

JCS SEAL

Campaign Analysis Report

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U-145,017-02

8 October 2002

(U) **Subject:** Venomous Snakes and Scorpions in Iraq, and Their Antivenin Sources

1. (U) **Purpose:** To specify the venomous snakes and scorpions inhabiting Iraq and discuss the best manufacturer from which to obtain related antivenins.

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Executive Summary

Military forces deployed to Iraq will be at increased risk for venomous snakebites and scorpion stings. The most effective treatment for significant snake or scorpion envenomation (the act of injecting venom by a bite or sting) is geographic- and species-specific antivenin. The Saudi Arabia National Antivenin and Vaccine Production Center in Riyadh is the best regional source for antivenin to treat envenomation from snakes and scorpions found in Iraq and the Arabian Peninsula.

2. (U) Key Points:

A. (U) Seven venomous snake species and four venomous scorpion species found in Iraq are capable of inflicting life-threatening wounds. The most appropriate treatment for significant snake or scorpion envenomation is geographic- and species-specific antivenin administered by trained medical personnel.

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Antivenin

Geographic- and species-specific antivenin administered by medical personnel is the primary recommended treatment for snakebites and scorpion stings with significant envenomation. Most antivenin is produced by injecting snake or scorpion venom in increasingly higher doses into horses, thereby inducing the animal's immune system to produce antibodies to the venom. The horse's blood is collected and processed to manufacture antivenin, a process that can take 6 to 8 weeks. Antivenin is marketed freeze-dried in glass vials or as a liquid in ampoules. Most antivenin has a shelf life of about 3 years.

The quality of antivenin and efficiency of production are directly related to the age and health of both the biting snakes and the horses used in manufacturing the antivenin as well as quality control practices in the facility that produces the antivenin. The World Health Organization has published guidelines for properly producing antivenin, and it recommends using horses between age 5 and 10 to

produce antivenin. Approximately 15 to 20 percent of recipients of horse-derived antivenin may demonstrate side effects. Medical personnel administering antivenin should be trained and equipped to treat adverse antivenin reactions.

B. (U) Six of Iraq's venomous snakes are classified as true vipers. These snakes produce hemotoxic venom that causes severe damage to blood cells and tissue of bite victims. Perhaps the most deadly member of this group is the saw-scaled viper (*Echis carinatus*), which is found throughout Iraq and the Arabian Peninsula.

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Scientific Name	<i>Echis carinatus</i>	
Range	Southern Iraq	
Venom	Hemotoxic--markedly hemorrhagic	
Antivenin Available	Yes	
Antivenin Source	Saudi Arabia, Iran	
Common Names	Persian sand viper	
Scientific Name	<i>Pseudocerastes persicus persicus</i>	
Range	Northern Iraq	
Venom	Hemotoxic	
Antivenin Available	Yes	
Antivenin Source	Iran	
Common Names	Field's sand viper	
Scientific Name	<i>Pseudocerastes persicus fieldi</i>	
Range	Southwestern Iraq	
Venom	Hemotoxic	
Antivenin Available	Yes	
Antivenin Source	Iran	
Common Names	Desert black snake, desert black cobra	
Scientific Name	<i>Walterinnesia aegyptia</i>	
Range	Countrywide	
Venom	Neurotoxic--markedly so	
Antivenin Available	Yes	
Antivenin Source	Saudi Arabia, Israel	
SCORPIONS		
Common Names	Death stalker	
Scientific Name	<i>Leiurus quinquestriatus</i>	
Range	Countrywide	

Venom	Neurotoxic	
Antivenin Available	Yes	
Antivenin Source	Saudi Arabia, France	
Common Names	Black scorpion	
Scientific Name	<i>Androctonus crassicauda</i>	
Range	Countrywide	
Venom	Neurotoxic	
Antivenin Available	Yes	
Antivenin Source	Saudi Arabia	
Common Names	Fat-tailed scorpion	
Scientific Name	<i>Androctonus amoreuxi</i>	
Range	Countrywide	
Venom	Neurotoxic	
Antivenin Available	Yes	
Antivenin Source	Saudi Arabia	
Common Names	None	
Scientific Name	<i>Hemiscorpius lepturus</i>	
Range	Countrywide	
Venom	Cytotoxic	
Antivenin Available	No	
Antivenin Source	None	

