



Appendix

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Appendix to: Johnston CI, Ryan NM, Page CB, et al. The Australian Snakebite Project, 2005–2015 (ASP-20). *Med J Aust* 2017; 207: [119-125](#). doi: [10.5694/mja17.00094](#).

Table 1. Australian snake envenoming clinical syndromes.

<i>Syndrome</i>	<i>Definition</i>
<i>Coagulopathy</i>	
<i>Complete VICC</i>	Undetectable fibrinogen and/or raised D-Dimer (10x upper limit of normal or > 2.5mg/L) and INR > 3
<i>Partial VICC</i>	Low but detectable fibrinogen/elevated D-Dimer and a maximum INR < 3
<i>Anticoagulant coagulopathy</i>	Elevated aPTT based upon local laboratory range without evidence of VICC.
<i>Neurotoxicity</i>	Presence of a descending flaccid paralysis.
<i>Severe</i>	Bulbar or respiratory muscle paralysis; requirement for endotracheal intubation/mechanical ventilation.
<i>Myotoxicity</i>	
<i>Mild</i>	Raised creatine kinase > 1000 U/L
<i>Severe</i>	Raised creatine kinase > 10000 U/L
<i>Thrombotic microangiopathy</i>	Presence of intravascular haemolysis on blood film, thrombocytopenia and acute kidney injury
<i>Acute kidney injury</i>¹	
<i>Risk</i>	Serum Cr increased 1.5 to 2 times baseline or GFR decreased > 25%
<i>Injury</i>	Serum Cr increased 2 to 3 times baseline or GFR decreased > 50%
<i>Failure</i>	Serum Cr increased > 3 times baseline or GFR decreased > 75% or serum Cr > 4mg/dL; acute rise 0.5mg/dL
<i>Loss of function</i>	Persistent acute renal failure, complete loss of kidney function for > 4 weeks requiring dialysis
<i>Major Haemorrhage</i>	Major haemorrhage as defined by the International Society on Thrombosis and Haemostasis: <ul style="list-style-type: none"> a. Fatal bleeding, b. Symptomatic bleeding in a critical area or organ, such as intracranial, intraspinal, intraocular, retroperitoneal, intra-articular or pericardial, c. Bleeding causing a fall in Hb > 20 g/L, or leading to transfusion of 2+ units of whole blood or red cells
<i>Collapse</i>	Loss of consciousness usually associated with hypotension and/or apnoea
<i>Non-specific systemic symptoms</i>	Nausea, vomiting, abdominal pain, generalised diaphoresis and/or diarrhoea.

¹ Adapted from RIFLE criteria for acute renal failure (Bellomo R, Ronco C, Kellum JA, Mehta RL, Palevsky P, Acute Dialysis Quality Initiative w. Acute renal failure - definition, outcome measures, animal models, fluid therapy and information technology needs: the Second International Consensus Conference of the Acute Dialysis Quality Initiative (ADQI) Group. Crit Care. 2004; 8: R204-12). aPTT – activated partial thromboplastin time; INR – international normalised ratio; Hb - haemoglobin; Cr – creatinine; GFR – glomerular filtration rate.

Table 2. Activity at the time of snake bite.

Activity	Number of cases	Percentage
Walking/activity unknowingly near snake	730	47.1%
Attempting to catch or kill snake	224	14.5%
Gardening	128	8.3%
Snake keeper providing care for snake (e.g. medicating)	101	6.5%
Unknown/unspecified	85	5.5%
Accidentally stepped on snake	74	4.8%
Child playing	54	3.5%
Protecting pet	30	1.9%
Sitting on ground	18	1.2%
Mowing Lawn	17	1.1%
Recreationally interfering with snake	17	1.1%
Sleeping	17	1.1%
Fishing	16	1.0%
Going to toilet	12	0.8%
Snake education/training event	7	0.5%
Swimming	7	0.5%
Hanging out washing	7	0.5%
Run over with car	2	0.1%
Deliberate self-harm	2	0.1%

Table 3. Patient locality at the time of snake bite

Location at time of bite	Number of cases	Percentage
In yard around house	485	31.3%
Unknown/unspecified	248	16.0%
Inside building	220	14.2%
Bush or scrubland	173	11.2%
Nearby beach/waterway	112	7.2%
Farm	91	5.9%
Built-up outdoor area	71	4.6%
Parkland or golf course	53	3.4%
Inside shed/barn	37	2.4%
Bird enclosure	17	1.1%
Garage/car port	12	0.8%
Pool	11	0.7%
School	11	0.7%
Inside vehicle	7	0.5%

Table 4. Comparison of bite characteristics for envenomed and non-envenomed patients.

