

Epidemiology of venomous snakebites in Taiwan and further prospects

台灣毒蛇咬傷流行病學現況及未來展望

Dr. Chih-Chuan Lin

Assistant professor

Emergency medicine department

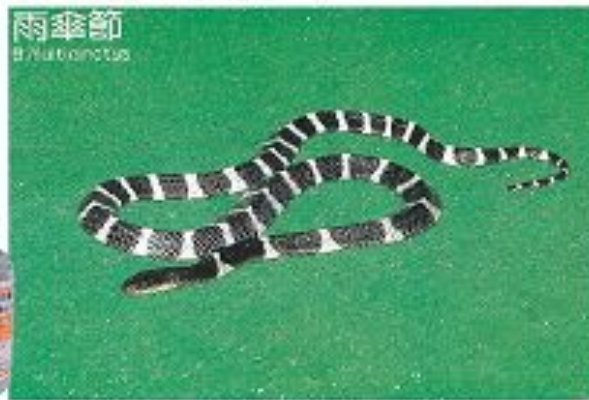
LinKou medical center, Chang Gung Memorial Hospital

toxicology and HAZMAT committee, TSEM

six
medically
important
venomous
snake
species
in Taiwan



學名: <i>Hydrophis obsoletus</i>	俗名: 巨太龍蝦	分類地位:
科名: 海蛇科、海蛇屬	分布: 主要分布在阿拉伯海、孟加拉灣、印度洋的東部。	分布範圍:
科名: 海蛇科		分布範圍:



姓名: 李金明	性别: 男	出生年月: 1985.10	民族: 汉族	籍贯: 湖南长沙	学历: 本科	学位: 学士	专业: 计算机科学与技术	职称: 助理工程师	工作单位: 湖南大学	联系电话: 13808888888	电子邮箱: 123456789@163.com
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URL: http://www.southchina.com.hk	语言: 简体中文, 英文, 粤语	搜索引擎: 中文, 英文
语言: 普通话, 广东话	地区: 中国大陆的福建, 浙江, 江西	1. 中文, 英文, 繁体中文, 粤语
语言: 普通话		2. 大陆, 香港, 台湾, 海外
		3. 大陆, 香港, 台湾, 海外, 大陆, 香港, 台湾, 海外

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hemorrhagic venom (FH group)

- local tissue swelling
- compartment syndrome.
- surgical intervention such as debridement, fasciotomy or graft may be needed.



neurotoxic venom (FN group)

- *Naja atra* (Chinese or Taiwan cobra)
tissue necrosis
- *Bungarus multicinctus* (Taiwan banded krait).
respiratory distress and some other manifestations such as diplopia, dysarthria and extremity paralysis.

