THIS WEBINAR WILL BEGIN SOON:

Coronavirus (COVID-19) in Veterinary and Animal Group Settings: Protecting People and Animals

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- AKC-Canine Health Foundation
- American Animal Hospital Association (AAHA)
- Merck Animal Health
- Virox Animal Health™
- Zoetis

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A Few Words…

- Audience includes many different sectors of animal health/group setting
- Different situations across North American/world
  - Varying stages of the pandemic
  - Varying approaches to containment/mitigation
  - Some temporary closing/moving to essential services only…will need to evaluate these issues when reopening
- Our goal: provide options and rationale for making the best choices for your business, staff, animals

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Coronavirus (COVID-19)

- SARS-CoV-2
- Rapidly spreading (infection of nose, throat, lungs)
  - China December 2019
  - First case USA (travel-related) January 19, 2020
  - First case Canada (travel-related) January 25, 2020
  - World Health Organization declares the outbreak a pandemic
- Most commonly spread person-to-person
  - Close contact with an infected person (respiratory droplets, saliva)
  - Touching something with the virus on it
- Symptoms (within 14 days of exposure)
  - Fever, cough, difficulty breathing
  - More severe outcomes: aged 65+, immunocompromised, underlying medical conditions
- Strong public health messaging and steps to contain/mitigate

Public Health Agency of Canada

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Potential Animal-Related Issues

- Animals as sources of infection?
- Animals as reservoir populations?
- Animals as fomites (become contaminated and spread)?

- Management of pets of affected people
  - Isolation, clinical management, shelter surrenders, kennels

- Impact of social distancing on veterinary clinic and shelter operations
- Impact of illness and self-isolation on clinic/shelter operations

- Supply shortages

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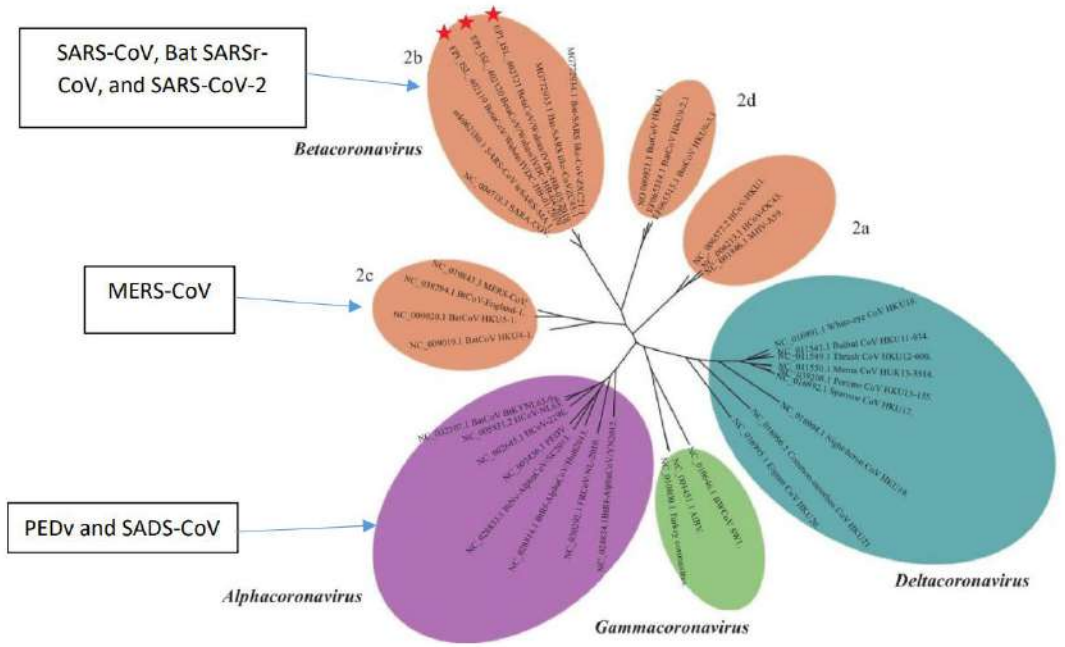
Coronaviruses

- Many in veterinary and human medicine
  - FIP
  - Canine enteric
  - Severe acute respiratory syndrome (SARS)
  - Middle East respiratory syndrome (MERS)
- Similarities between SARS-CoV & SARS-CoV-2