C. (U) The desert black snake/desert black cobra (*Walterinnesia aegyptia*) also is widely distributed in Iraq. This snake has neurotoxic venom that can disrupt the human central nervous system, hampering both respiration and heart functions. Significant envenomation by any of these seven snakes is considered a medical emergency requiring antivenin therapy, which should be administered in a medical facility by trained medical personnel.

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Table 2
Manufacturers of Antivenin for Snakes and Scorpions of Iraq.

MANUFACTURER	SNAKE ANTIVENINS	SCORPION ANTIVENINS
Saudi Arabia National Antivenin and Vaccine Production Center Al Haya Medical Company P.O. Box 442 Riyadh 11411, Saudi Arabia Telephone: 00966 1 4655075; fax 00966 1 4652354	Polyvalent (equine) for puff adder (<i>Bitis arietans</i>), desert-horned viper (<i>Cerastes cerastes</i>), saw-scaled viper I (<i>Echis carinatus</i>), saw-scaled viper II (<i>Echis coloratus</i>), Arabian cobra (<i>Naja haje</i>), desert black snake/desert black cobra (<i>Walterinnesia aegyptia</i>). Bivalent (equine) for Arabian cobra (<i>Naja haje</i>), desert black snake/desert black cobra (<i>Walterinnesia aegyptia</i>).	Polyvalent (equine) for black scorpion (<i>Androctonus crassicauda</i>), death stalker/yellow scorpion (<i>Leiurus quinquestriatus</i>), fat-tailed scorpion (<i>Androctonus amoreuxi</i>), and many other scorpions of the Middle East and North Africa.
Razi Vaccine and Serum Research Institute Hessarah-Karadj P.O. Box 11365-1558 Tehran, Iran Telephone: 98-261-452-005/9; fax 98-262-452-194; email rirc@neda.net.ir	Polyvalent (equine) for Indian cobra (<i>Naja naja</i>), Levantine viper/blunt-nosed viper (<i>Vipera lebetina</i>), Persian/field's sand viper (<i>Pseudocerastes persicus</i>), saw-scaled viper (<i>Echis carinatus</i>), Latifi's viper (<i>Vipera latifi</i>), mamushi (<i>Agkistrodon halys</i>). Monovalent (equine) for all the above snakes.	Polyvalent (equine) for all scorpions of the Middle East (no further information).
Rogoff Medical Research Institute Tel Aviv University Ramat Ave Tel Aviv, Israel Telephone: 972-3-640-9816; fax: 972-3-640-9403	Monovalent (equine) for desert black snake/desert black cobra (<i>Walterinnesia aegyptia</i>).	
Pasteur-Merieux-Connaught 58 Ave Leclerc, 69007 Lyon, France Telephone: 33-4-37370100; fax 33-4-37-37-7737	Polyvalent (equine) for puff adder (<i>Bitis arietans</i>), white-bellied saw-scaled viper (<i>Echis leucogaster</i>), Egyptian cobra (<i>Naja haje</i>), black-necked spitting cobra (<i>Naja nigricollis</i>), desert-horned viper (<i>Cerastes cerastes</i>), Sahara viper (<i>Microvipera deserti</i>)	Polyvalent (equine) for fat-tailed scorpion (<i>Androctonus australis hector</i>), death stalker (<i>Leiurus quinquestriatus</i>), no common name (<i>Buthus occitanus mardachei</i>)

D. (U) Iraq has a number of scorpions that inflict painful stings on humans. Four of these scorpions can deliver dangerous, possibly life-threatening injuries to humans. Three of the four scorpions of medical

importance have neurotoxic venom; polyvalent scorpion antivenin produced in Iran and Saudi Arabia is available for treating significant envenomation injuries inflicted by these scorpions. The fourth scorpion (*Hemiscorpius lepturus*) has highly cytotoxic venom, which can cause serious wounds with necrosis that are difficult to heal. No antivenin exists for treating sting victims of *H. lepturus*.