NHI database, 2005 ~ 2009

- 4647 snakebites victims

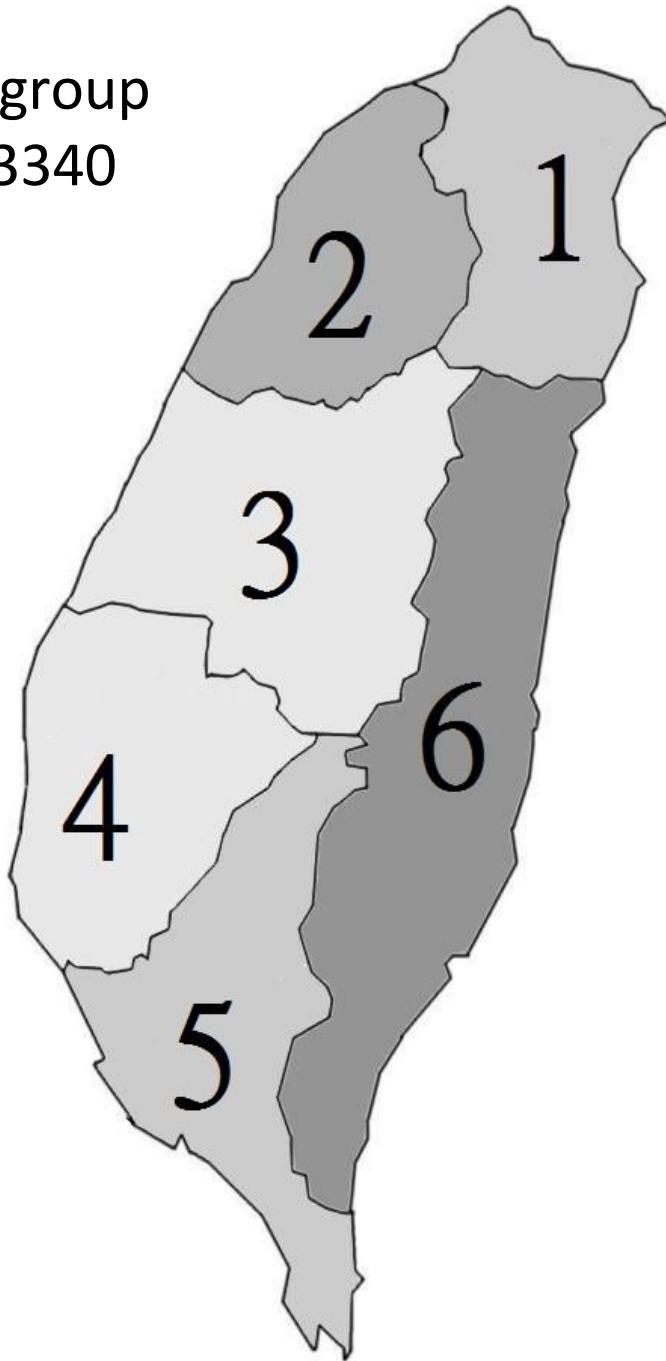
FH + FN

Undetermined Dx?
Inadequate training?
"Syndromic approach"?

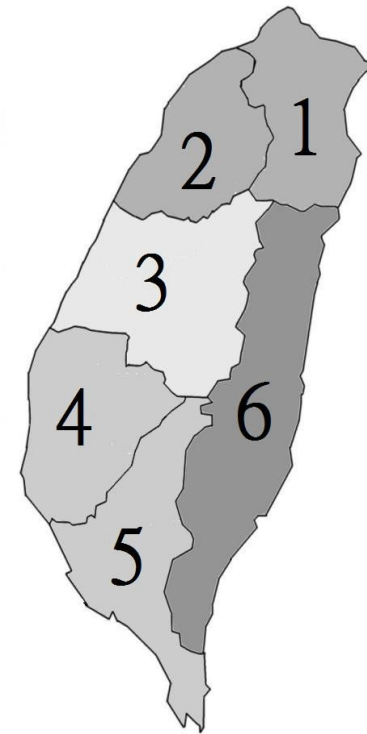
FH	3340	71.87%
FN	893	19.21%
mixed	380	8.1%
FA	34	0.73%

Nationwide annual incidence	40.49 / million persons
FH group	29.10 / million persons
FN group	7.78 / million persons
FA group	0.30 / million persons
mixed group	3.31 / million persons

