



Snake Venom Detection Results of a Pilot Survey

Nev Herrmann
Program Manager



Tiger



Death Adder



Taipan



Black Snake



Eastern Brown





WHY?



Western Brown



Approached by CSL

Subsequent dialogue with users was supportive

NATA concerned



Officer in Charge (or person involved in snake venom detection in your facility)

RE:Snake Venom Detection Quality Assurance Program

As the mailing address we have used for this letter has been de-identified in compliance with privacy requirements, please pass this document on to the senior person involved in snake venom detection in your laboratory or facility.

The RCPA Transfusion QAP has undertaken the task of developing a QAP aimed at assessing the competency of snake venom detection / immunotyping using the CSL Snake Venom Detection Kit (SVDK).

At this stage it is envisaged that a single swab sample containing venom would be despatched three times a year. The survey samples would contain venom concentrations to test the competency of the operator as well as provide experience in detection and immunotyping of unknown venom samples. CSL have agreed to assist in the provision of venom samples for the survey and also provide technical assistance for the interpretation and assessment of results if required.

We are planning to conduct a pilot study later this year with a view to commencing the survey in 2011.

To assist with the implementation with this important survey, we would appreciate your input by providing answers to the questions below. Please return this sheet by post in the envelope provided or fax to 07-38389413.

(Please circle your response)

Would your facility be interested in participating in the pilot study? Yes No

Would your facility participate in the survey commencing 2011? Yes No

If yes to either of the above please provide the following information:

Contact name:..... Phone:..... Fax:.....

Email:.....

Delivery address (write 'as above' if unchanged).....

Regards

Dr Bronwyn Williams
Program Chair
RCPA Transfusion QAP



505 expression of interest letters were sent to hospitals and other institutions

137 replies received

112 interested in participating in a survey in 2011

107 interested in participating in the pilot



Dr. Geoff Isbister
Assoc.Professor, University of Newcastle
Senior Staff Specialist in Clinical Toxicology
Calvary Mater Newcastle

‘Unfortunately there is a significant divide between clinical use of the SVDK and laboratory testing which has made this test very problematic in Australia. It is the age old issue of the clinical staff don’t really understand how the test works and the laboratory staff are not aware of the clinical implications + snake bite is rare.’

1. Possible false positives with SVDK mainly in brown snake well
2. SVDK should NEVER be used to used to make the diagnosis of envenoming
3. Very expensive – especially 3 surveys per year
4. Not that sensitive – only good for swabs, problems with urine testing and not sensitive enough for serum