E. (U) Venomous snakes and scorpions represent a potentially serious threat to US and coalition forces deployed to Iraq. The risk of venomous snakebites and scorpion stings will be higher for ground forces during field operations. Although total numbers of bite and sting casualties will likely be very small, victims are at risk for sustaining serious injury, disability, and possible death. Successfully treating these casualties requires knowledge of emergency first aid and management of the bite or sting site. The most important decision will likely be determining if antivenin should be administered; not all snakebites or scorpion stings result in significant envenomation requiring antivenin. The degree of envenomation is judged according to clinical criteria such as the presence of widely distributed pain, edema progressing toward the trunk, petechiae (pinpoint reddish rash) or ecchymosis (hemorrhagic spots), and systemic symptoms including fever, nausea, or vomiting. Clinicians should be aware that most antivenins are produced from horses, and approximately 15 to 20 percent of patients receiving equine-based antivenins will exhibit adverse side effects.

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Table 3 Possible Early Adverse Reactions to Current Snake Antivenins		
Reaction	Cause	Symptoms
Pyrogenic	Interaction between antivenin or bacterial endotoxins present in antivenin and the patient's macrophages	Include fever and chills
Anaphylactic	Immunoglobulin E-mediated. Occurs in individuals previously sensitized to horsemeat, horse fur, and other equine-derived heterologous antivenins	May include unconsciousness, shock, and death
Anaphylactoid	Does not involve previous sensitization. May occur when the first antivenin dose is administered	Similar to anaphylactic

F. (U) The availability of species-specific antivenin manufactured under rigorous good manufacturing practices is of paramount importance. The Saudi Arabia National Antivenin and Vaccine Production Center in Riyadh is assessed as the best source of antivenin for treating bites from venomous snakes and scorpions native to Iraq and the Arabian Peninsula. The Razi Institute in Iran also reportedly produces various polyvalent and monovalent vaccines for snake and scorpion envenomations.

G. (U) Military personnel could sustain a wound from a snake or scorpion for which no specific antivenin is available. In these instances, one option is using polyvalent antivenin that might contain genus-specific antivenin. In cases where the exact identification of the snake or scorpion is unknown, polyvalent antivenins should be considered.

Prepared by:

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Table 1		
Iraq - Venomous Snakes and Scorpions of Medical Importance.		
VENOMOUS SNAKES		
Common Names	Blunt-nosed viper, Levantine viper	?
Scientific Name	<i>Vipera lebetina</i>	
Range	Throughout Iraq	
Venom	Hemotoxic	
Antivenin Available	Yes	
Antivenin Source	Iran	
Common Names	Kurdistan viper	?
Scientific Name	<i>Vipera raddei</i>	
Range	Extreme northern Iraq, Kurdistan	
Venom	Hemotoxic	
Antivenin Available	No	
Antivenin Source	None	
Common Names	Desert-horned viper	?
Scientific Name	<i>Cerastes cerastes</i>	
Range	Southern Iraq	
Venom	Hemotoxic	
Antivenin Available	Yes	
Antivenin Source	Saudi Arabia, France	
Common Names	Saw-scaled viper	?
Scientific Name	<i>Echis carinatus</i>	
Range	Southern Iraq	
Venom	Hemotoxic--markedly hemorrhagic	
Antivenin Available	Yes	
Antivenin Source	Saudi Arabia, Iran	

Common Names	Persian sand viper	?
Scientific Name	<i>Pseudocerastes persicus persicus</i>	
Range	Northern Iraq	
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Antivenin Source	Iran	
Common Names	Field's sand viper	?
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Venom	Hemotoxic	
Antivenin Available	Yes	
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Scientific Name	<i>Walterinnesia aegyptia</i>	
Range	Countrywide	
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Antivenin Available	Yes	
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Common Names	Death stalker	?
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