Norvik Enterprise** 78/3, Kampala Road, P.O.Box. 21034, Kampala, UGANDA.	Under Registration	-

Product has been supplied in these countries

PANAF-Premium™ is widely distributed

- South Africa, Botswana, Lesotho, Uganda, Gambia, Malawi, Zimbabwe, South Sudan, Kenya, Tanzania, Rwanda, Burundi, Congo, Namibia, Angola, Zambia, Mozambique, Cameroon, Togo, Ghana, Nigeria, Eritrea, Ethiopia, Gabon, Mauritania, Mali, Spain, Netherlands and USA
- Also to various countries through UNICEF, MSF & WHO

Case Report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79%
NSAG
Andries, Jess Briner, +27 66 242 6233,...
2,4m black mamba, Barberton, Mpumalanga
Patient presented with early excessive diaphoresis, tingling sensation in the mouth. Arrived at Nelspruit Mediclinic approximately 42 Min after the bite high up on his right thigh.
Rapid onset of neurotoxic symptoms continued indicating clear signs of progressive weakness syndrome. In consultation Dr K Venter and Jason Seale, it was decided to administer 15 vials of Panaf Premium.
After a 30 Min infusion of the Panaf Premium, the patient showed a marked turn around , with no noteworthy allergic reactions and has made a full recovery.
Thank you to Jason for your invaluable advice and to Dr K Venter for your amazing work done on this case and for logging the details on the NSAG database
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3 unread messages
Message

Thanks
for
your attention