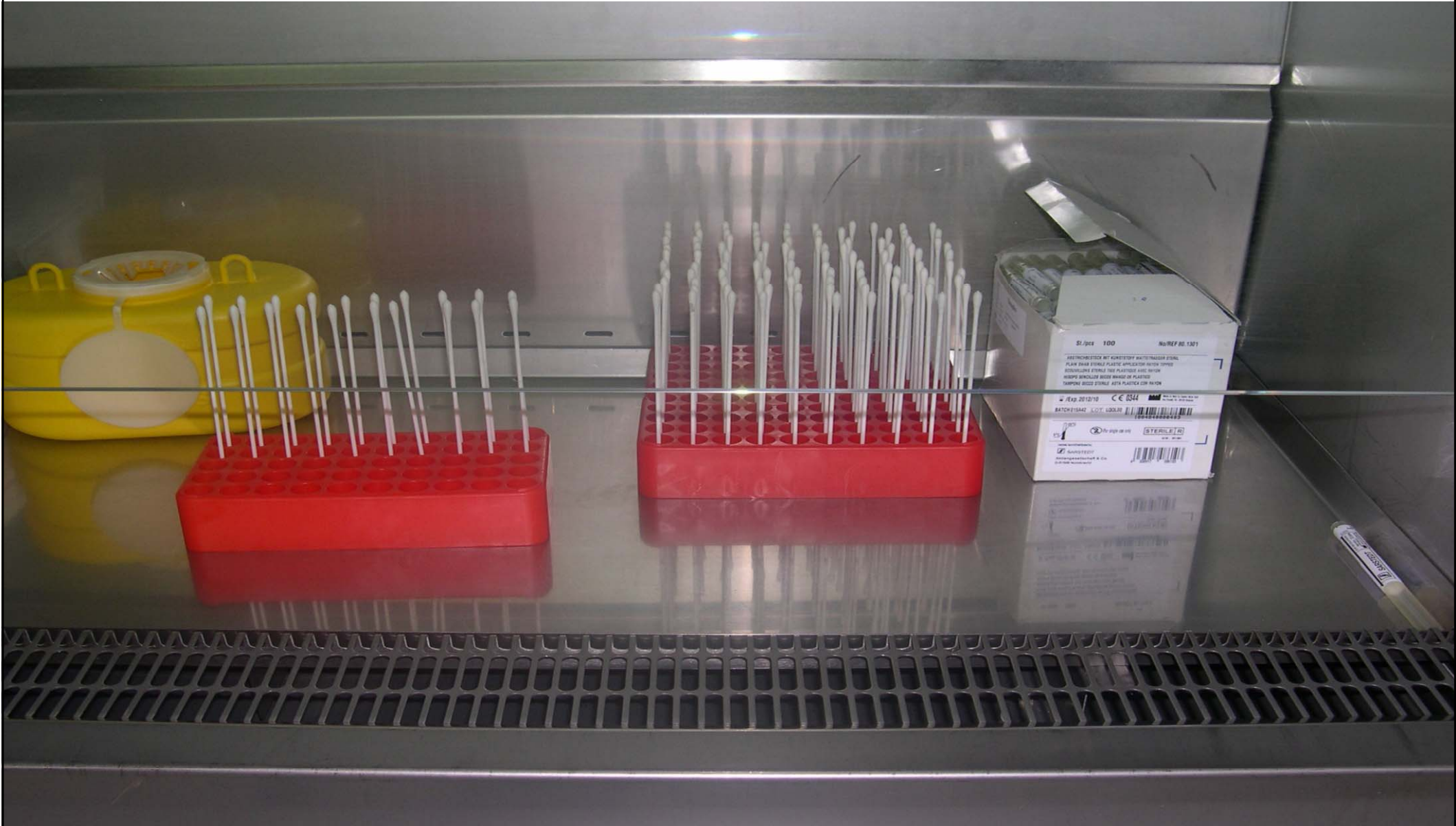


Decision made to proceed with preparation for the pilot

Weak solution of brown snake venom was obtained from CSL

A suitable dacron swab was sourced to deliver a standard dose