Wenjie et al., 2020

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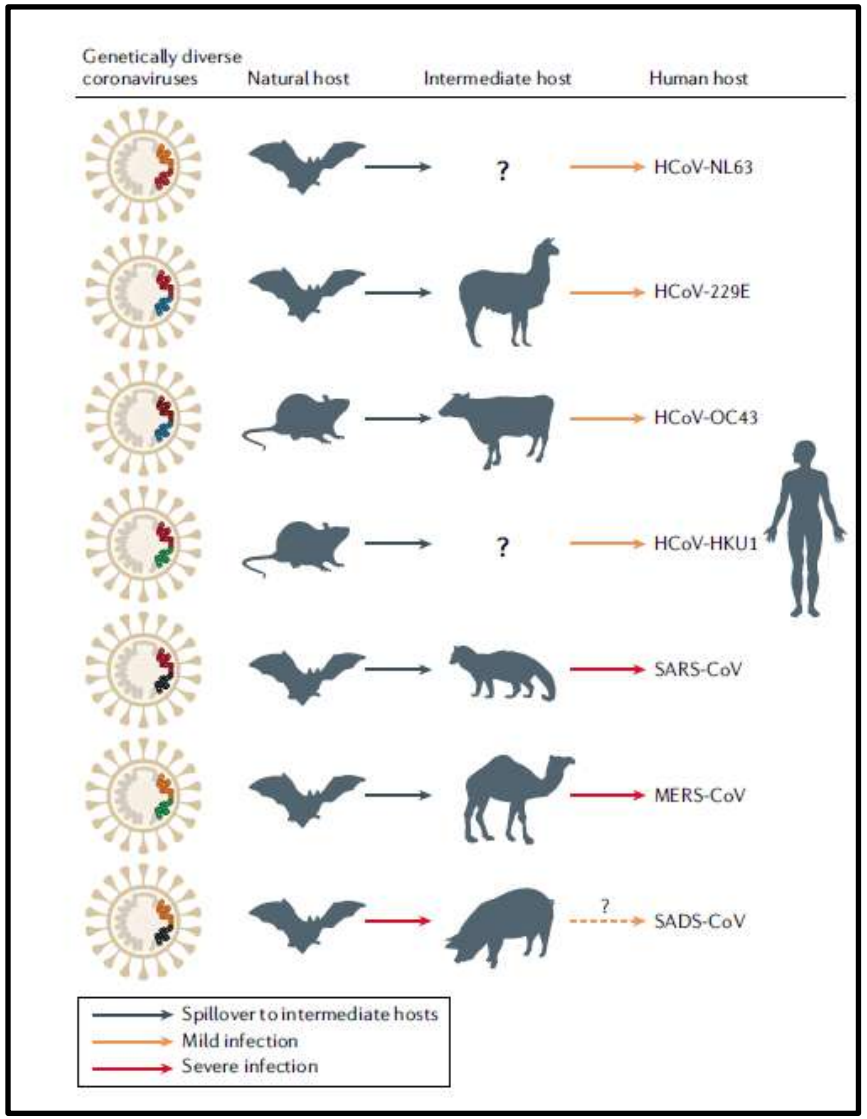
SARS-CoV-2 (COVID-19)

- Likely animal origin
- Similarities to SARS?
  - Animal host bats?
  - Intermediate hosts?



Cui et al., 2019

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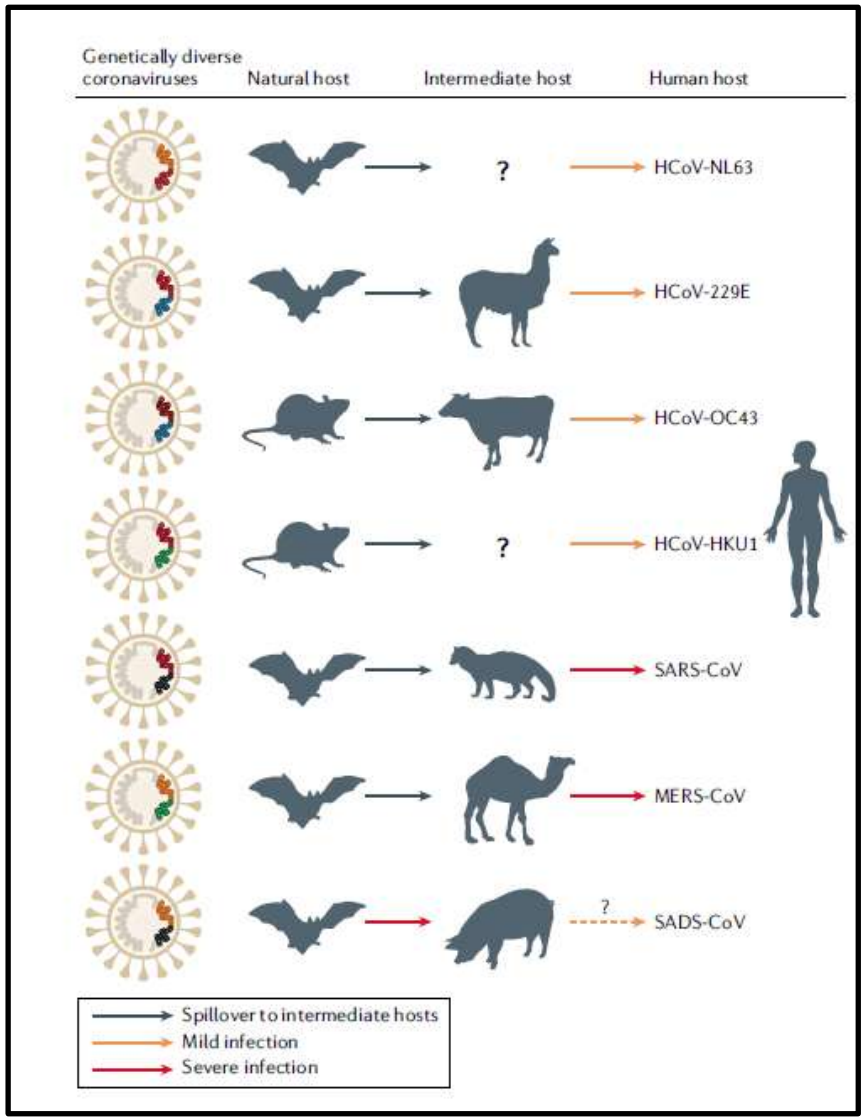
SARS-CoV



Cui et al., 2019

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SARS-CoV-2 (COVID-19) [1]

- Uses same receptor as SARS-CoV
- Mutation could enhance ability to bind
- Predicts SARS-CoV-2 can effectively bind to receptor (similar to humans) in
  - Non-human primates
  - Pigs
  - Ferrets
  - Cats

AMERICAN SOCIETY FOR MICROBIOLOGY | Journal of Virology®

VIRUS-CELL INTERACTIONS

Receptor Recognition by the Novel Coronavirus from Wuhan: an Analysis Based on Decade-Long Structural Studies of SARS Coronavirus

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Yushun Wan and Jian Shang contributed equally to this work. Author order was determined by the time to join the project.