	Envenomed	Non-envenomed
Number of cases	835	713
Median age	40 y (IQR 24 to 54)	36 y (IQR 22 to 52)
Male	624 (74.7%)	511 (71.7%)
Snake handler	120 (14.3%)	48 (6.7%)
Intoxicated	47 (5.6%)	7 (1.0%)
PBI used	733 (87.7%)	572 (80.2%)
Bite site		
Upper limb	377 (45.1%)	269 (37.7%)
Lower limb	431 (51.6%)	382 (53.6%)
Torso	10 (1.2%)	3 (0.4%)
Head	2 (0.2%)	0 (0%)
Unknown	15 (1.8%)	59 (8.3%)

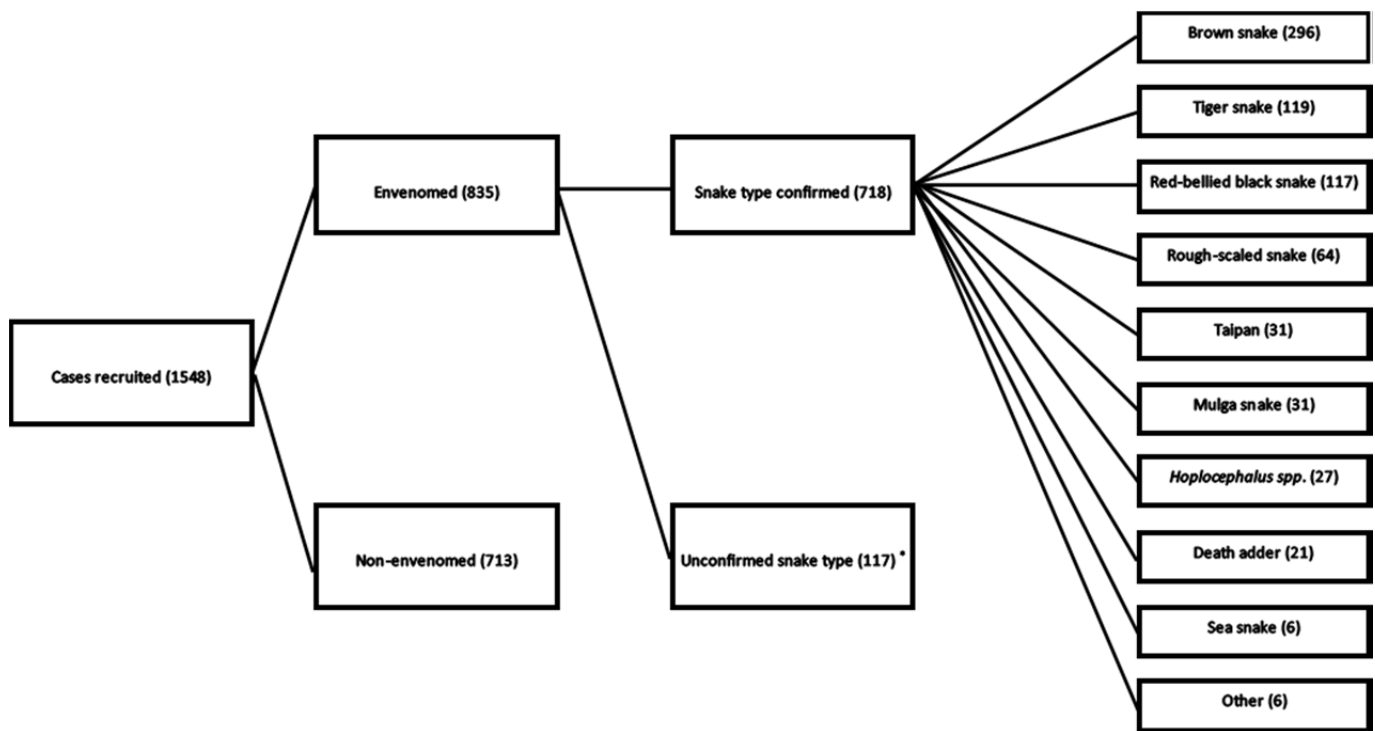
Table 5. Seqirus bite site VDK results for tests performed in non-envenomed patients.

