Let’s Talk Shelter Vaccines!
Your Presenter

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Overview

• What we’ll cover today:
  • Importance of vaccination
  • How vaccines work
  • National guidelines for cat and dog protocols
  • Vaccine selection
  • Handling & administration
  • Adverse events
  • Record keeping
  • Special populations & considerations
The Importance of Vaccination

• Infectious disease control remains a continuous challenge

• Vaccines are a critical cost-effective and life-saving tool
  • Reduce severity and duration of many common, potentially fatal illnesses
  • Prevent some diseases altogether
Vaccinations

ONE component of a herd health program
NOT a magic bullet
Protocols must consider:

• When to vaccinate
• Who to vaccinate
• What product to use
• By what route
• How often
What are vaccines?

What vaccines are:

- Biological products designed to trigger an immune response that will protect animals from future disease

What vaccines are not:

- Preformed antibodies
- Instant immunity
- An absolute guarantee
Vaccines: The Basics

• Lessen the severity of future diseases
• Prevent SOME diseases altogether
• Vaccines = actual live viruses
  • Similar to the ones that cause disease
  • Result in antibody production that provides protection against the real thing
  • Need to be handled carefully & administered appropriately
How Vaccines Work
How Vaccines Work

- **Primary immune response**, slow to build up and not very strong.
- **Secondary response** stronger and more rapid than primary response.
- Memory cells remain.

Timeline:
- **Vaccination**
- **Infection by pathogen**
Vaccination may indeed be beneficial, but it is not innocuous, and the benefit of vaccinating an animal must be balanced against the risk of adverse events, likelihood of exposure, and severity of disease.

- 2013 AAFP “Feline Vaccine Advisory Panel Report”
Vaccination Protocol Goals

• To vaccinate:
  • Only against infectious agents that cause significant disease AND that there is a realistic risk of exposure
  • When potential benefits outweigh potential risks
  • No more frequently than necessary
  • As many animals as possible in the population at risk
  • To protect human/public health

- 2013 AAFP “Feline Vaccine Advisory Panel Report”
National Vaccination Guidelines

- American Animal Hospital Association’s (AAHA) “Canine Vaccination Guidelines”
- American Association of Feline Practitioners’s (AAFP) “Feline Vaccine Advisory Panel Report”

- Written by a panel of experts in the field
- Represent the current thinking on vaccination for cats and dogs
- Available online for free
National Vaccination Guidelines

Vaccines are classified as:

- **Core**: recommended for all
- **Non-core**: recommended for certain dogs or cats, based on life-style and risk
- **Not recommended**
Vaccination Resources

Guidelines are available on the organizations’ websites in a downloadable format:

• http://www.catvets.com/guidelines/practice-guidelines/feline-vaccination-guidelines

AAHA “Canine Vaccination Guidelines” (2011)
• https://www.aaha.org/professional/resources/canine_vaccine.aspx#gsc.tab=0
Shelter Animals are Different

Animals entering shelters:

- Have a high likelihood of exposure to infectious disease
- Are often housed in high-density environments with new animals arriving daily
- Often have had little or no preventive care prior to admission
- Are at tremendous risk for infection
Recommendations for Cats

FVRCP vaccination against panleukopenia, herpesvirus, and calicivirus for all cats on entry

• Starting at 4-6 weeks of age
• Repeated every 2 weeks of age in high-risk environments until 16+ weeks of age
• One booster for cats and kittens 16+ weeks
Recommendations for Cats

FVRCP: injectable MLV or intranasal?

- Lack of data showing improved efficacy against viral causes of URI
- Concern over reliability of panleuk portion in intranasal
- Give MLV injectable panleuk regardless of route for herpes & calici
Recommendations for Cats

- FeLV vaccination for group housed cats:
  - Kittens as young as 8 weeks of age, booster 2-3 weeks later
  - Not recommended for individually housed cats – spread through close prolonged physical contact
  - Remember: does not replace testing and appropriate segregation by retroviral status

- FIV vaccination not recommended
Panleukopenia

- Panleuk is considered to be a vaccine-preventable disease – “sterile immunity”

- Vaccination is highly effective for FPV:
  - Clinically relevant protection within hours
  - Immunity within 72 hours of administration
Panleukopenia

This is a core vaccine – don’t assume they are protected!