ABSTRACT Recently, a novel coronavirus (2019-nCoV) has emerged from Wuhan, China, causing symptoms in humans similar to those caused by severe acute respiratory syndrome coronavirus (SARS-CoV). Since the SARS-CoV outbreak in 2002, extensive structural analyses have revealed key atomic-level interactions between the SARS-CoV spike protein receptor-binding domain (RBD) and its host receptor angiotensin-converting enzyme 2 (ACE2), which regulate both the cross-species and human-to-human transmissions of SARS-CoV. Here, we analyzed the potential receptor usage by 2019-nCoV, based on the rich knowledge about SARS-CoV and the newly released sequence of 2019-nCoV. First, the sequence of 2019-nCoV RBD, including its receptor-binding motif (RBM) that directly contacts ACE2, is similar to that of SARS-CoV, strongly suggesting that 2019-nCoV uses ACE2 as its receptor. Second, several critical residues in 2019-nCoV RBM (particularly Gln493) provide favorable interactions with human ACE2, consistent with 2019-nCoV's capacity for human cell infection. Third, several other critical residues in 2019-nCoV RBM (particularly Asn501) are compatible with, but not ideal for, binding human ACE2, suggesting that 2019-nCoV has acquired some capacity for human-to-human transmission. Last, while phylogenetic analysis indicates a bat origin of 2019-nCoV, 2019-nCoV also potentially recognizes ACE2 from a diversity of animal species (except mice and rats), implicating these animal species as possible intermediate hosts or animal models for 2019-nCoV infections. These analyses provide insights into the receptor usage, cell entry, host cell infectivity and animal origin of 2019-nCoV and may help epidemic surveillance and preventive measures against 2019-nCoV.

IMPORTANCE The recent emergence of Wuhan coronavirus (2019-nCoV) puts the world on alert. 2019-nCoV is reminiscent of the SARS-CoV outbreak in 2002 to 2003. Our decade-long structural studies on the receptor recognition by SARS-CoV have identified key interactions between SARS-CoV spike protein and its host receptor angiotensin-converting enzyme 2 (ACE2), which regulate both the cross-species and human-to-human transmissions of SARS-CoV. One of the goals of SARS-CoV research was to build an atomic-level iterative framework of virus-receptor interactions to facilitate epidemic surveillance, predict species-specific receptor usage, and identify potential animal hosts and animal models of viruses. Based on the sequence of 2019-nCoV spike protein, we apply this predictive framework to provide novel insights into the receptor usage and likely host range of 2019-nCoV. This study provides a robust test of this reiterative framework, providing the basic, translational, and public health research communities with predictive insights that may help study and battle this novel 2019-nCoV.

KEYWORDS 2019-nCoV, SARS coronavirus, angiotensin-converting enzyme 2, animal reservoir, cross-species transmission, human-to-human transmission

Citation Wan Y, Shang J, Graham R, Baric RS, Li F. 2020. Receptor recognition by the novel coronavirus from Wuhan: an analysis based on decade-long structural studies of SARS coronavirus. J Virol 94:e00127-20. https://doi.org/10.1128/JVI.00127-20.

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[1]Wan, 2020

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Dog Tests Positive for SARS-CoV-2

- Hong Kong owner with COVID-19
- Healthy dog: consecutive positive tests
- Early serology (antibody test) negative
- Too early to mount immune response?
- Media reports dog died following release from quarantine
- Infected?
- Infectious?

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PET FOOD NEWS / CORONAVIRUS AND PETS

(Kira_Yan, BigStock.com)

BY TIM WALL ON MARCH 9, 2020

Dog infected by coronavirus COVID-19 in Hong Kong

The World Organization for Animal Health published a report of the emerging disease, listing this case as the first in dogs.

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SARS-CoV-2 on Surfaces

- Can persist on surfaces hours to days[1]
  - Aerosols: 3 hrs
  - Copper: 4 hrs
  - Cardboard: 24 hrs
  - Plastic/steel: 2-3 days

NEWS RELEASES

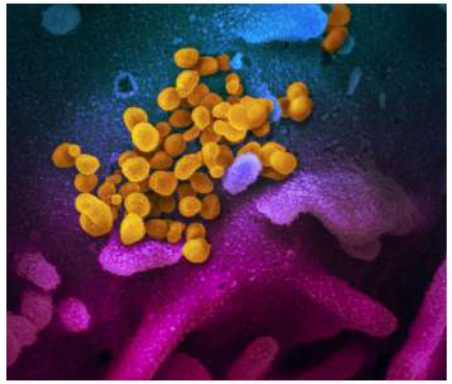
Tuesday, March 17, 2020

New coronavirus stable for hours on surfaces

SARS-CoV-2 stability similar to original SARS virus.

What

The virus that causes coronavirus disease 2019 (COVID-19) is stable for several hours to days in aerosols and on surfaces, according to a new study from National Institutes of Health, CDC, UCLA and Princeton University scientists in *The New England Journal of Medicine*. The scientists found that severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was detectable in aerosols for up to three hours, up to four hours on copper, up to 24 hours on cardboard and up to two to three days on plastic and stainless steel. The results provide key information about the stability of SARS-CoV-2, which causes COVID-19 disease, and suggests that people may acquire the virus through the air and after touching contaminated objects. The study information was widely shared during the past two weeks after the researchers placed the contents on a preprint server to quickly share their data with colleagues.



