VACCINATION PROTOCOLS IN CATS: FROM PRINCIPLES TO PRACTICE

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VACCINATION PROTOCOLS IN CATS:

Traditionally:
- Annual “Jab”: One size fits all
  - All agents, all cats, into the scruff, every year
- Overdue booster?
  - Start again
  - 2 vaccines, 3 weeks apart

Advantages:
- Simple
- Annual Health Check
- No off-license use
- Ensures maximum protection
- Good for business
**VACCINATION PROTOCOLS IN CATS:**

- Traditionally:
  - Annual “Jab”: One size fits all
    - All agents, all cats, into the scruff, every year
  - Overdue booster?
    - Start again
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- ”Over-Vaccination”
  - What is the duration of immunity?
  - Adverse effects
Currently:

- More vaccines available
  - Advanced vaccine technology
  - Better vaccines
- Better understanding of efficacy and duration of immunity
- Genuine concerns about adverse effects
- More information available to owners
VACCINATION PROTOCOLS IN CATS

- Consensus Guidelines
  - Independent, evidence based
  - Recent / Up to Date
  - Practical
VACCINATION PROTOCOLS IN CATS

- Consensus Guidelines
  - Independent, evidence based
  - Recent / Up to Date
  - Practical
  - Locally relevant

Vaccinate more individual cats
Vaccinate each individual cat less often
Core and Non-Core Vaccines: UK Perspective

- **Core Vaccines – All Cats**
  - Feline Herpesvirus
  - Feline Calicivirus
  - Feline Panleukopenia

- **Non-Core Vaccines**
  - Feline Leukaemia virus:
    - Cats with free access to outdoors in areas where infected cats may be found
  - Rabies:
    - Cats that travel
  - Chlamydia, Bordetella
    - Cats at increased risk of infection
FELINE HERPES VIRUS

Large, enveloped DNA virus
One serotype
Enveloped virus
  Susceptible to most disinfectants
  Relatively poor survival in the environment
Complex “life-cycle”
  Life-long infection in most cats
  Latency: Trigeminal ganglion, Cornea; no viral shedding
  Recrudescence: Associated with stress, period of virus shedding; may show mild clinical signs
Natural Infection does not produce complete immunity
FELINE CALICIVIRUS

Small, non-enveloped RNA virus

Non-enveloped virus
Less susceptible to disinfectants
Survives longer in the environment

RNA Virus
Frequent mutations
Multiple strains
Many different clinical manifestations
FELINE CALICIVIRUS

Small, non-enveloped RNA virus
Relatively simple “life-cycle”
- Infection produces clinical signs, virus is shed in all secretions
- Clinical signs resolve, virus continues to be shed for some weeks

Amount of virus shed reduces over time
Most cats eventually clear the infection
- Usually weeks to months
- Sometimes lifelong shedding persists

Immunity to future infection?

“...A large number of FCV strains co-circulated in the UK at the national and community levels, with no strain comprising more than 5% and 14% of these populations, respectively. ..”

“... strains exhibited a relatively restricted geographical range, with only 2 strains (1 field virus and 1 vaccine virus) spreading further than 100 km. None of the field strains were identified outside the United Kingdom...”
FELINE UPPER RESPIRATORY VIRUSES

Direct Spread
Sneezing and co-grooming
Ocular and nasal discharges

Indirect / Fomites
FCV survives better in the environment than FHV

Carrier cats
Asymptomatic cats can still shed and spread virus
Feline Calicivirus: Estimated Incidence

**Healthy Cats**
- PCR / VI positive: 14-29%
- Antibody positive: 58-86%

**Cats with, or in contact with, URT disease**
- PCR / VI positive: 33-47%
- Antibody positive: 99.7%
Feline Herpes: Estimated Incidence

Healthy Cats

- PCR / VI positive: 1-8%
- Antibody positive: 54-67%

Cats with, or in contact with, URT disease

- PCR / VI positive: 1-16%

Healthy flu virus carrier cats appears to be as common now as before the introduction of vaccines.
FELINE UPPER RESPIRATORY VIRUSES

Vaccination

- Controls disease
- Does not prevent infection, latency or shedding
- Cannot eliminate flu viruses from the cat population

Healthy flu virus carrier cats appears to be as common now as before the introduction of vaccines.
Vaccination Types

- **“Infectious”**
  - Modified Live Vaccines
  - Recombinant Vectored Viruses
  
  Antigen multiplies within the cat, stimulating the immune system as the infectious agent would
  
  Generate rapid, robust immunity
  
  In the absence of MDA, a single injection usually provides good protection
  
  Potential to cause mild signs of disease?

- **“Non-Infectious”**
  - Killed / Inactivated Vaccines
  - (Subunit / Naked DNA Vaccines)
  
  Antigen cannot cause signs of disease
  
  Antigen cannot replicate; less likely to stimulate both cell mediated and humoral immunity
  
  Adjuvant required to increase potency
  
  Multiple doses usually required
  
  Duration of immunity generally shorter
ADVERSE REACTIONS TO VACCINATION

- Adverse reactions are rare
  - UK: Veterinary Medicines Directorate SARSS
    - Estimated 6 adverse reactions per 100,000 vaccines sold
    - Element of under-reporting?
  - US Survey of Practice Management Systems
    - 516 adverse reactions per 100,000 vaccines administered
    - Wider range of vaccines, legal requirement to vaccinate against rabies

Vaccinate more individual cats. Vaccinate each individual cat less often
ADVERSE REACTIONS TO VACCINATION

- Lethargic and off food for 24 hours
- Local skin reaction
- Brief hypotension
  - kittens, first vaccine only