			Seqirus VDK test result						
Snake Type	Scientific Name	VDK performed	Tiger snake	Brown Snake	Black Snake	Death adder	Taipan	Inconclusive	Negative
Black-bellied swamp snake	<i>Hemiaspis signata</i>	1	1	0	0	0	0	0	0
Broad headed snakes	<i>Hoplocephalus</i> spp.	2	1	0	0	0	0	1	
Brown snake	<i>Pseudonaja</i> spp.	18	0	13	0	0	0	0	5
Collett's Snake	<i>Pseudechis colletti</i>	1	0	0	1	0	0	0	0
Copperhead	<i>Austrelaps</i> spp,	2	1	0	0	0	0	0	1
Death adder	<i>Acanthophis</i> spp	6	0	0	0	6	0	0	0
Eastern Secretive Snake	<i>Cryptophis nigrescens</i>	1	0	0	0	0	0	1	0
Green tree snake	<i>Dendrelaphis punctulatus</i>	1	0	0	0	0	0	0	1
Mulga snake	<i>Pseudechis australis</i>	7	0	0	2	0	0	0	5
Non-venomous		3	0	0	0	0	0	1	2
Red-bellied black snake	<i>Pseudechis porphyriacus</i>	21	1	0	10	0	0	4	6
Taipan	<i>Oxyuranus</i> spp.	3	0	0	0	0	1	0	2
Tiger snake	<i>Notechis</i> spp.	4	3	1	0	0	0	0	0
Unknown		286	15	59	9	2	0	4	197
Whip Snake	<i>Demansia</i> spp.	7	1	4	0	0	0	0	2
White-crowned snake	<i>Cacophis harriettae</i>	1	0	0	0	1	0	0	0

Table 6. List of the reasons that antivenom was given in the 49 non-venomated patients who received antivenom.

Reason to administer antivenom	Number of cases
Symptoms potentially consistent with envenoming present	13 (27%)
VDK result	9 (18%)
Isolated raised serum creatine kinase	3 (6%)
Raised INR in patient treated with warfarin	3 (6%)
Isolated raised d-dimer	3 (6%)
Point of care coagulation test result	1 (2%)
Venom allergy	1 (2%)
Isolated raised white cell count	1 (2%)
Reason for administering antivenom unclear	15 (31%)

Figure 1. Number of patients with envenoming and identification.. Other includes Collett’s snake (*Pseudechis colletti*; 3), Whip snake (*Demansia* spp.; 2) and Ornamental snake (*Denisonia maculata*; 1).



* Of the 117 patients with envenoming and unconfirmed snake type, 36 cases had detectable tiger snake group venom concentrations that were too low to distinguish between tiger snake and rough-scaled snake venom. Venom was not detectable in samples from 13 patients, the remaining 68 patients had no samples available for assay.

Figure 2. Number of cases recruited by state/territory

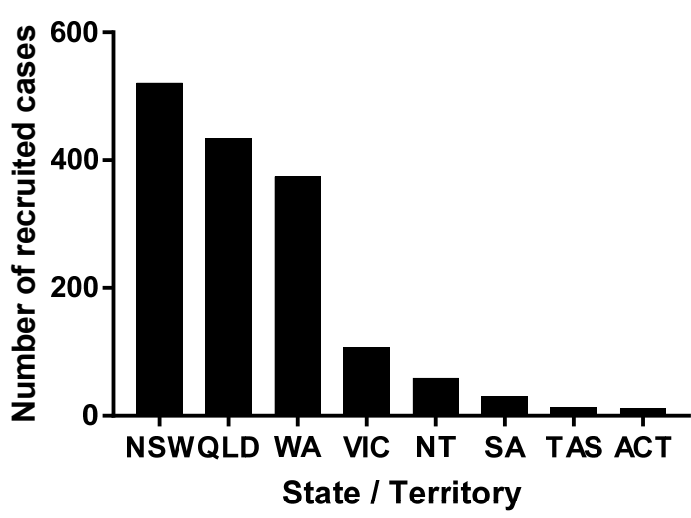


Figure 3. Snake type for envenomed cases. Other includes Collett’s snake (*Pseudechis colletti*; 3), Whip snake (*Demansia* spp.; 2) and Ornamental snake (*Denisonia maculata*; 1).

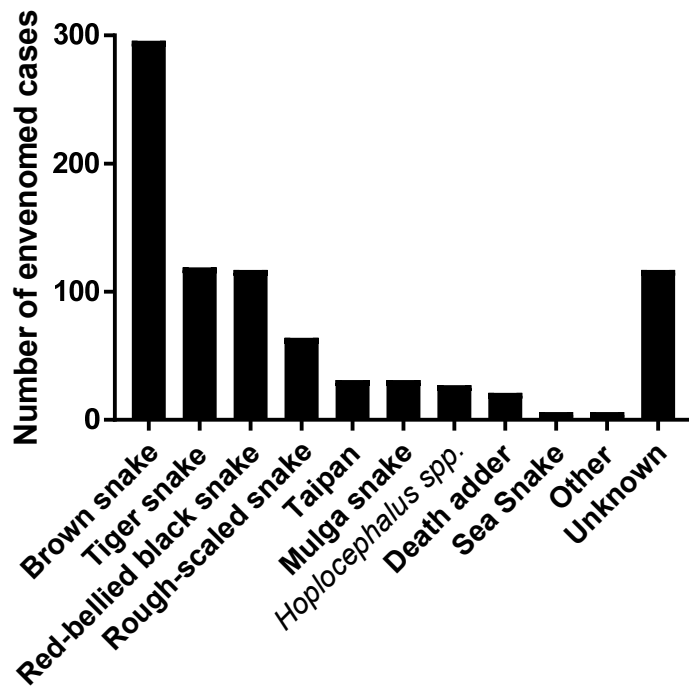


Figure 4. Number of snakebite fatalities per snakebite season which is from July in one year until June the following year (see Figure 1).

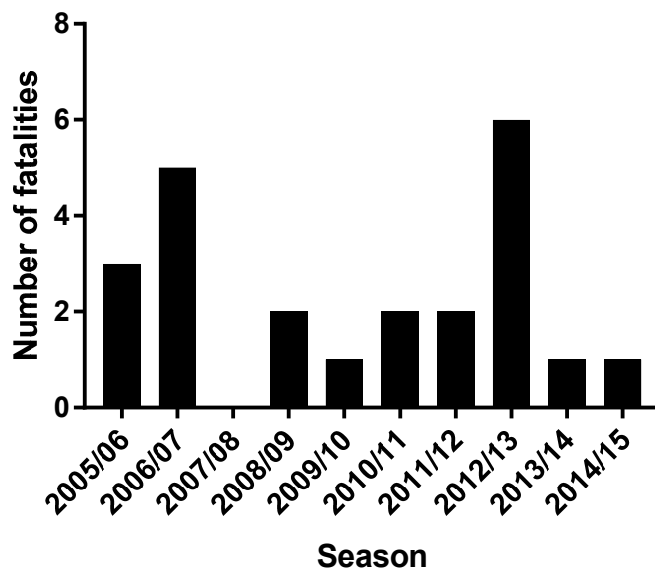


Figure 5. Median time to first antivenom from the bite (with interquartile range, confidence interval [5% to 95%] and outliers) from 2006 to 2015.