This scanning electron microscope image shows SARS-CoV-2 (yellow)—also known as 2019-nCoV, the virus that causes COVID-19—isolated from a patient in the U.S., emerging from the surface of cells (blue/pink) cultured in the lab. *NIAID-RML*

The NIH scientists, from the National Institute of Allergy and Infectious Diseases' Montana facility at Rocky Mountain Laboratories, compared how the environment affects SARS-CoV-2 and SARS-CoV-1, which causes SARS. SARS-CoV-1, like its successor now circulating across the globe, emerged from China and infected more than 8,000 people in 2002 and 2003. SARS-CoV-1 was eradicated by intensive contact tracing and case isolation measures and no cases have been detected since 2004. SARS-CoV-1 is the human coronavirus most closely related to SARS-CoV-2. In the stability study the two viruses behaved similarly, which unfortunately fails to explain why COVID-19 has become a much larger outbreak.

[1]N van Doremalen, 2020

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Potential Animal-Related Issues

- Animals as sources of infection?
- Animals as reservoir populations?
- Animals as fomites (become contaminated and spread)?

- Management of pets of affected people
  - Isolation, clinical management, shelter surrenders, kennels

- Impact of social distancing on veterinary clinic and shelter operations
- Impact of illness and self-isolation on clinic/shelter operations

- Supply shortages

Key Steps: Protect Yourself & Others

- Do these
  - Clean hands frequently: soap and water or hand sanitizer
  - Avoiding touching eyes, nose, mouth with unwashed hands
  - Avoid unnecessary personal contact (shaking hands)
  - Cough or sneeze into your elbow or a tissue
  - Do not share food/drink
  - Avoid contact with people who are sick
  - Clean and disinfect frequently touched surfaces/objects
- If you are sick
  - Fever, cough, or congestion/tightness in the chest
  - Stay at home, contact primary health-care provider

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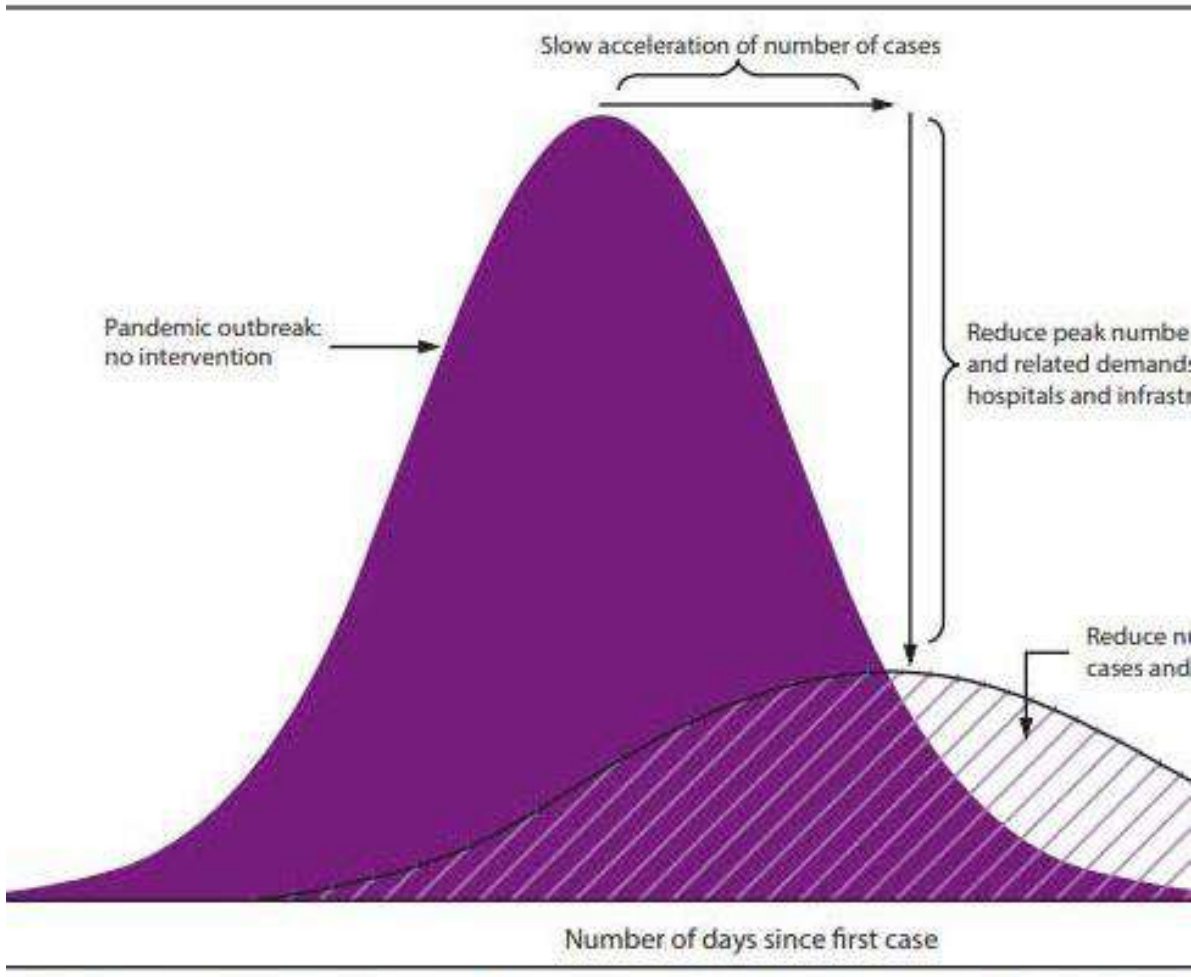
Key Steps: Protecting our Community