- Allergic reactions
  - Cutaneous Urticaria
  - Anaphylactic shock

- Other immune-mediated diseases:
  - IMHA, myaesthenia gravis, polyneuropathy …
  - No evidence of these in cats

Benefits of vaccination outweigh the risks
RENAL AUTOANTIBODIES

Vaccine strain viruses raised in Crandall-Reese Feline Kidney cell cultures

Renal cell contaminants remain in vaccines
Stimulate auto-antibody production when injected into cats and over time may cause interstitial nephritis


Risk factors for CKD (Finch et al, JVIM, 2016).
Annual vaccination and dental disease were the only two factors identified that were associated with increased risk of developing CKD
UK estimated incidence: Approx 1 per 5000-12,500 vaccination visits
Suggested incidence of approx 1 case per vet practice every 5 years

Report all cases of FISS to VMD through SARSS
Vaccines are the most common cause:

- Other injections are implicated
  - Antibiotics, corticosteroids, lufenuron, meloxicam
- Any vaccine can give rise to FISS but adjuvanted vaccines appear to be more likely
- Proposed mechanism is contribution of inflammation to carcinogenesis

WSAVA Vaccine Guidelines: In cats use non-adjuvanted vaccines where possible
FELINE INJECTION SITE SARCOMA

- Sites for Vaccination
  - Avoid the “scruff”
  - Distal limbs
  - Tail
  - Lateral abdomen
- Use a different site each year
  - Record the site on the vaccination card
  - Adopt a practice policy for each year
FELINE INJECTION SITE SARCOMA

Prevention

Vaccinate no more than necessary in accordance with current guidelines.

- Vaccinate more individual cats
- Vaccinate each individual cat less often

- Non-adjuvanted vaccines over adjuvanted
- Modified live or recombinant vaccines over inactivated
- Vaccines with extended duration of immunity
FLU VACCINES

Current WSAVA Guidelines:

“Core” Vaccine – all cats
Kitten course; First booster; Then…

Cats in low risk environments:
Booster every 3 years with MLV vaccine
Booster every year with killed vaccine

Cats at higher risk – annual booster
Multi-cat households, access to the outdoors, boarding catteries (cats that need regular visits to veterinary practices?)

“Low risk” – solo indoor cats, cats that don’t visit boarding catteries (or vets?)
FLU VACCINES

- Lapsed vaccines (> 3 years)
  - Single MLV injection re-establishes immunity
- Unvaccinated / Unknown Status Adults
  - Give two injections 2-4 weeks apart, even when using MLV vaccines
    - Single injection still likely to be of equivalent benefit
- Boarding Catteries
  - Where possible give booster in the 3 months prior to the visit
Current WSAVA Guidelines:

“Core” Vaccine – all cats
Kitten course; First booster; Then…
Revaccinate not more often than every 3 years thereafter

Lapsed vaccines (> 3 year interval)
Single MLV vaccine provides full immunity

Unvaccinated Adults / Unknown Vaccination Status
Single MLV vaccine provides full immunity
Current WSAVA Guidelines:

“Core” Vaccine for cats with free access to the outdoors, especially < 1 y/o

Kitten Course
First booster at 1 year
Booster every 2-3 years thereafter – if still perceived to be at risk of infection – annual review
Inducing Immunity: Kittens

- At least 2 injections required, 3-4 weeks apart, plus first “annual” booster:
  - Non-infectious Vaccines require two injections to induce immunity
  - FeLV: 2 injections required even with recombinant vector vaccines
  - Modified Live Vaccines: second (and subsequent) vaccines are to ensure that maternally derived antibody doesn’t impinge on response
    - Levels of MDA are highly variable between litters and individuals
    - Usually waned by 8-12 weeks, may persist up to 16-20 weeks
      - Affects 15% kittens
      - Pedigree cats vaccinated just prior to mating, or in groups where the infectious agent is endemic
Inducing Immunity: Kittens

- At least 2 injections required, 3-4 weeks apart, plus first “annual” booster:
  - Inject at 12 and 16 weeks: kittens with low/normal MDA vulnerable to infection before first injection given
  - Inject at 8 and 12 weeks: kittens with high MDA may not react

- **WSAVA Guidelines: Suggestion …**
  - Begin at 6-8 weeks, repeat every 2-4 weeks until 16 w/o
  - First booster at 26 weeks will “catch” any outliers (if using an MLV vaccine)

- **European Advisory Board on Cat Diseases (ABCD):**
  - Consider early vaccination and/or 16 week vaccination for “high risk” kittens
FROM PRINCIPLES TO PRACTICE

Vaccinate more individual cats. Vaccinate each individual cat less often

- Which Vaccine Brand?
  - Infectious or Non-Infectious?
    - WSAVA Guidelines: “Non-adjuvanted vaccines should be used in cats whenever possible”
    - Infectious vaccines provide longer duration of immunity and, in adults, a single MLV injection usually produces long term immunity
  - Flexibility:
    - Ability to separate FPV, FCV+FHV, FeLV
  - Feline Calicivirus:
    - Which vaccine viruses and how many?
Continued regular Flu and Panleukopenia vaccinations recommended

Flu Vaccines: If boosters only given every 3 years in youth, consider increasing frequency to annual vaccination in older age

- Immune system less effective in older age
- Consequences of disease more serious in older age
- Adverse effects: if the cats is predisposed to adverse effects, likely would have showed them by now
VACCINATIONS FOR SENIOR CATS?

Requirement for ongoing FeLV vaccination?

Good long term immunity from vaccination
Older cats may be spending less time outdoors and be less likely to meet the infection

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Vaccinate each individual cat less often