A method for applying the venom to the swab was devised

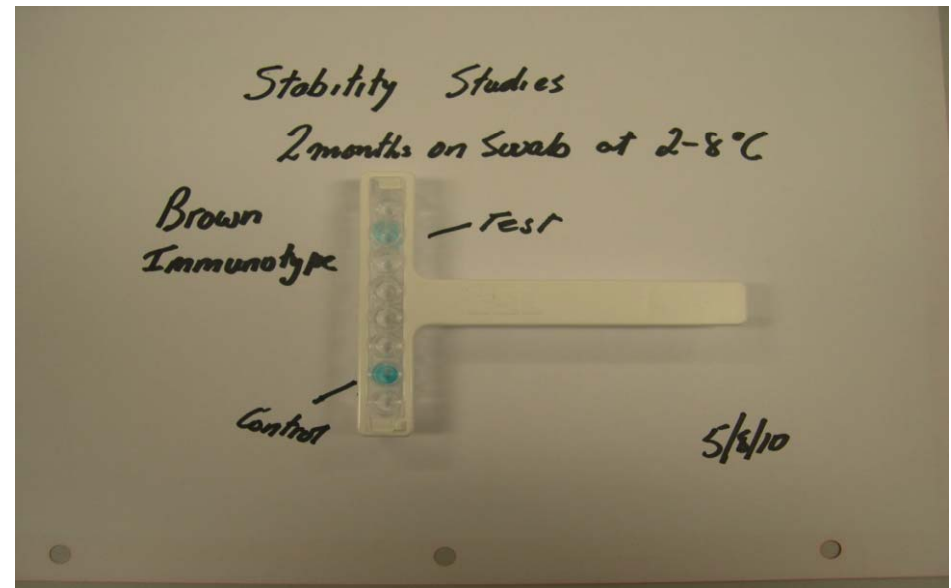
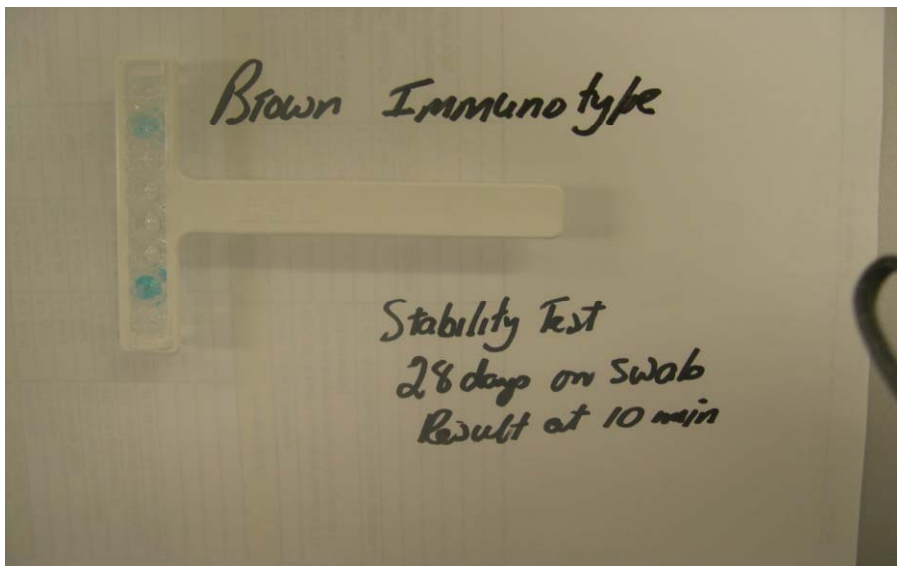
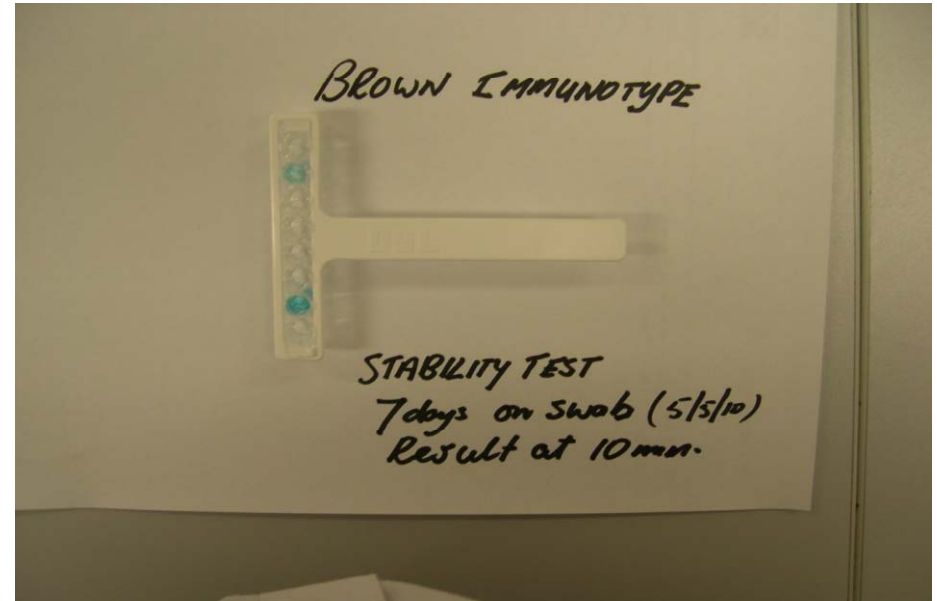
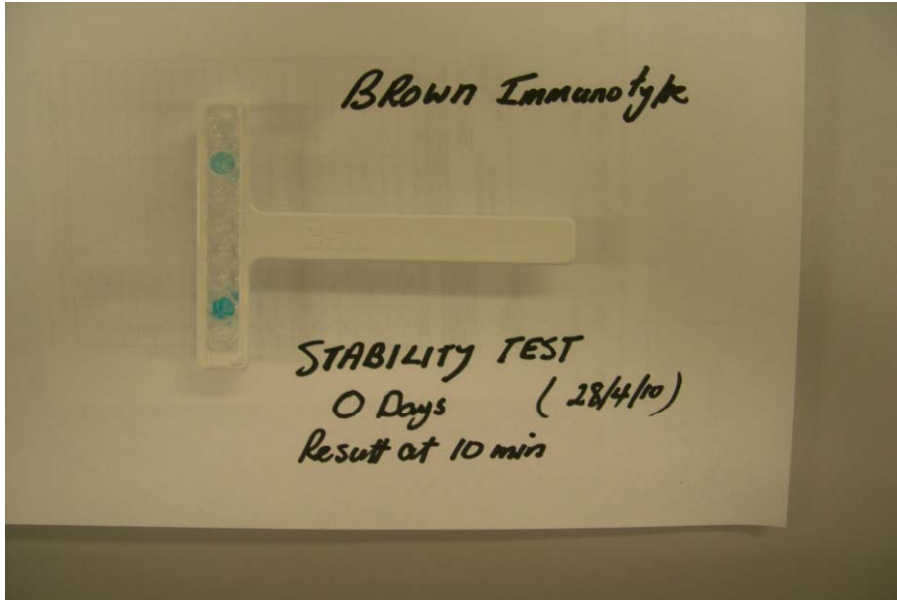




Sampling method needed to be validated

Stability on swab established

Stability Studies





Correspondance with Prof. Julian White

Consultant Clinical Toxinologist

Head of Toxinology

Women's and Children's Hospital

North Adelaide



‘I believe the concept of RCPA QAP for SVDK use is highly appropriate. This test kit has been in widespread use for nearly 30 years, going through an evolution of kit design over that time.’

‘It was designed to determine the most appropriate choice of antivenom to give an envenomed snakebite patient. It was therefore conceived as a test to use in envenomed patients, not in patients without envenoming, or those without even a clear history of snakebite. Unfortunately it has increasingly been misused as a tool for confirming/excluding snakebite in patients, a function it was neither designed for, nor can it fulfill this role. This use has been largely driven by Emergency Departments and the pressure on them to have quick patient turnover.’

‘I have been aware for years that there was an error rate with the SVDK, used in either the laboratory or ED setting, but determining the actual rate has proved elusive. In most cases the error was a result of testing the wrong sample or in the wrong clinical setting, rather than a technical error with the kit.’



‘Apart from technical problems using the kit, most likely due to operator inexperience/error, it is the interpretation side that often causes problems.

‘So, in designing a QAP for SVDK, I suggest two aspects need to be considered, firstly the technical performance of the kit, whether the expected result is obtained, and secondly the way the result is interpreted and the report written.’

I think lab staff, if properly trained, can play an important role in ensuring best practice, by advising clinicians if the requested set/timing of lab tests in snakebite falls outside guidelines.’



Decision was made to proceed with the pilot

A worksheet was designed incorporating both technical and clinical interpretation



Patient: Daniel Smith DOB 05/04/2004 UR No. 661444

This child has been admitted to your emergency department with vomiting and headache. The following tests have been ordered to exclude possible snake bite envenoming.

Investigations collected include swab from bite site for snake venom detection, full blood count, Group/Hold, coagulation studies and D-dimer, electrolytes, liver function tests, CPK and blood gas.

(For the purpose of this exercise, imagine you have received the swab a few minutes post collection).



RCPA Quality Assurance Programs Pty Limited

AEN 32 003 520 072
Transfusion

PO Box 2074
Kelvin Grove Qld 4059
AUSTRALIA

T +61 7 3838 9170; F +61 7 3838 9413
E-mail: transfusion@rcpaqap.com.au
www.rcpaqap.com.au/transfusion/

**SNAKE VENOM DETECTION QAP
RESULT SHEET FOR PILOT SURVEY SV2010-1**

Thank you for participating in this pilot study. The information generated will be used to develop the Snake Venom Detection Quality Assurance Program (SV Survey) commencing in 2011. The aim of the pilot is to gather as much information as possible. In addition to obtaining the correct snake venom immunotype, the questions are aimed at detecting variations in kit and operator performance and clinical interpretation. The results will be used to refine the information selected for use in next year's program.

SURVEY ID: PARTICIPANT NUMBER:
 DATE SWAB RECEIVED: RESULTS DUE DATE:

SCENARIO

Patient: Daniel Smith DOB 05/04/2004 UR No. 661444

This child has been admitted to your emergency department with vomiting and headache. The following tests have been ordered to exclude possible snake bite envenoming. Investigations collected include swab from bite site for snake venom detection, full blood count, Group/Hold, coagulation studies and D-dimer, electrolytes, liver function tests, CPK and blood gas.
(For the purpose of this exercise, imagine you have received the swab a few minutes post collection).