- Minimize serious illness and deaths
- Minimize societal disruption
- Personal measures
- Cleaning and disinfecting surfaces
- Social distancing



ed from: CDC. Interim pre-pandemic planning guidance: community strategy for pandemic influenza mitigatio
nonpharmaceutical interventions. Atlanta, GA: US Department of Health and Human Services, CDC; 2007. http

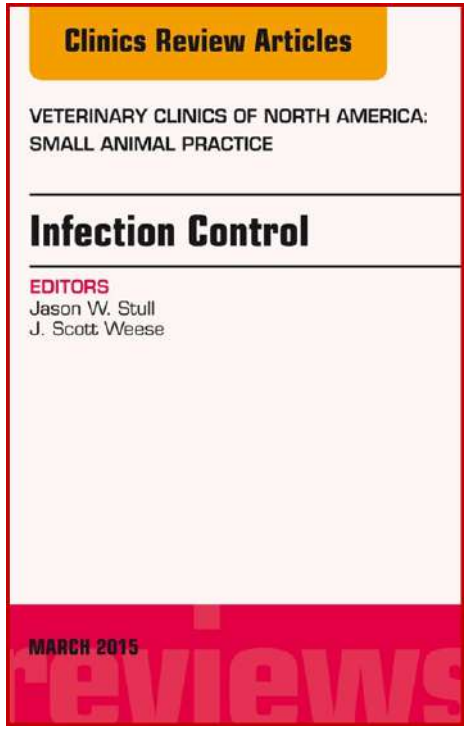
Animals?

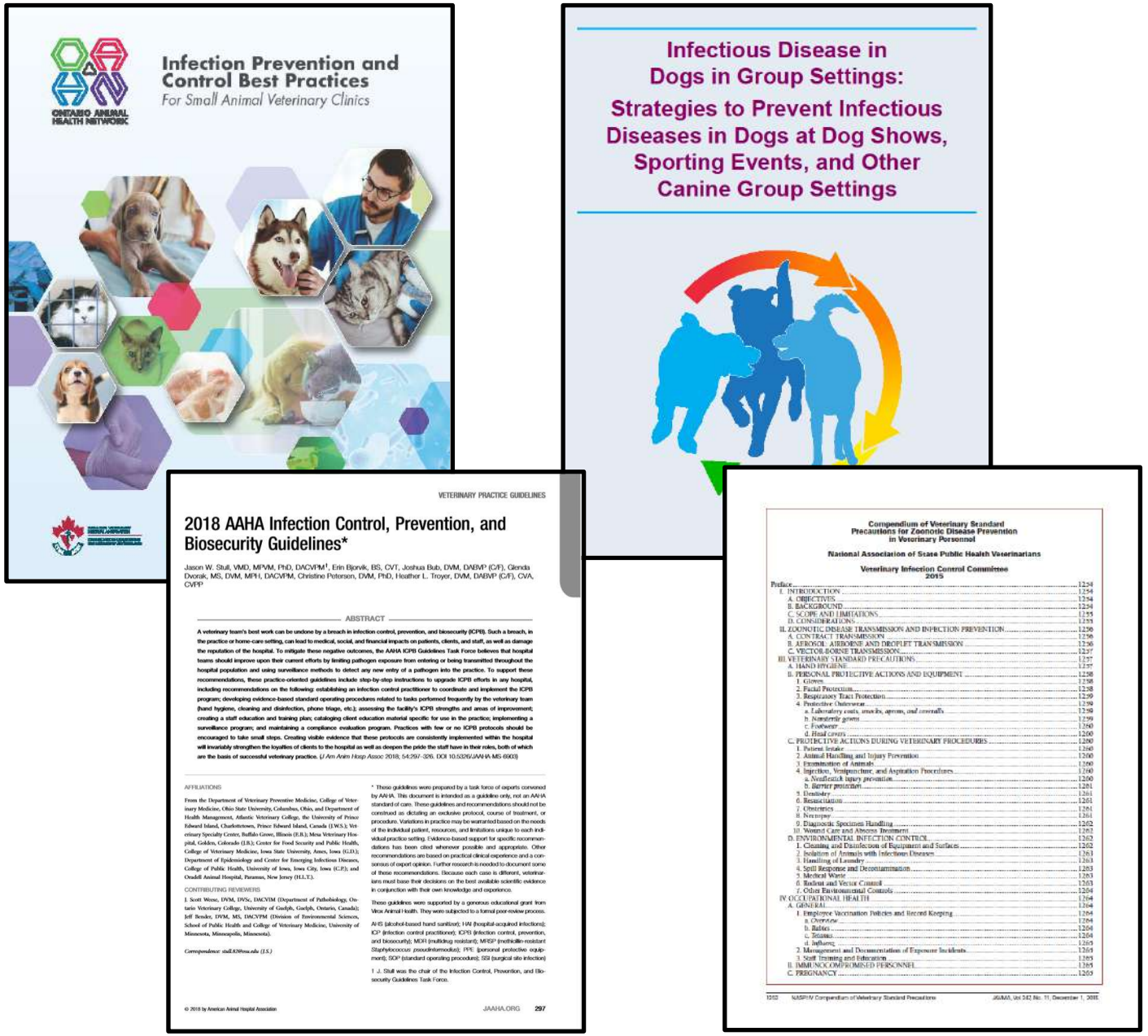
- Extension of personal measures
- If person diagnosed with COVID-19, while ill
  - Avoid close contact with animals
  - Practice good cough/sneeze etiquette
  - Have someone else care for animals
  - Limit animal's contact with other people and animals
- Social distancing with owners

Protecting Staff and Clients

- Owners with confirmed/suspect COVID-19
- Animals from confirmed/suspect COVID-19 households

