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Emerging Diseases of Wildlife Home and Away

AAPSP Roadshow

Cheryl Sangster

March and April, 2017

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Schedule

Day One

9-10:30
- Introduction
- WHA

11-12:30
- Definition emerging diseases

1:30-3
- Mechanisms of emerging diseases

3:30-5
- Mechanisms continued
- Slide review

Day Two

9-10:30
- Emerging diseases of Aus

11-12:30
- Guest speakers

1:30-3
- Aus diseases continued
- What's up fungus?
- Tools of investigation

3:30-5
- Investigation workshop
- Slide review

Slide 3

Thank you

- AAPSP and site coordinators
- Wildlife Health Australia; Tiggy Grillo
- Sydney University; Mark Krockenberger
- Guest speakers: Karrie Rose, Graeme Knowles, Mark Hawes, John Mackie, Greg Simmons, Mark O'Dea, Bethany Jackson
- Contributors
- Personal assistant i.e. my husband

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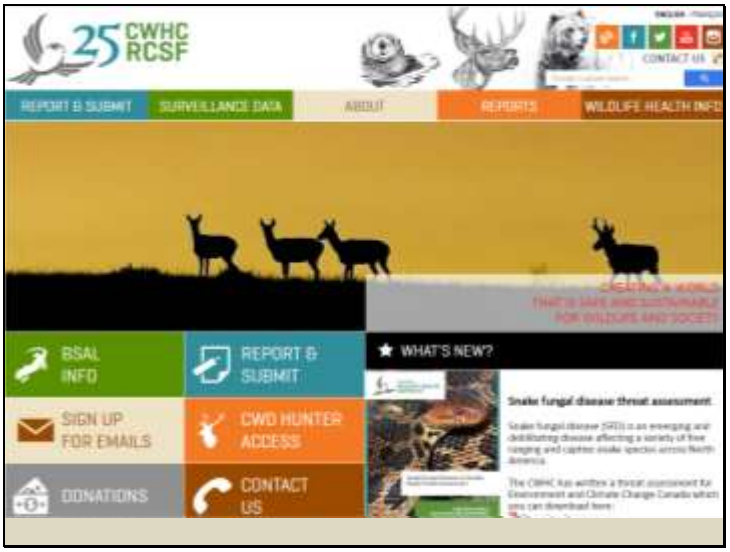
Slide 5



I was raised as a wildlife pathologist within the Canadian Wildlife Health Cooperative. For those of you who are not familiar with the CWHC, it is an institute which lacks bricks and mortar, but rather exists as a series of part-time and full-time appointments of personnel within the pathology departments of the Canadian vet schools, funded by various federal and provincial government bodies and private wildlife organizations. Although the primary focus of my training was traditional, domestic animal anatomic pathology, I was also given the opportunity to work in many applied aspects of wildlife pathology. I travelled to the Canadian North to assist with culling a herd of TB-infected bison, I ran risk assessments of zoonotic disease from endangered Vietnamese species, I participated in foot and mouth infection trials in white tailed deer and I assessed the feasibility of using coyotes as sentinels of bovine TB infection in cervids in and around a national park.

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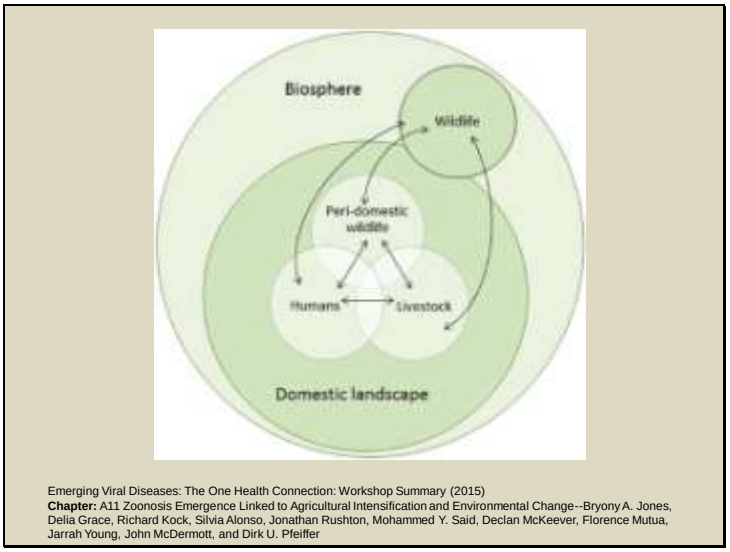

Emerging Viral Diseases: The One Health Connection: Workshop Summary (2015)
Chapter: A11 Zoonosis Emergence Linked to Agricultural Intensification and Environmental Change--Bryony A. Jones, Delia Grace, Richard Kock, Silvia Alonso, Jonathan Rushton, Mohammed Y. Said, Declan McKeever, Florence Mutua, Jarrah Young, John McDermott, and Dirk U. Pfeiffer

And it was through all these experiences that I learned that wildlife pathology can never be just about the pathology, but must include consideration of populations, epidemiology, disease ecology, climate and social and political environments. So, although we'll be looking at lots gross and histopathology over the next few days, we'll also be touching on other factors and aspects of wildlife disease.

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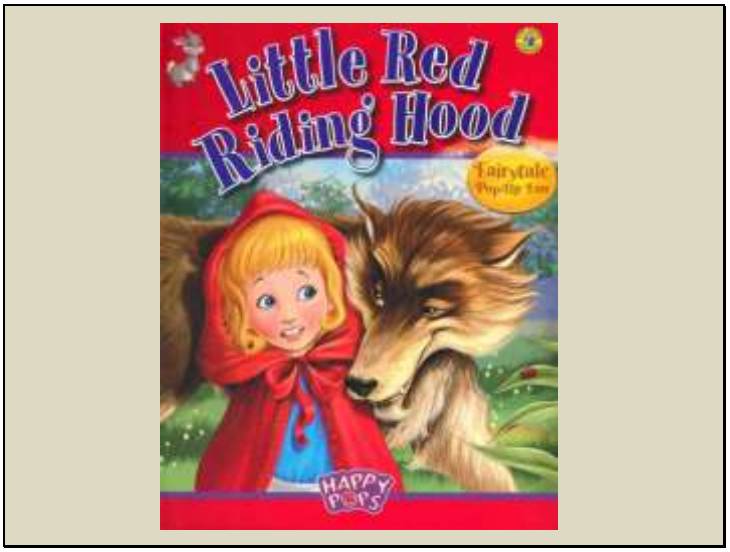

In my wildlife diseases graduate course taught by Gary Wobeser, the individual diseases were often presented to us as stories, sometimes with a conclusion, sometimes without. In the case of emerging diseases, I think it can be useful to think of them as stories, realising that when we first recognise a disease we are VERY rarely at the beginning of the story. If we're lucky, we can trace our way back to the beginning, and if we're astute enough, we can record the story going forward, fully and completely. Hopefully, over the next two days, I'll be able to introduce you to some new stories as well as review some you're already familiar with.

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Emerging diseases are a hot topic at the moment, as is evidenced by the volume of material in peer-reviewed literature as well as grey-literature, etc. A lot of this material focuses on infectious diseases, but I will clarify at the moment that not all emerging diseases are infectious and we will cover examples of such. However, infectious diseases do make up the majority of emerging diseases and are the focus of a lot of discussion.

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As I was sifting through so much material on emerging diseases, I had this article handed to me and I think it makes a fantastic point. The term “emerging disease” has become a trendy catch phrase that a lot of people want to get into the title of their papers. And definitely there is merit in highlighting a disease as potentially emerging, but this team have systematically assessed peer reviewed reports of “emerging diseases” and have found that many of them lack the evidence to support that claim.

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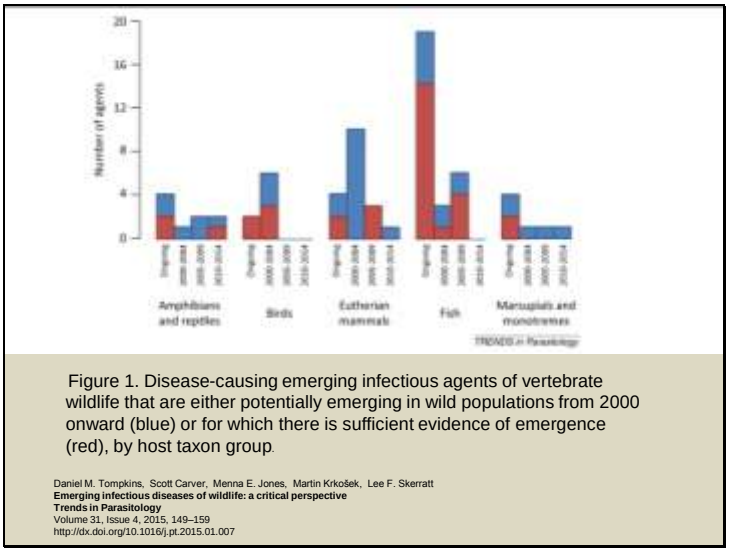

Figure 1. Disease-causing emerging infectious agents of vertebrate wildlife that are either potentially emerging in wild populations from 2000 onward (blue) or for which there is sufficient evidence of emergence (red), by host taxon group.

Daniel M. Tompkins, Scott Carver, Menna E. Jones, Martin Krkošek, Lee F. Skerratt
Emerging infectious diseases of wildlife: a critical perspective
Trends in Parasitology
Volume 31, Issue 4, 2015, 149–159
http://dx.doi.org/10.1016/j.pt.2015.01.007

Confirmed vs insufficient evidence
Numbers of emerging diseases across vertebrate groups

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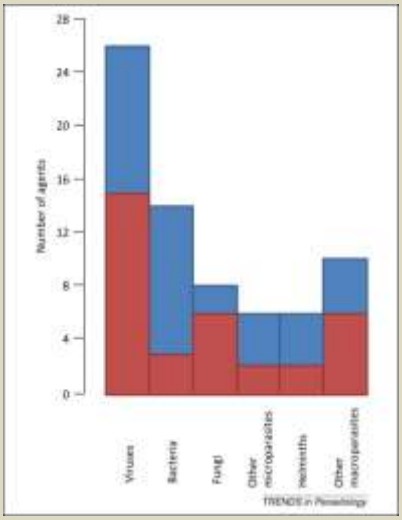

Figure 2. Disease-causing emerging infectious agents of vertebrate wildlife that are either potentially emerging in wild populations from 2000 onward (blue) or for which there is sufficient evidence of emergence (red), by agent taxon group.

