Introduction to Principles of Vaccination

Learning Objectives
1. Understand the AVMA’s principles of vaccination

Introduction
There is no such thing as a perfectly safe and perfectly effective vaccine; good vaccines are a balance of risks and benefits!

- Risks of vaccination
  - Known vaccine-related side effects
    - Vaccine-associated feline fibrosarcomas – a rare event
  - Hypersensitivities
    - Anaphylaxis
  - Nonspecific systemic side effects
    - Fever, lethargy, loss of appetite a day or so after vaccination due to proinflammatory cytokine production
  - Localized reactions
    - Alterations in immune homeostasis – do vaccines contribute to these situations?
      - Allergy in predisposed animals?
      - Autoimmune disease in predisposed animals?
      - Post-vaccinal polyneuropathy – Guillain-Barre syndrome in humans, coonhound paralysis

- Benefits of vaccination
  - Vaccines are essential for:
    - Safe and efficient food production
    - Control of emerging and exotic diseases of animals and people
    - Control of zoonotic diseases
    - Reduction of transmission of food borne disease
    - Reduction of animal suffering
    - Reduction of the need for antibiotics to treat animals
    - Control of diseases of companion animals and horses
  - Prevention of deadly diseases – e.g., core vaccines in companion animals prevent deadly viral diseases
  - Always be aware of and minimize potential risks, but, in general, the benefits of vaccinating with the core vaccines outweigh the risks

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https://www.avma.org/KB/Policies/Pages/Vaccination-Principles.aspx

- Introduction
  - “Medical decisions concerning vaccine selection and administration protocols are among the most complicated medical decisions facing veterinarians today.”

- Conclusion
  - “Revaccination recommendations should be designed to maintain clinically relevant immunity while minimizing adverse event potential.”

- Other highlights:
  - “Vaccine products vary in efficacy and safety and are not necessarily indicated for all patients.”
- “Vaccination protects a population of animals”… “Vaccination does not protect every individual patient even when they are properly vaccinated.” (Herd immunity)
- “Knowledge of immunology and vaccinology, including associated benefits and risks, and the pathobiology of infectious diseases, are necessary to implement an effective vaccination program.”
- “Vaccines, including polyvalent products, should be selected to include only those antigens appropriate for the specific risk needs of the patient, thereby eliminating unnecessary immune system stimulation and lowering potential risks of adverse events. Veterinarians need to be aware of the risk of “endotoxin stacking” with the use of multiple Gram-negative vaccines.”
- “Veterinarians should create a core vaccine program, intended for use in the majority of animals in their practice area.”
- “Veterinarians should create a non-core vaccine program, intended for a minority of animals in their practice area.”

**Species Specific Vaccination Recommendations**

- Cattle and Pigs: there are no species specific guidelines for cattle and pigs, no consensus on core/non-core