Resources: You are Not Alone





All resources can be found at https://rescuedisinfectants.com/covid-19/

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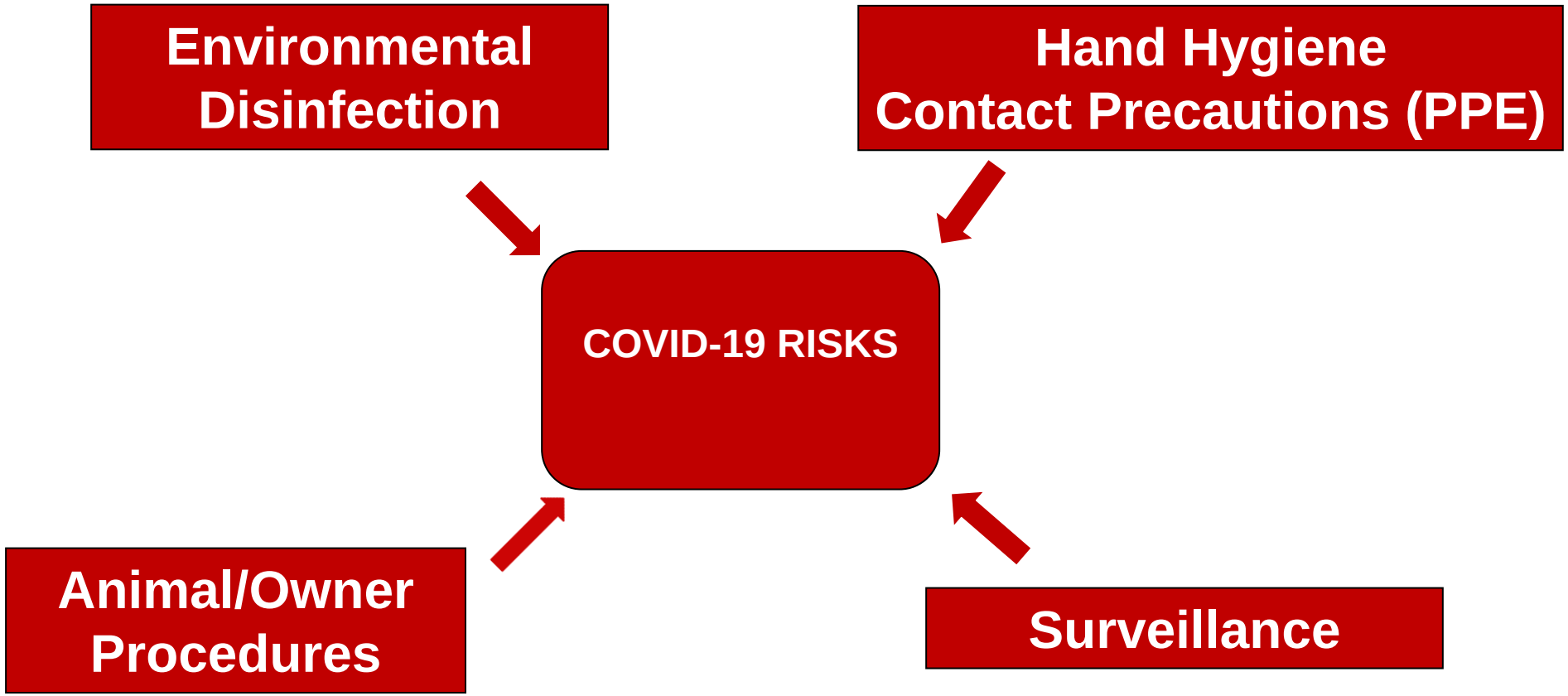
Multiple Domains to Address in Animal-Person Settings



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Hand Hygiene and Personal Protective Equipment

- Alcohol-based hand sanitizer or soap and water
  - Reinforce importance
  - Before/after patient contact
  - Esp after owner contact, before eating/drinking, before touching face
- PPE
  - Dedicated clothing (washed at least daily)
  - Disposable/washable gowns
  - Gloves
  - Masks

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PPE

PPE

OW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) XAMPLE 1

ere are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with tentially infectious materials. Here is one example. **Remove all PPE before exiting the patient room** except a respirator, orn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

GLOVES

Outside of gloves are contaminated!

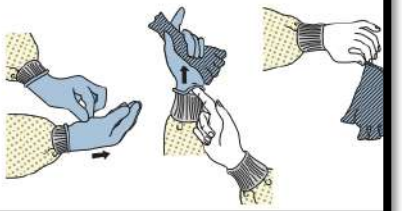
If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer

Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove

Hold removed glove in gloved hand

Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove

Discard gloves in a waste container



GOGGLES OR FACE SHIELD

Outside of goggles or face shield are contaminated!

If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer

Remove goggles or face shield from the back by lifting head band or ear pieces

If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

GOWN

Gown front and sleeves are contaminated!

If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer

Unfasten gown ties, taking care that sleeves don't contact your body when reaching for ties

Pull gown away from neck and shoulders, touching inside of gown only

Turn gown inside out

Fold or roll into a bundle and discard in a waste container

MASK OR RESPIRATOR

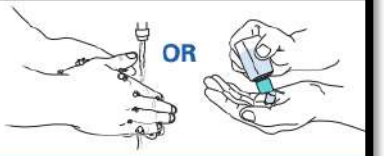
Front of mask/respirator is contaminated — DO NOT TOUCH!