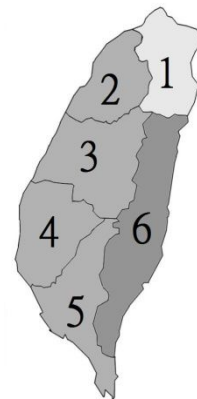
FH group
N=3340



FN group
n=893



FA
n=34

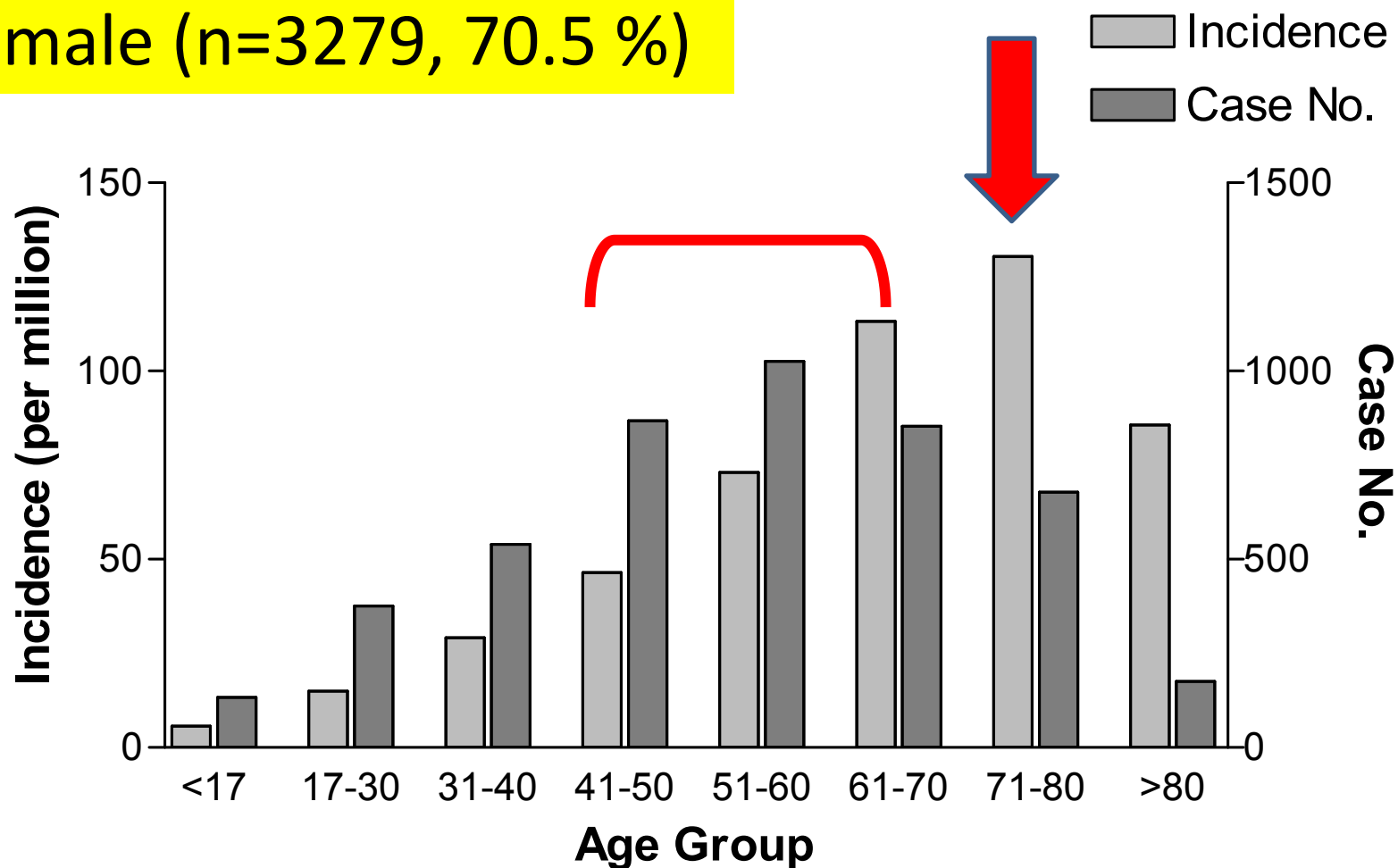


The case numbers and incidences

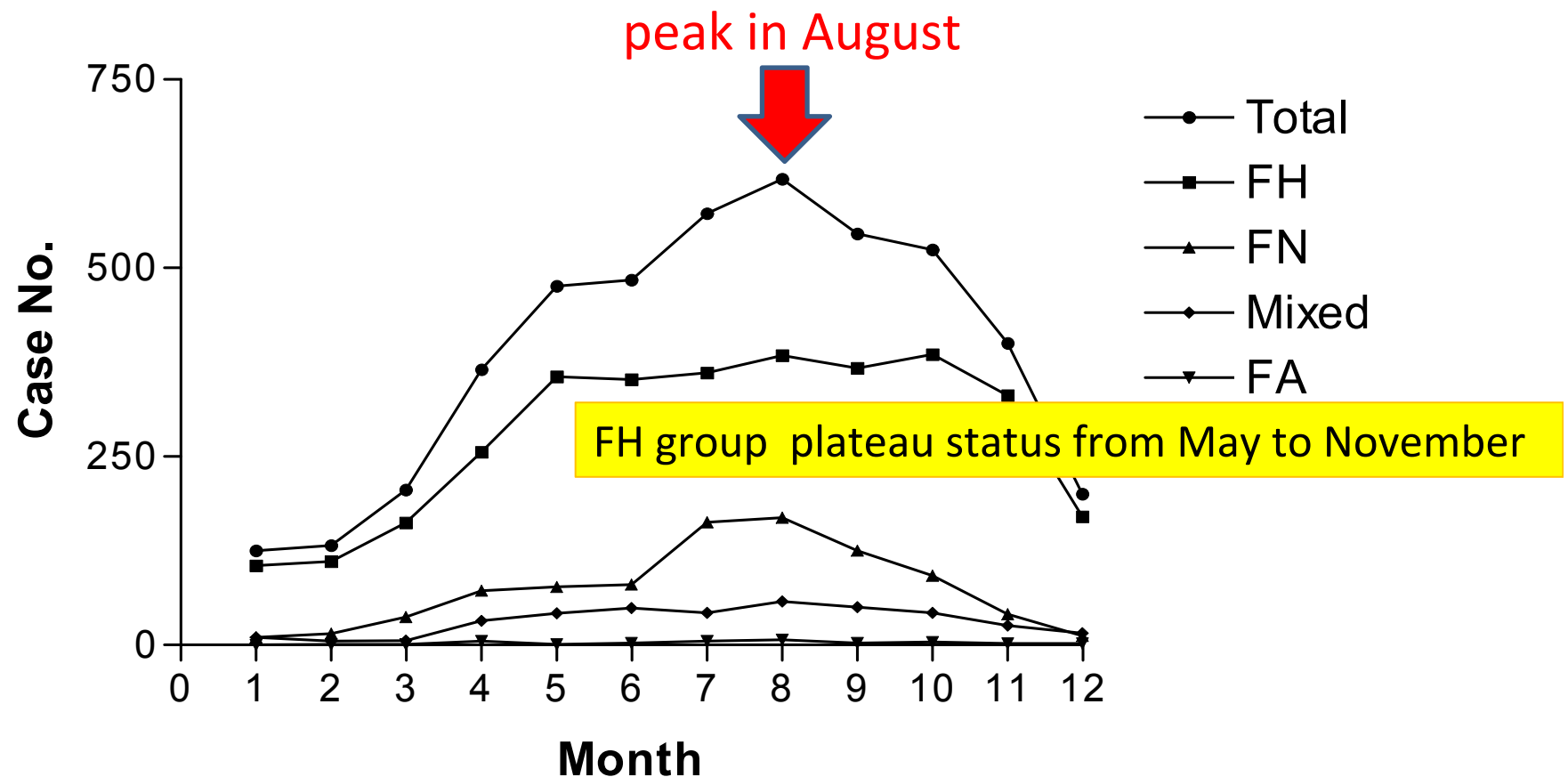
District	FH		FN		FA		Mixed		Total	
	Case No.	Incidence	Case No.	Incidence	Case No.	Incidence	Case No.	Incidence	Case No.	Incidence
1	1099	30.22	81	2.23	7	0.19	96	2.64	1283	35.28
2	479	28.26	133	7.85	2	0.12	93	5.49	707	41.71
3	396	17.78	203	9.11	4	0.18	51	2.29	654	29.37
4	345	20.17	142	8.30	1	0.06	42	2.46	530	30.99
5	416	22.77	187	10.24	4	0.22	37	2.03	644	35.25
6	605	209.25	147	50.87	16	5.52	61	21.05	829	286.70
Total	3340	29.10	893	7.78	34	0.30	380	3.31	4647	40.49

Age distribution of snakebites in Taiwan during 2005-2009

male (n=3279, 70.5 %)



Month distribution of snakebites in Taiwan during 2005-2009.



77 % (n=3584) from April to November

Clinical characteristics

	FH N=658	FN N=157	FA N=6	Mixed N=71
Allergy	31(4.7%)	11(7.0%)	0	6 (8.5%)
No antibiotics	119(18.1%)	37 (23.6%)	4 (66.7%)	10(14.1%)
Antibiotics				
Penicillins	152(23.1%)	49 (31.2%)	1 (16.7%)	50(70.4%)
Cephalosporins	430(65.3%)	90 (57.3%)	1 (16.7%)	18(25.4%)
Aminoglocosides	154(23.4%)	41 (26.1%)	0	0
Quinolones	9 (1.4%)	7 (4.5%)	0	10(14.1%)
Others	31 (4.7%)	7 (4.5%)	0	0
Surgical intervention				
Debridement	12	12	0	0
Fasciotomy	13	15	0	0
Grafting	9	17	0	0
Others	18	4	0	0
Total	52(7.9%)	48(30.6%)	0	0

Outcomes

The FA group highest ICU admission rate, and the FH group the lowest.

