Have you “herd”? You can’t disinfect EWWW!

Infectious diseases and the importance of cleaning protocols

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YOU CAN'T DISINFECT

POO .... EWWWW
Lecture Overview

• Principles of disease prevention
• Discussion of common diseases
• Treatment Strategies
• Outbreak Management
• Cleaning and disinfecting protocols
Principles of Disease Prevention

• Infectious disease control prioritizes the utilization of measures that prevent and manage infectious disease in individual animals as well as steps to ensure that the health and welfare of the entire population is also protected.

“Herd Health”
Three requirements for disease spread

• A source of infection sufficient to cause disease (pathogen)
• A susceptible host
• A mode of transmission of the infection to another host for the disease to continue

Typically, the population of animals is constantly changing. Therefore, breaking the cycle of transmission is usually the focus. We do this by decreasing exposure to pathogens.
Three Aims of infection control

• Minimize any factors that may lead to increase host susceptibility
• Optimize every individual animal’s ability to resist disease.
• Simultaneously decrease the likelihood of exposure to the pathogens that cause disease.

Note that regardless of your program or set-up, any time animals of different ages, backgrounds, stress levels and health conditions come together infectious diseases will occur.
Host susceptibility

- Avoid dietary changes
- Avoid unnecessary treatments
- Keep population within the capacity to care
- Enrich the environment/decrease stress & overcrowding.
Optimize ability to resist disease

• Vaccination
  – Ideally immediate vaccination of all animals as they enter a facility, including those pregnant and mildly ill

• Parasite control
  – Tailored to zoonotic parasites and to regional and facility parasite prevalence
Modes of disease transmission

- Direct transmission: the body surface of one animal touches the body surface of another animal
- Indirect or Fomite transmission: a animal comes into contact with a contaminated inanimate object. (not washing hands/bowls)
- Droplet transmission: small, infectious droplets travel through the air and land on another animal’s mucous membranes or in the environment. (sneezing)
- Airborne transmission: infectious residue in dried droplets or dust remain suspended and travel through the air. (cleaning)
- Vector transmission: another living animal serves as an intermediary to transmit diseases to the next animal. (mosquitos/rodents/fleas/ticks)
Preventing disease transmission is complicated

- Many diseases cause similar symptoms
- Some animals may be sick but not showing any signs or may be “carriers” that only shed the disease periodically
- Disease may be short-lived or killed easily, or persist in the environment

The key to disease control is to ensure that staff working with animals understand that there are many agents of disease capable of being transmitted by a variety of modes.
Decrease exposure to pathogens

- Facility design
  - Sink, drainage, water supply
  - Ventilation/HVAC system
  - Animal housing and isolation rooms
  - Human & animal traffic patterns (healthy to sick)
  - Segregation (species, age, physical/health & behavior status)
Decrease exposure to pathogens cont.

- **Administrative measures**
  - Written plans → communicated & followed
  - Hand hygiene ** single most important thing **
  - Monitoring and removing ill animals
  - Managing people/animals during an outbreak
- **Personal Protective Equipment (PPE)**
  - Only serves as a barrier to pathogens so it should not be the only precaution utilized.
  - Use of disposable gloves, disposable or routinely laundered gowns, and protective foot wear can help reduce indirect transmission and minimize exposure to zoonotic pathogens.
Common Diseases

- **Respiratory**
  - Feline Upper Respiratory Disease
  - Canine Kennel Cough Complex
  - Canine Distemper
  - Canine Influenza
- **Gastrointestinal**
  - Canine Parvovirus and Coronavirus
  - Feline Panleukopenia
  - Internal parasites
  - Bacterial and Protozoal infections
Common Disease cont.