If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer

Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front

Discard in a waste container

WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



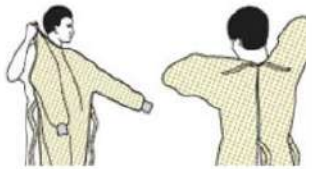
ERFORM HAND HYGIENE BETWEEN STEPS IF HANDS ECOME CONTAMINATED AND IMMEDIATELY AFTER EMOVING ALL PPE

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the speci type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GOVES

- Extend to cover wrist of isolation gown

USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

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Cleaning & Disinfection

- Must first be clean and dry before disinfected
- Disinfection
  - Product
  - Dilution
  - Contact time

2018 AAHA INFECTION CONTROL, PREVENTION, AND BIOSECURITY GUIDELINES

AAHA
The Standard of Veterinary Excellence

9 Common Disinfection Mistakes

During training and any later staff coaching on infection control expectations and protocols, pay attention to these common mistakes:

1 Eyeballing disinfectant solution mixtures.
Always follow label instructions for dilution and use of a disinfectant. Measure everything. The tendency is to go light on the disinfectant, either due to incorrect measurements or an attempt to save money by using less product. Both strategies can lead to a disinfectant solution that is too weak to work properly.

2 Failing to reach designated contact time.
In other words, the surface being cleaned does not stay wet with the right level of diluted disinfectant for the full length of time required for efficacy.

3 Confusing sanitizing with disinfecting.
Sanitizing reduces the number of bacteria on a surface or object to a safe level. Disinfecting kills bacteria, viruses, and mold on a surface.

4 Not knowing the shelf-life of the disinfectant being used.
In addition to knowing the shelf-life of the concentrated disinfectant, it's important to know how long the disinfectant, once diluted, will continue to work properly. The diluted shelf-life for some disinfectants may only be 24 hours, or as much as 90 days, so be sure you're not wasting product by mixing up too much at once or using expired product.

5 Topping off diluted disinfectant bottles, rather than starting each time with a cleaned bottle and fresh batch.
Making this mistake means you've just mixed old disinfectant with new. This can lead to an overdiluted or inactivated mixture. In other words, it won't work as well.

6 Mixing cleaning chemicals.
In addition to the potential for dangerous interactions, there's a chance that adding one chemical to another will cause the disinfectant to not work properly. For example, if you add a scented product to your disinfectant simply because you like the smell better, there's a chance the chemical mixture won't be as potent as it needs to be.

aaha.org/biosecurity

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Disinfection

TABLE 7. Antimicrobial spectrum of selected disinfectants* (Modified from Linton 1987, Block 2001)

Most susceptible

Susceptibility of microorganisms to chemical disinfectants

Most resistant

Agent	Ethyl alcohol Isopropyl alcohol	Formaldehyde	Ammonia	Chlorhexidine Chlorhexidine	Hypochlorite Bleach	AHP, Peroxygen	Phenols	Quaternary Ammonium Compounds
Mycoplasmas	++	++	++	++	++	++	++	+
Gram-positive bacteria	++	++	+	++	++	++	++	++
Gram-negative bacteria	++	++	+	+	++	++	++	+
Pseudomonads	++	++	+	±	++	++	++	±
Enveloped viruses	+	++	+	++	++	++	++	+
Chlamydiae	±	+	+	±	+	+	±	-
Non-enveloped viruses	-	+	±	-	++	+	±**	-
Fungal spores	±	+	+	±	+	±	+	±
Acid-fast bacteria	+	++	+	-	+	±	++	-
Bacterial spores	-	+	±	-	++	+	-	-
Coccidia	-	-	+	-	-	±	+	-

++ Highly effective; + Effective; ± Limited activity; - No activity

https://www.wormsandgermsblog.com/resources-pets/

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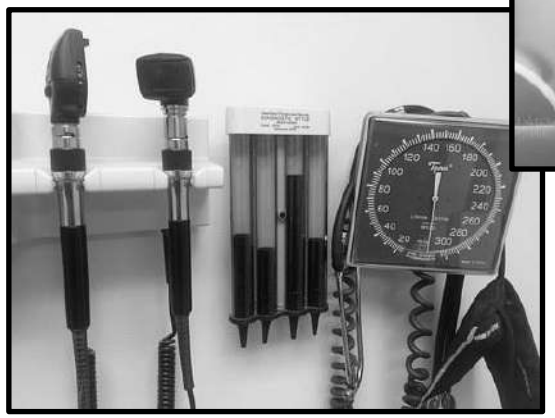
Environmental Cleaning and Disinfection

You've got THESE



But don't forget THESE

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Policies, Screening Tools, Patient/Owner Flow

- Personnel illness
- Screening tools
  - Sick patients
  - COVID-19 owners – symptoms, recent international travel
- Social distancing
  - Waiting areas, contact with owners
- Limit contamination of work environment

AAHA
The Standard of Veterinary Excellence

IDENTIFYING HIGH-RISK PATIENTS:
Questions to Ask When Making Appointments

Species: Canine Feline Other: _____ **Age:** _____

Has the patient...
(Check all boxes that apply.)

☐ Been recently adopted or purchased? Date of acquisition: _____
☐ Visited a boarding kennel, dog park, day care facility, or animal shelter in the past week.
☐ Attended a dog/cat show of any kind in the past week?
☐ Traveled to another area or country in the past week?
☐ Been exposed to other animals who are ill?
o What were their clinical signs? _____
☐ Had a multi-drug resistant infection?
o What kind of infection? Urinary Skin/Ear Bone Not sure

In the past 24 hours, has the patient...

