Snake Venom Binding Activity of Expired Antivenoms

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Background
- Given international shortages of many antivenoms, our goal was to examine the viability of multiple expired snake antivenoms
- An in vitro model was used to assess antivenom-venom binding of expired snake antivenom

Methods
- Expired lots of South African Institute for Medical Research (SAIMR), Antivipmyn, Antivipmyn TRI, and Soro Antivipmyn antivenoms were tested for snake venom binding activity and compared to unexpired antivenom
- 96 well plates were coated with snake venom
- Serial dilutions of antivenom were added to the venom coated wells
- Unbound antivenom was removed and the plates incubated with biotinylated rabbit anti-horse IgG
- Unbound IgG was removed and Streptavidin conjugated to beta-galactosidase was added
- The hydrolysis of 4-methylumbelliferyl-beta-D-galactopyranoside by beta-galactosidase generated proportional fluorescence
- Plates were analyzed using a fluorescent microplate reader

Results
- Results were reported as the amount of increased signal over a horse serum control
- Five lots of SAIMR antivenom with expiration dates from 1998-2010 retained binding activity to Naja naja venom, in some cases as well or better than unexpired controls
- SAIMR antivenom also demonstrated similar results against Naja naja venom, indicating species cross-reactivity
- Antivipmyn antivenom with an expiration date of 2010 retained binding activity to both Bothrops jararaca and Crotalus Atrox nearly equivalent to unexpired controls
- Antivipmyn TRI antivenom with an expiration date of 2009 retained binding activity to both Bothrops jararaca and Crotalus Atrox nearly equivalent to unexpired controls and with slightly more activity than Antivipmyn
- Soro Antivipmyn antivenom with expiration dates of 2008 & 2004 demonstrated significantly more binding activity to both Bothrops jararaca and Crotalus Atrox over unexpired Antivipmyn and Antivipmyn TRI, suggesting species cross-reactivity

Conclusion
- Expired antivenoms retain binding activity to snake venom compared to horse serum controls
- Expired antivenom binds snake venom to nearly the same degree as unexpired antivenom
- Expired Soro Antivipmyn antivenom possesses superior venom binding compared to unexpired Antivipmyn and Antivipmyn TRI antivenoms

Limitations
- In vitro venom binding may not translate to in vivo binding and clinical benefit
- The safety of expired antivenoms is unknown
- Antibody concentrations between lots may differ, influencing venom binding capacity

Future Implications
- Further study is needed to determine the safety of expired antivenoms, lot variability, and whether in vitro antivenom-venom binding translates to comparable clinical outcomes