## Panleukopenia

This is a core vaccine – don’t assume they are protected!

<table>
<thead>
<tr>
<th>Age Group</th>
<th>% Cats with PAT</th>
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<tbody>
<tr>
<td>&lt; 6 months</td>
<td>33.8</td>
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<tr>
<td>6-11 months</td>
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<tr>
<td>1-5 years</td>
<td>53.6</td>
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<tr>
<td>&gt; 5 years</td>
<td>64.3</td>
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</table>

## Panleukopenia

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>No. tested</th>
<th>No. seropositive</th>
<th>Prevalence (%)</th>
<th>OR</th>
<th>95% CI</th>
<th>P value</th>
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## Panleukopenia


Protect all cats – don’t try to predict who may or may not have previously been vaccinated!

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Good News!

“The time necessary to obtain the immunity of cats against Panleukopenia has been studied by means of a modified live vaccine. This vaccine makes it possible to obtain a very early post-vaccinal immunity: the full immunity is reached 72 hr after the inoculation of the vaccine by the subcutaneous route. Furthermore, we have demonstrated that a sensitive kitten can be admitted in a contaminated environment immediately after vaccination without showing any clinical evidence of the disease.”

TNR Programs: Core Vaccinations

• Rabies (3yr DOI) – huge public health benefit

• FVRCP strongly recommended
Can an animal even respond to a vaccine if we give it the same day as surgery?

The short answer → Yes!

The long answer → Yes, as best we can tell from the few studies that have looked at this situation.
What’s Been Published on the Topic

Best evidence to date: a prospective study looking at response to vaccines given at surgery!

- 61 cats (4+ months old) in a TNR program
- Trapped, anesthetized, sterilized, vaccinated post-op against FVRCP, Rabies, FeLV
- Trapped and sedated again 2 months later for blood draw
What’s Been Published on the Topic

- There was a significant increase in the number of cats with protective levels of antibodies following vaccination 😊

<table>
<thead>
<tr>
<th></th>
<th>Before vaccination</th>
<th>After vaccination</th>
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<tbody>
<tr>
<td>Panleuk</td>
<td>33%</td>
<td>90%</td>
</tr>
<tr>
<td>Herpes</td>
<td>21%</td>
<td>56%</td>
</tr>
<tr>
<td>Calici</td>
<td>64%</td>
<td>93%</td>
</tr>
<tr>
<td>Rabies</td>
<td>3%</td>
<td>98%</td>
</tr>
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</table>
Rabies Vaccination

For kittens/cats at least 12 weeks of age:

- At intake for long-term stays or high LRR
- Optional at intake or give prior to release for short term stays
Recommendations for Dogs

**DA$_2$PP vaccination for all dogs on entry**
- Starting at 4-6 weeks of age
- Repeated every 2 weeks of age in high-risk environments until 18-20 weeks of age
- Boosters as for pet dogs if very long term stays

**Intranasal *Bordetella* and Parainfluenza for all dogs on entry**
- Starting as early as 3 weeks of age
- No booster necessary unless < 6 weeks old at intake
Rabies Vaccination

Core for puppies/dogs at least 12 weeks of age:

• For long-term stays and/or high LRR: at intake
• For short-term stays: optional at intake or prior to release
Parvovirus

• Parvo is considered to be a vaccine-preventable disease – “sterile immunity”

• Vaccination is highly effective for CPV:
  • Current vaccines provide protection against known variants, including CPV-2c
  • Immunity within days of administration
Parvovirus

This is a core vaccine – don’t assume they are protected!

Parvovirus

This is a core vaccine – don’t assume they are protected!

Good News!

“Dogs vaccinated with modified live canine parvovirus develop high hemagglutination inhibition titers within four days of inoculation and antibody persisted.”