☐ Vomited?
☐ Had three or more loose stools?
☐ Had episodes of bloody diarrhea?

aaha.org/biosecurity

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Protecting Staff and Clients

- Owners with confirmed/suspect COVID-19
- Animals from confirmed/suspect COVID-19 households

Precautions for Exposed Animals, COVID-19 Owners

All resources can be found at
https://www.cliniciansbrief.com/covid-19-updates

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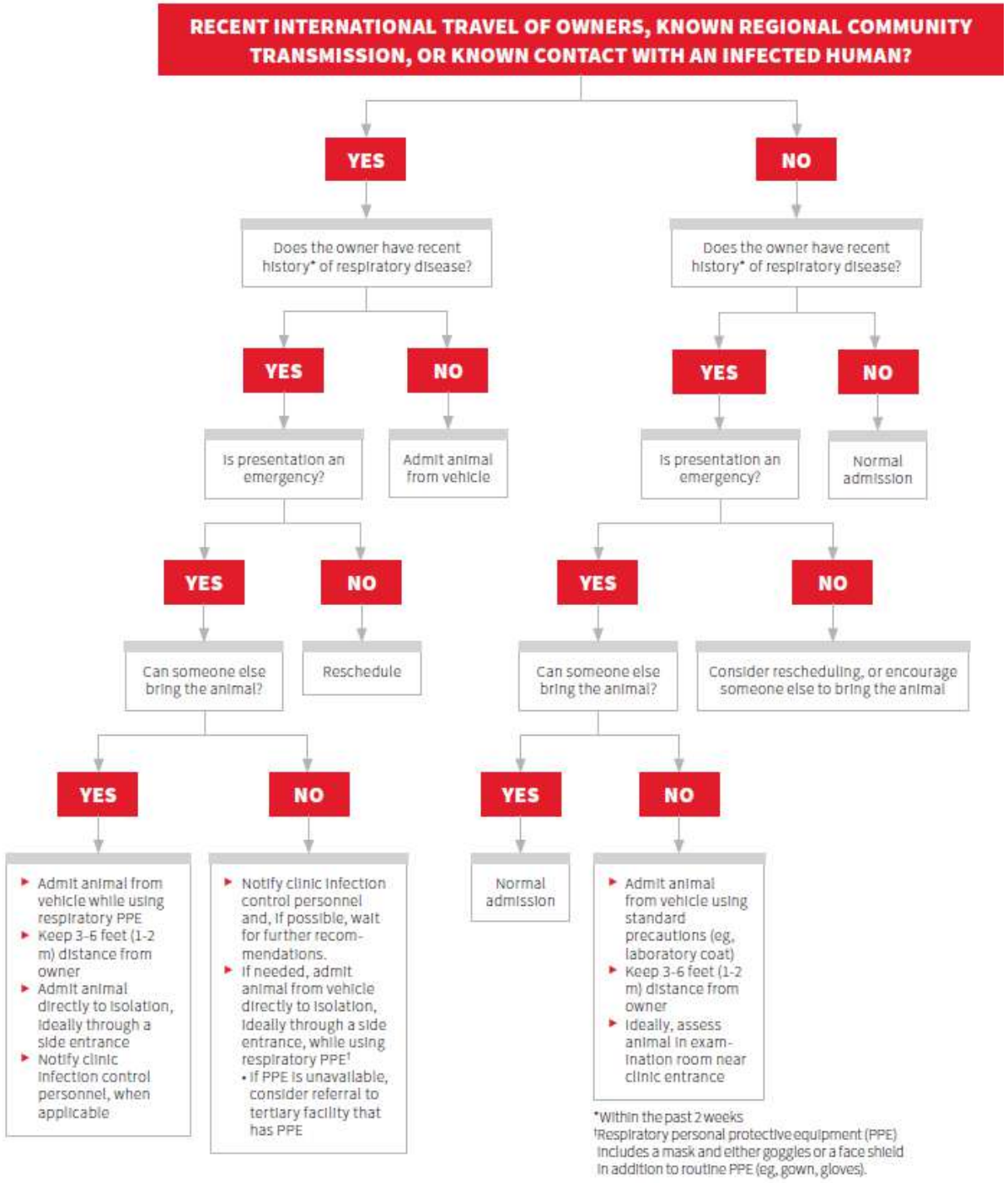
Precautions for Exposed Animals, COVID-19 Owners



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https://www.cliniciansbrief.com/covid-19-updates

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Testing Animals

- SARS-CoV-2 PCR available from multiple labs
- Little indication for routine diagnostic testing

- Testing best reserved for organized surveillance testing of contacts of infected people

- If there's enough reason to test, it should be assumed the animal is infectious (respiratory PPE)

What About Exposed Animals?

- Bathing?
  - With what?
- Quarantine?
  - When, how long?

Other Related Setting Issues

- Impact of illness and self-isolation on clinic/shelter operations
- Supply shortages

Social Distancing

- Reducing direct human-human contact
- Reducing cross-contamination
- While causing as limited disruption as possible

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Social Distancing Cont'd

- Veterinary clinics (and other settings)
  - Close waiting room
    - Drop off admission and/or admissions from vehicles
    - Communicate with owners by phone/computer
  - Screen (travel and resp disease history) owners
  - Telemedicine
  - Cohorting staff groups
  - Electronic payment only
  - Limiting need for signatures (or disinfecting pens)
  - Arranging food/drug delivery
  - Requiring pre-order for any items picked up from the clinic

- Ensuring personnel are social distancing outside of work!

Questions?

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Where to Buy Rescue:

PATTERSON VETERINARY

covetrus

MWI Animal Health
AmerisourceBergen

Animal Health INTERNATIONAL

midwest veterinary supply

first veterinary supply
Putting Veterinarians First

MILLER VETERINARY SUPPLY

Dental • Medical • Animal
UGS
Equipment • Products • Solutions

VMC
VICTOR MEDICAL COMPANY

Available at amazon

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Where to Buy Prevail: