



# A preliminary survey of Hong Kong snake shops and the potential snake bite risks for the healthcare system

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**Summary** Consumption of snakes is a traditional part of Chinese life. Snake shops, which provide both the food products and live snakes to the public, are believed by the medical community to stock only local species. The medical risk posed by these live snakes is therefore regarded as manageable as they are indigenous and thus effective anti-snake venom (ASV) is believed to be available. This study visited four snake shops, reviewed the snakes present and interviewed the vendors regarding the snakes' likely geographical origin. Snakes species were definitively identified and, in addition, the current stocking of ASV by hospitals in terms of amount and species covered was determined. Snakes were also examined to determine whether they had been de-fanged and thus rendered unable to inflict a venomous bite. The study identified that non-indigenous species are being imported, capable of delivering a venomous bite, which provide a tangible medical risk as ASV is not available to deal with envenomations. © 2009 Royal Society of Tropical Medicine and Hygiene. Published by Elsevier Ltd. All rights reserved.

## 1. Introduction

Snake bite is correctly regarded as primarily a problem of the rural agricultural worker undertaking agricultural activities. Subsistence farming is a common cause of snake bite. How-

ever, other cultural activities can also create unique risks of snake bite and present particular problems to treating physicians and authorities. In China, the practice of consuming snakes for food necessitates the existence of snake shops, which provide either live snakes for consumption or food-stuffs containing snakes.<sup>1</sup> Snake soup is the dish of choice in these establishments.

The need for these shops to store and provide live snakes, particularly venomous species, could pose potential risks to the employees and members of the public who attend these

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**Table 1** Number of snake bites recorded in Hong Kong Special Administrative Region, China, by the Clinical Data Analysis and Reporting System

Hong Kong Cluster	No. of bites recorded <sup>a</sup>
Hong Kong West Cluster	1
Hong Kong East Cluster	7
Kowloon West Cluster	9
Kowloon Central Cluster	6
Kowloon East Cluster	2
New Territories West Cluster	35
New Territories East Cluster	23

<sup>a</sup> These figures are bites, not envenomations.

premises. An enduring assumption is that the snakes in these premises are de-fanged and thus unable to bite and therefore envenomate victims.<sup>1</sup> In addition, the presence of local species in these premises should provide a low risk of mortality, as local medical facilities would be equipped with effective anti-snake venom (ASV).

The objective of this study was to examine the potential risk presented by these facilities and to determine the implications for the local medical response.

## 2. Method

### 2.1. Study area

Hong Kong is divided into seven Clusters or areas for administrative purposes, each with a main hospital or 'Cluster Hospital' supported by a number of acute hospitals. The New Territories West Cluster (NTWC) represents a significant portion of bites in Hong Kong and is situated in the non-urban area of Hong Kong. In 2007, NTWC recorded 35 cases of snake bite on the Clinical Data Analysis and Reporting System (CDARS) (Table 1). Of these, 13 patients were determined to constitute envenomations and were administered ASV. NTWC has a population of approximately 1.0 million, which would indicate a bite rate of 3.5/100 000 and an envenoming rate of 1.3/100 000. It should be noted that NTWC is regarded as a 'high' snake bite area in Hong Kong, with 42% of the total bites. Two hospitals serve the area, Tuen Mun Hospital (TMH), which is a Cluster Hospital, and Pok Oi Hospital (POH), which is an acute hospital; both are equipped with Accident and Emergency Departments and handle all snake bites in the NTWC area. The road infrastructure is excellent and journey times for snake bite victims are seldom more than 30 min. Both hospitals are equipped with

advanced equipment, including ventilators and resuscitation equipment.

Kowloon West Cluster (KWC) has Princess Margaret Hospital as the Cluster Hospital, with Yan Chai Hospital, Caritas Medical Centre and Kwong Wah Hospital as acute hospitals. KWC is situated in the urban area of Hong Kong.

The CDARS recorded 83 cases of snake bite for Hong Kong in total in 2007 (Table 1). Hong Kong's population in 2007 is recorded at 6.93 million,<sup>2</sup> which would indicate a bite level of 1.23/100 000 for Hong Kong in total.

Key snakes of medical significance in Hong Kong are the white-lipped pit viper (*Cryptelytrops albolabris*), the Chinese cobra (*Naja atra*), the Chinese or many-banded krait (*Bungarus multicinctus*) and the banded krait (*Bungarus fasciatus*).<sup>3-8</sup>

### 2.2. Approach

The research team visited four snake shops in NTWC and KWC in September 2008, selected on the basis of local reputation for high levels of customer activity and the presence of live snakes. The team carried out snake counts at each location and examined morphological keys such as dorsal scales, head scales and description, which were used to identify species. In the case of cobras, dorsal scale counts, paying particular emphasis to scale counts behind the hood, were carried out to verify which species of cobra was present.<sup>9</sup>

The owners of the shops were interviewed to determine: (i) the geographical origin of the species; (ii) the volume of snakes ordered; and (iii) whether snakes had been de-fanged.

### 2.3. Anti-snake venom availability

A review was carried out at TMH and POH to determine ASV stocks, types of ASV available, species against which the ASV was effective, amount and how these stocking levels were derived.

## 3. Results

Details of the snake species identified in each shop are presented in Table 2.

The majority of cobras were identified as being in the 23–29 dorsal scale range behind the hood, however two cobras had a scale count of 31, which identified them as being not *N. atra* but rather another cobra species, most likely *Naja kaouthia* owing to

**Table 2** Details of live snake species and status identified in four snake shops in Hong Kong

Location	<i>Naja atra</i>	<i>Bungarus multicinctus</i>	<i>Ophiophagus hannah</i>	<i>Elaphe radiata</i>	<i>Naja kaouthia</i>	<i>Rhabdophis subminiatus helleri</i>
Shop 1	11				2 <sup>L</sup> (31) <sup>a</sup>	
Shop 2	2			8		
Shop 3	8		1 <sup>L</sup>			1 <sup>L</sup>
Shop 4	9	1 <sup>L</sup>	1			1 <sup>L</sup>

<sup>L</sup>: potentially lethal in that the snake had not been de-fanged and was capable of a venomous bite.

<sup>a</sup> 31 = dorsal scale count just behind the hood; all other cobras were in the 23–29 dorsal scale range at that position.

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