Vaccination and CIRDC

• Vaccines available to protect against some causes:
  • *Bordetella bronchiseptica*
  • Parainfluenza virus
  • Adenovirus
  • Canine distemper virus
  • Canine influenza virus

• Vaccines not available to protect against others:
  • Respiratory coronavirus
  • Strep zoo
  • Mycoplasma

• Not vaccine preventable disease, but still an important tool
Distemper, Adeno, Parainfluenza

- Vaccination is highly effective for CDV:
  - Clinically relevant protection within hours
  - Longer time frame to prevent mild signs, actual infection, viral shedding

- Reasonable protection against CAV

- Don’t rely on it for CPiV
Distemper Vaccination

• This is a core vaccine - don’t assume they are protected!

Distemper Vaccination

- Don’t assume they are protected!

- Dogs’ source, health status, and the type of community from which they originated were not associated with protective antibody levels

...
Intranasal Vaccination

• Intranasal *Bordetella* AND Parainfluenza at intake for dogs as young as 3-4 weeks of age
  • Dogs < 6 weeks old: repeat once in 14 days
  • Dogs > 6 months old: not necessary

• Caution not to give via parenteral route: severe reactions, including acute hepatic necrosis and death may occur

• Oral *Bordetella* vaccine $\rightarrow$ effective, but lacks CPiV component

![Image of The Canadian Veterinary Journal]

Respiratory disease outbreak in a veterinary hospital associated with canine parainfluenza virus infection

J. Scott Weese and Jason Stull
Canine Influenza Vaccination

• Recent approval of a vaccine against canine influenza

• Parenteral killed product, 2 doses 2-4 weeks apart
  • Immunity should not be expected until approximately one week following the second dose
  • Limited benefit unless exposure can be prevented
CIV Vaccination

- Vaccine limits the severity and duration of clinical signs, viral shedding but does not prevent infection

- Included in AAHA’s 2011 Canine Vaccination Guidelines as a non-core vaccine
  - Recommended for use in certain populations of shelter-housed dogs
  - Transfers to/from, sometimes within endemic shelters or communities
  - Certain higher risk pet dogs

Recommendations for Dogs

• Not recommended for routine use in the shelter because:
  • Not a significant threat to the population
  • Inadequate time for immunity to develop
  • Limited efficacy against clinical disease

• Current list:
  • Canine coronavirus
  • Leptospirosis
  • Lyme disease
  • Rattlesnake
  • Injectable *Bordetella*, Parainfluenza
How Early Can Vaccines Be Given?

The minimum age for a dog/cat to receive vaccines in the shelter is 4 weeks.
Maternal Antibody Interference

AKA – why puppies and kittens need so many vaccines!

Age (in weeks)

Antibody level

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Maternal Antibody Interference

AKA – why puppies and kittens need so many vaccines!

Antibody level vs. Age (in weeks)

Protects from infection
Maternal Antibody Interference

AKA – why puppies and kittens need so many vaccines!

- Protects from infection
- Interferes with vaccination

Age (in weeks)

Antibody level
Maternal Antibody Interference

AKA – why puppies and kittens need so many vaccines!

**Protector of infection**

**“Window of susceptibility”**

**Interferes with vaccination**

Age (in weeks)

Antibody level
Maternal Antibody Interference

Age (in weeks)

Antibody level
Maternal Antibody Interference

Antibody level vs. Age (in weeks)
Maternal Antibody Interference

Antibody level

Age (in weeks)

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Maternal Antibody Interference

Age (in weeks)

Antibody level
Maternal Antibody Interference

Antibody level vs. Age (in weeks)

- Antibody level decreases over time.
- Maternal antibodies interfere with the kitten's immune response.
- Vaccinations at 6 and 8 weeks are marked with red 'X' symbols, indicating they should be skipped.
- Vaccination at 10 weeks is marked with a green symbol, indicating it is necessary.

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Maternal Antibody Interference

- Antibody level decreases over time with age (in weeks).
- Maternal antibodies interfere with vaccination at certain ages.
- Typical vaccination schedule is marked with "X" to avoid interference.

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Maternal Antibody Interference

Antibody level vs. Age (in weeks)

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Maternal Antibody Interference

Antibody level vs. Age (in weeks)
# Vaccine Type Comparison

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<th>Advantages</th>
<th>MLV</th>
<th>Killed</th>
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<tbody>
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<td>Rapid onset of immunity</td>
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<td>Safe in immunocompromised</td>
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<tr>
<td>Sustained immunity from 1 dose</td>
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<td>Stable in storage</td>
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<tr>
<td>Better able to breakthrough MDA</td>
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<tr>
<td>May immunize others</td>
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<td>Disadvantages</td>
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<td>Requires careful handling</td>
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<td>Slow onset of immunity</td>
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<td>Less stable in storage</td>
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<td>Requires multiple boosters</td>
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<td>Theoretical risk in pregnancy</td>
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<td>Potential for reversion to virulence</td>
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<td>Reduced degree of protection</td>
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<tr>
<td>Concerns with immunosuppression</td>
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<td>Poor breakthrough of MDA</td>
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Adapted from: Sykes JE. *Canine and feline infectious diseases*. Elsevier Health Sciences, 2013.
# Vaccine Type Comparison

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<tr>
<th>Advantage</th>
<th>MV</th>
<th>Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid onset of immunity</td>
<td></td>
<td>Safe in immunocompromised status</td>
</tr>
<tr>
<td>Sustained immunity from 1 dose</td>
<td></td>
<td>Stable in storage</td>
</tr>
<tr>
<td>Better able to breakthrough MDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May immunize others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disadvantage</th>
<th>MV</th>
<th>Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires careful handling</td>
<td></td>
<td>Slow onset of immunity</td>
</tr>
<tr>
<td>Less stable in storage</td>
<td></td>
<td>Requires multiple boosters</td>
</tr>
<tr>
<td>Theoretical for mutagenicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential for an increase in virulence</td>
<td></td>
<td>May be highly allergenic</td>
</tr>
<tr>
<td>Concerns with immunosuppression</td>
<td></td>
<td>Reduced degree of protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor breakthrough of MDA</td>
</tr>
</tbody>
</table>

Adapted from: Sykes JE. *Canine and feline infectious diseases*. Elsevier Health Sciences, 2013.
Handling and Administration

- Give as close to time of intake as possible, or before if at all possible
- Must be kept refrigerated from time of arrival until time of administration
- Must be mixed up fresh – do not mix and keep in the fridge for later use
- Weigh exposure risk vs. vaccination risk
  - Rule of thumb: too sick to vaccinate = too sick to stay in the shelter
Vaccine Placement

http://www.maddiesfund.org/Maddies_Institute/Articles/Proper_Use_and_Handling_of_Vaccines_in_Animal_Shelters.html
Vaccine Placement

Vaccinate here

Not here
Vaccine Placement

NEW 2013 Recommended Injection Site: the Tail

Vaccinate here

Not here
Record Keeping

- Each vaccination MUST be documented in animal’s individual medical record

- What to record:
  - Date of administration
  - Name of person giving vaccine
  - Product name, manufacturer, lot or serial number, expiration date
  - Route, location of administration
  - Any complications
    - Also report to the manufacturer and USDA’s Center for Veterinary Biologics
Adverse Reactions

• Adverse events are usually mild
• Must have written protocols for how to handle

• Local: pain, swelling, irritation, hair loss, at injection site; sarcoma formation rare

• Systemic: fever, lethargy, facial swelling, hives, redness, itching, salivation, v/d, difficulty breathing, collapse, death
  • Other hypersensitivity reactions
  • Vaccine-induced disease
Your very own protocol!

• National guidelines provide a starting framework

• Develop program-specific SOPs with a veterinarian, considering:
  • Risks and benefits
  • Diseases endemic to your area
  • Potential for exposure
  • Available resources
What about vaccinating...?
Vaccination vs. Titer Testing