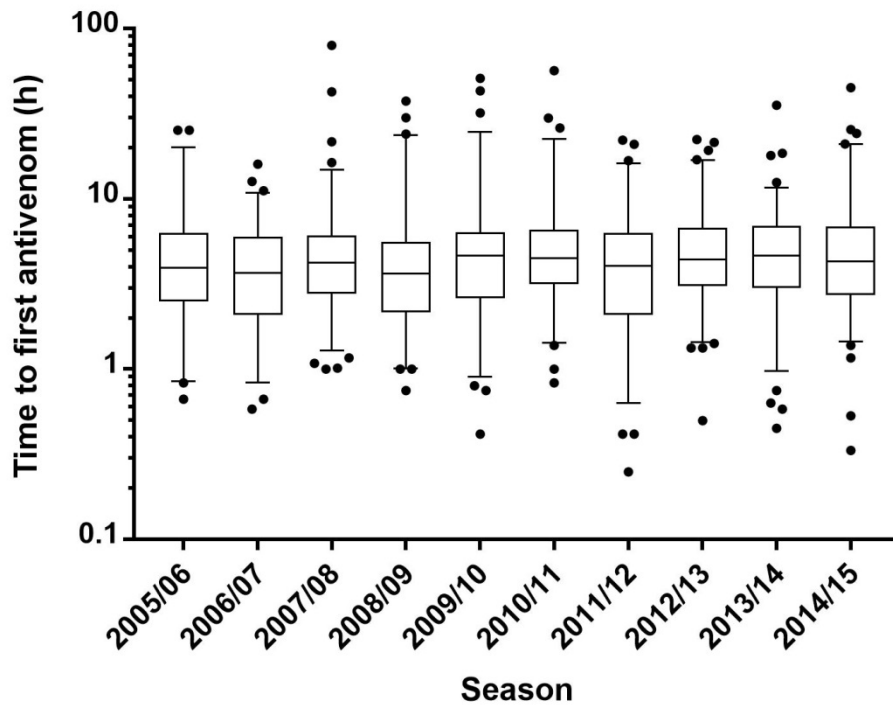


Figure 6. Proportion of patients treated with antivenom with immediate hypersensitivity reactions per snakebite season.

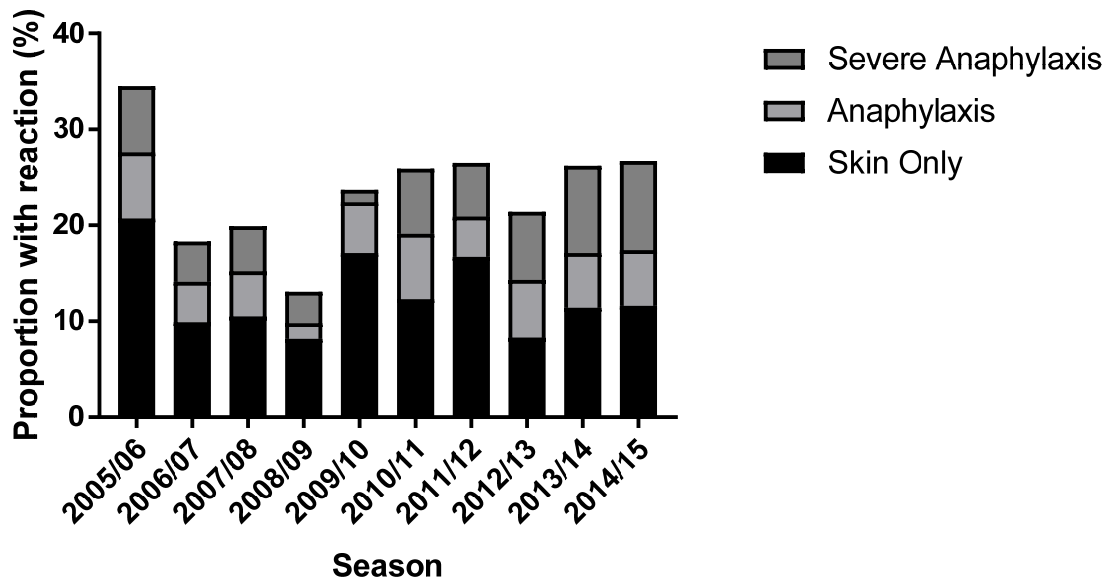


Figure 7. Median time to discharge from hospital post snake-bite for envenomed (closed circle) and non-envenomed (open square) patients by snakebite season