TEST RESULTS

1. SVDK Batch Number: _____ SVDK Batch Expiry Date: _____

2. Wash solution used: Tap water Bottled water Purified (distilled) water Saline
 (circle) Buffered saline Other (specify) _____

3. Positive control turned blue within 1 minute? (circle) YES NO

4. Blue colour developed in the test well within? (circle) 1 minute 1 - 5 minutes 5 - 10 minutes

5. Reaction Strength (circle) Weak Strong

6. Final Result Interpretation (circle) Tiger Immunotype Brown Immunotype Black Immunotype
 Death Adder Immunotype Taipan Immunotype

CLINICAL INTERPRETATION Please select one (1) response only

- This result indicates unequivocal evidence of envenoming.
- This result is good evidence of envenoming if supported by laboratory tests and clinical findings.
- This result is not indicative of envenoming.
- This result does not exclude envenoming - laboratory tests and clinical findings need to be considered.
- No interpretation offered.

Test Performed by: _____ Date Tested: _____

Comments / Feedback:

Please fax or post your completed result sheet to: RCPA Transfusion QAP
 PO Box 2074
 Kelvin Grove Qld 4059
 Fax: 07 3838 9413

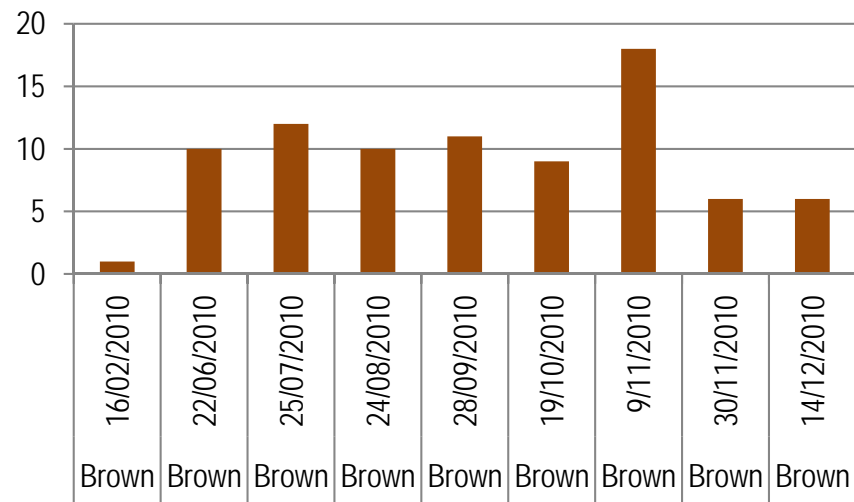
THANK YOU FOR PARTICIPATING IN THIS PILOT - ALL PARTICIPANT RESULTS WILL BE ANALYSED AND A REPORT RETURNED TO YOUR FACILITY AS SOON AS COMPLETED.



84 results returned

Analysis of Immunotype by SVDK expiry date:

<i>Immunotype</i>	<i>Batch Expiry</i>	<i>No. of Part.</i>
Brown	16/02/2010	1
Brown	22/06/2010	10
Brown	25/07/2010	12
Brown	24/08/2010	10
Brown	28/09/2010	11
Brown	19/10/2010	9
Brown	9/11/2010	18
Brown	30/11/2010	6
Brown	14/12/2010	6



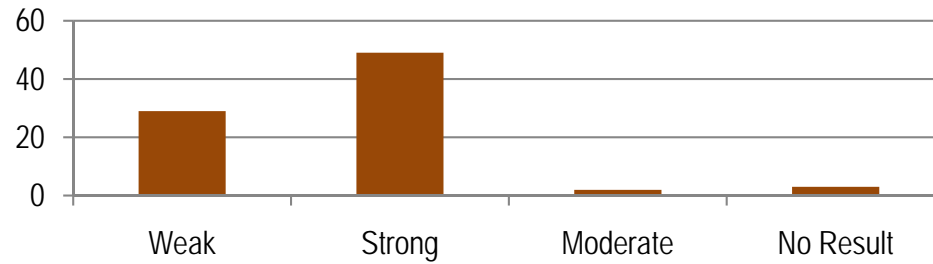
Eastern Brown





Analysis of Reaction Strength

<i>Reaction Strength</i>	<i>No. of Part.</i>
Weak	29
Strong	49
Moderate	2
No Result	3



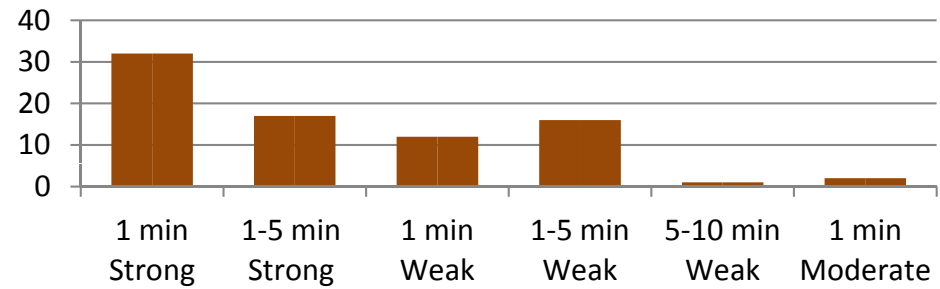
Spotted brown (Dugite)





Analysis of Reaction Strength by Reaction Time

<i>Reaction</i>	<i>Time</i>	<i>No. of Part.</i>
Strong	1 min	32
Strong	1-5 min	17
Weak	1 min	12
Weak	1-5 min	16
Weak	5-10 min	1
Moderate	1 min	2



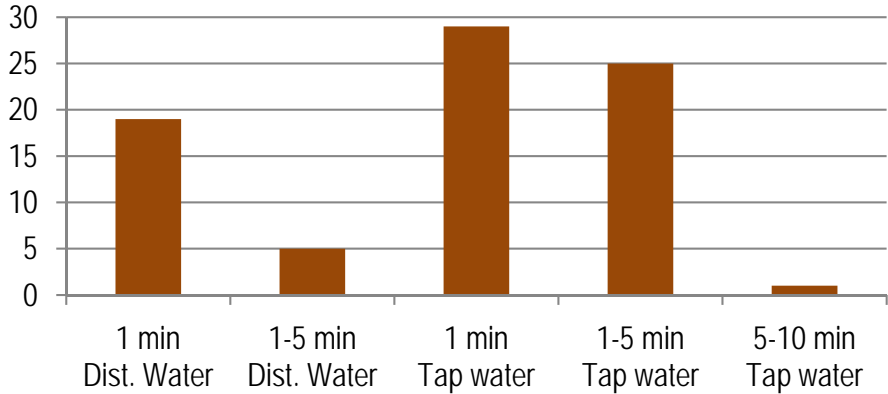
Eastern Brown Snake





Analysis of Reaction Time by Wash Solution

<i>Wash Solution</i>	<i>Reaction time</i>	<i>No. of Part.</i>
Distilled Water	1 min	19
Distilled Water	1-5 min	5
Tap water	1 min	29
Tap water	1-5 min	25
Tap water	5-10 min	1



Black Tiger Snake



Mainland Tiger Snake



Comment	No. of Participants
This result indicates unequivocal evidence of envenoming	5
This result is good evidence of envenoming if supported by laboratory tests and clinical findings	68
This result is not indicative of envenoming	1
This result does not exclude envenoming - laboratory tests and clinical findings need to be considered	5
No interpretation offered	4



Coastal Taipan



FEEDBACK

'Used as an educational exercise for nursing staff. Extremely valuable exercise'

'Great training exercise. Promoted discussion on treatment options / retrievals etc + capabilities of Istat analysis, INR, chem8 as diagnostic adjuncts'

'Very good exercise for clinical staff to participate in as a reminder of how to do test'

'Clinicians at hospital use venom kit to screen rather than to select monovalent antivenom for patient'

'How safe is it doing this test. I hope snake venom is not being used as this would present a danger to the person doing the test.'



Professor White

“Overall it is clear that most labs were able to undertake venom detection using the SVDK and gained the correct venom detection result and, in the majority of cases, placed the correct interpretation/response. It is also evident that a number of labs found this QA process a valuable education process and therefore it would be reasonable to schedule such QA on an on-going basis. However, the SVDK is not inexpensive and is sometimes in short supply, so undertaking such exercises too often would be both expensive and risk depleting kits available for use in actual cases. Possibly once per year might be appropriate.”



Professor White agreed to join the committee and oversee the program if the QAP decided to go ahead with the program

So will there be a snake venom detection program next year?

YES

One survey in September - \$160



Acknowledgements

CSL for providing the SVDK and training as well a venom sample for the pilot and invaluable technical assistance

Prof. Julian White and Assoc.Prof. Geoff Isbister for taking the trouble to get involved and provide valuable assistance from both a technical and user point of view

Sarstedt Australia Pty Ltd for kindly providing enough swabs to perform the pilot study.