Group	Case No.	Ward (%)	ICU (%)	Death (%)
FH	2644	837 (31.7%)	42 (1.6%)	0
FN	736	222 (30.2%)	45 (6.1%)	1 (0.1%)
FA	28	12 (42.9%)	4 (14.3%)	0
Mixed	1239	591 (47.7%)	78 (6.3%)	1 (0.08%)
Total	4647	1662 (35.8%)	169 (3.6%)	2 (0.04%)

why success

- High quality antivenoms
- Medical Education: PCC and TSEM AILS course(developed by toxicology and HAZMAT committee)

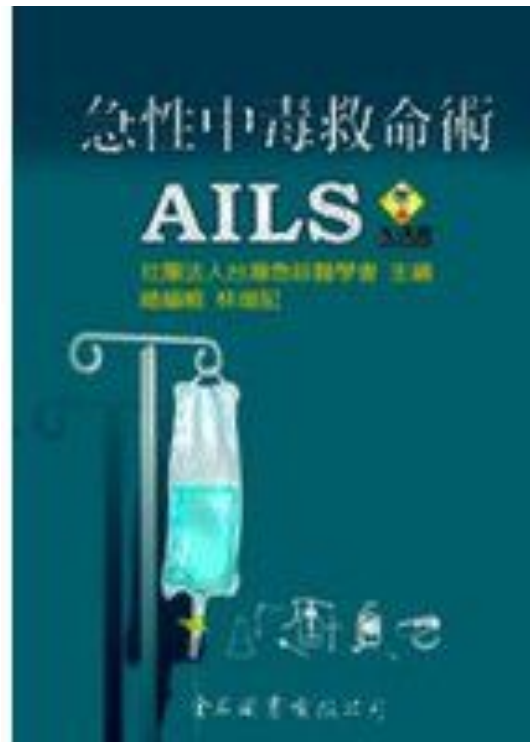


Table 1. Characteristics of snake bite victims in South Asia.

Characteristic	Details
Age	The mean age of snake bite victims is around 30 years. Three-quarters of the victims are in the 10- to 40-year age group, broadly in agreement with demography.
Gender	There is a clear preponderance of males among snake bite victims. A 2:1 male to female ratio is frequently observed.
Occupation	Farmers account for more than half of the victims. Students and housewives are also frequently bitten.
Time of bite	The time of bite depends on the relative abundance of diurnal and nocturnal snakes. Krait bites generally occur at night, whereas viper and cobra bites mostly occur during daytime.
Site of bite	60%–80% of bites occur on the foot, ankle, or leg. Bites on the head and trunk are mostly due to nocturnal species biting sleeping people.
Delay between bite and treatment	The bite-to-treatment delay varies greatly, ranging from 30 minutes to 15 days. Most studies show that at least 60% of victims reach a health centre within six hours but very few in less than one hour.
First aid methods	In eight out of 15 studies, more than 50% of snake bite victims used inappropriate and harmful first aid methods. Tourniquets are used by up to 98% of patients.
Mortality	Mortality rates are highly variable, ranging from 0.5% to 58%. Most fatalities occur before reaching treatment centres.

Further aspects

- good outcomes in treating venomous snakebites in Taiwan.
- 8.1% -- the mixed group



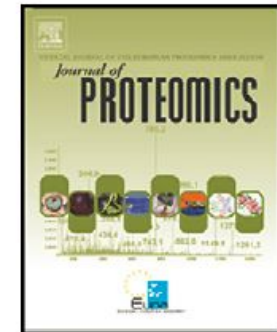
“Syndromic approach”
Lacking of specific diagnostic test
Severity assessment



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Review

Snake venomomics and antivenomics: Proteomic tools in the design and control of antivenoms for the treatment of snakebite envenoming

José María Gutiérrez^{a,*}, Bruno Lomonte^a, Guillermo León^a, Alberto Alape-Girón^{a,b,c}, Marietta Flores-Díaz^a, Libia Sanz^d, Yamileth Angulo^a, Juan J. Calvete^d

Snake venomomics and antivenomics

inter- and
intra species
venom
variability

Antivenoms
effectiveness

quality control
of venom
preparations
used in
antivenom
manufacture

applications

**guided by
venom
proteome
analysis
“Antivenomics”**

Snake venomomics and antivenomics

preclinical testing
of antivenom
efficacy

using
functional
neutralization
assays

Eventually
alternative in
vitro tests for the
assessment of
antivenom
efficacy
substitute
current in vivo
tests.

Cobra test kit

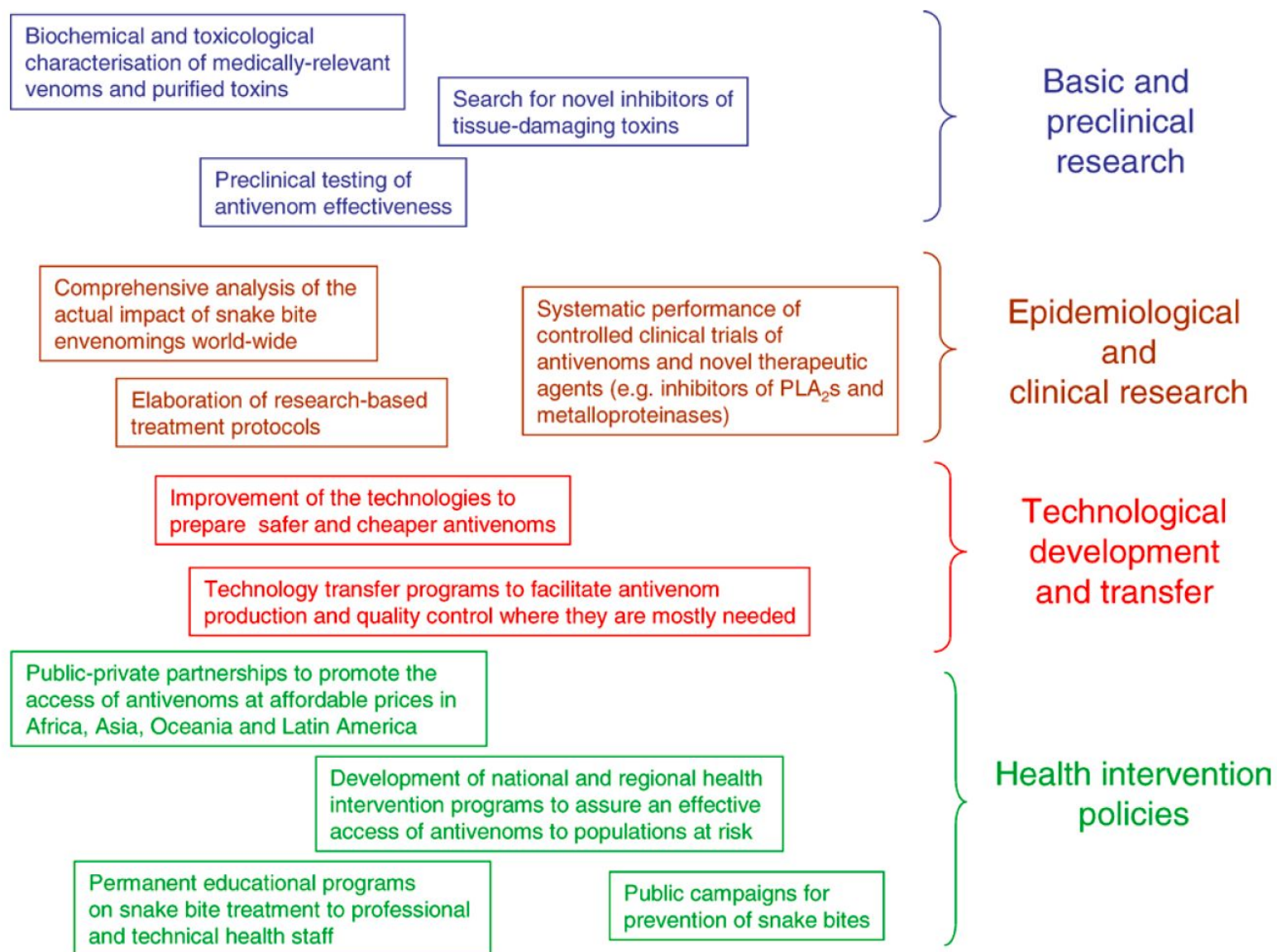


- At present time, the proteins of the venom of the 6 medically important venomous snake species of Taiwan have already identified. This may lead a further progress in developing detection kits and antivenoms

Neglected Diseases

Confronting the Neglected Problem of Snake Bite Envenoming: The Need for a Global Partnership

José María Gutiérrez*, R. David G. Theakston, David A. Warrell



DOI: 10.1371/journal.pmed.0030150.g003

Figure 3. Scientific, Technological, and Political Tasks Required to Improve the Prevention and Treatment of Snake Bite Envenoming

There is an urgent need to gain a deeper knowledge of the epidemiology and clinical manifestations of snake bite envenoming around the globe, and to promote research and public health policies aimed at improving the treatment and prevention of these envenomings, particularly regarding antivenom production and distribution, as well as training of medical staff. The fulfilment of these tasks requires a concerted effort involving many actors at both national and international levels.

PLA₂s, phospholipases A₂.

"Co-operation"