Daniel M. Tompkins et al.
Trends in Parasitology
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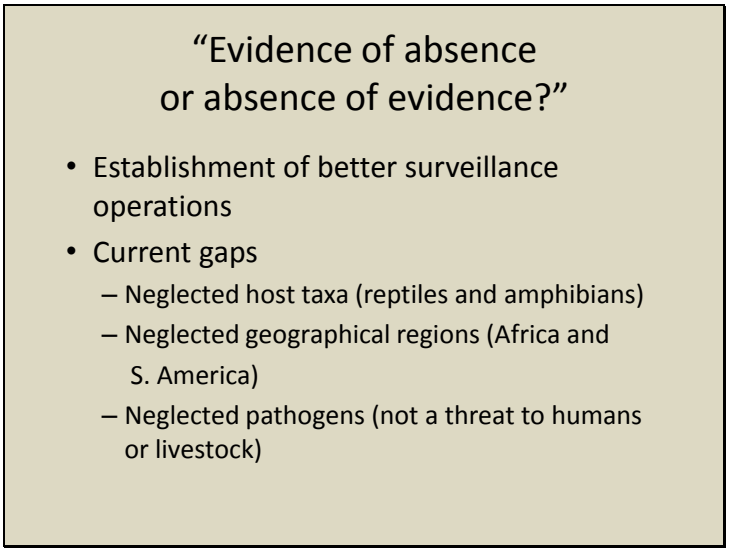

The most difficult factor to prove when suggesting a disease may be emerging is establishing that it wasn't already there in the first place. As the authors suggest, this is very difficult to do retrospectively, and therefore it is prudent of us to establish better surveillance operations to provide that baseline data. They highlight a number of particular gaps in terms of surveillance, including neglected host taxa, geographical regions and pathogens.

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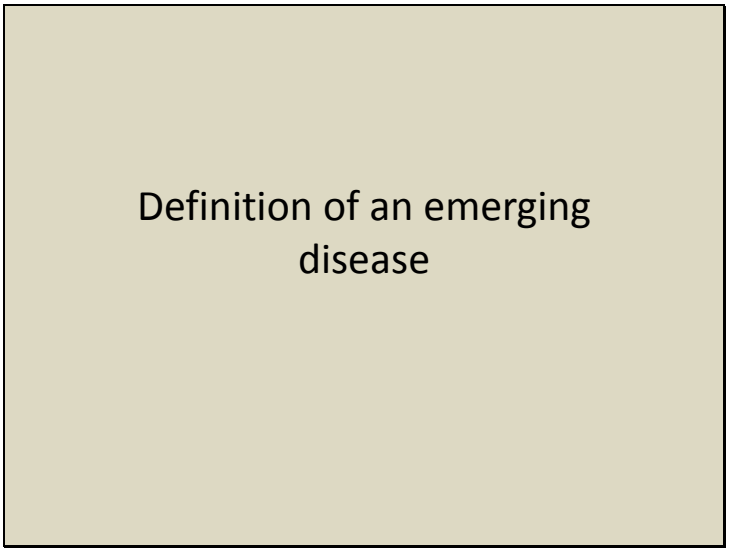

I’ve jumped the gun a bit, getting into a discussion of emerging diseases without first defining what they are.

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OIE

- An emerging disease is defined as a new infection resulting from the evolution or change of an existing pathogen or parasite resulting in a change of host range, vector, pathogenicity or strain; or the occurrence of a previously unrecognised infection or disease.
- A re-emerging disease is considered an already known disease that either shifts its geographical setting or expands its host range, or significantly increases its prevalence.

http://www.oie.int/for-the-media/editorials/detail/article/emerging-and-re-emerging-zoonoses/

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OIE

- Williams *et al.* 2002. Emerging infectious diseases in wildlife. Rev sci tech Off int Epiz. 21:139-157.

"… changes in the recognition of emerging pathogens due to the advances in the techniques of epidemiology."

Possibly argues against Tompkins *et al* by legitimising the new recognition of a disease as a form of emerging

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WHO

- An emerging disease has appeared in a population for the first time, or may have existed previously but is rapidly increasing in incidence or geographic range

http://www.who.int/topics/emerging_diseases/en/

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What is an emerging disease?

- Previously unrecognised disease
- Known disease in a new host
- Change in geographic range
- Increased incidence within a population
- Re-emergence of a previously controlled disease

Some emerging diseases fulfill more than one of these criteria