• Dermatological
  – Dermatophytosis ("Ringworm")
  – Ectoparasites

• Other
  – Rabies
  – Feline Leukemia & Feline Immunodeficiency Virus
  – Feline Infectious Peritonitis
  – Vector-Borne Diseases
  – Heartworm Disease
Feline Upper Respiratory Disease

• Causes
  – Feline Herpesvirus (FVR) and Calicivirus are most common.
  – Bacterial agents: *Bordatella bronchiseptica, Chlamydophila felis, Mycoplasma* species

• Transmission
  – highly infectious transmitted primarily in ocular, nasal and oral secretions
  – Primarily by fomites or direct transmission
  – Droplet transmission (group housing, cages facing each other < 4 feet apart)
Feline Upper Respiratory Disease

- Herpesvirus can live up to 18 hours outside the body in a moist environment.
  - Once infected, shedding can occur as early as 24 hours after infection and lasts for 1-3 weeks.
- Calicivirus can survive up to 28 days at room temperature in the environment even in a dried state.
  - Also can shed < 24 hours after infection and can last 30 days. Half of cats were still shedding infection after 2 months.
Canine Kennel Cough Complex

- Causes (many !!)
  - Canine adenovirus-1 (CAV-2)
  - Canine parainfluenza virus (CPiV)
  - Canine respiratory coronavirus (CRCoV)
  - Canine herpesvirus (CHV)
  - Canine distemper virus (CDV)
  - Canine influenza virus (CIV)
  - *Bordatella bronchiseptica*
  - *Mycoplasma cynos*
  - *Streptococcus equi subsp. zooepidemicus*
Canine Kennel Cough Complex

• Transmission
  – Direct – when sharing kennels, when solid walls are not used to separate runs, or when dogs have common run areas where they may be exposed to mucous
  – Airborne (aerosolization)
  – Indirect/Fomite
  – Fecal/oral (Distemper virus)

• Incubation periods may be as short as 2 days and as long as 14 days.
Canine Distemper

• **Causes**
  – Canine distemper virus
  – Found in all body secretions and excretions depending on the stage of infection

• **Transmission**
  – Airborne
  – Direct contact
  – Indirect/Fomite – however, virus does not remain infectious for more than hours to a few days.

• **Incubation**
  – Depends on the virus and the host
  – Ranges from less than 2 weeks up to 6 weeks post infection
Canine Influenza

• Causes
  – H2N8 Influenza A virus

• Transmission
  – Airborne
  – Droplet
  – Direct contact with respiratory secretions
  – Indirect/Fomite

• Incubation
  – 2 to 4 days from exposure

Shelter facilities area at high risk for CIV, and CIV has spread to multiple shelters in CA, CO, DE, FL, KY, NY, PA, UT and WY.

Closely related to equine H3N8 – suggests interspecies transmission, followed by viral adaptation to the dog.
Feline Panleukopenia

• Cause
  – Feline Panleukopenia virus AKA “feline distemper”
    • Leads to cerebellar hypoplasia in unborn kittens

• Transmission
  – Direct contact (cat to cat; in the environment; transplacental)
  – Droplet
  – Fecal/oral (even via flies & mosquitoes)

• Incubation
  – 2 to 10 days

Virus can stay in the environment for months to years
Canine Parvovirus

• Cause
  – Canine Parvovirus – most significant because of highly contagious nature and ability to survive long-term in the environment
• Transmission – highly contagious !!!
  – Direct contact with contaminated feces
  – Indirect/fomite
  – Airborne (aerosolized while cleaning??)
• Incubation
  – Commonly 7 to 14 days
  – Recent strains – 4 to 6 days
Canine Coronavirus

• Cause
  – Canine coronavirus

• Transmission
  – Same as parvovirus

• Incubation
  – 1 to 3 days

Generally regarded as a mild, usually sublethal, highly contagious disease of puppies < 12 weeks old.

Coronavirus is easily inactivated by most commercial detergents and disinfectants.
Internal parasites

- **Roundworms** (*Toxocara and Baylisascaris* spp)
  - Transmission: ingestion of feces or other hosts (rodents, birds); in utero; nursing
- **Hookworms** (*Ancylostoma* spp)
  - “voracious blood suckers”
  - Transmission: skin penetration; ingestion of feces or other hosts, nursing
- **Whipworms** (*Trichuris vulpis*)
  - Transmission: ingesting eggs in the soil

Eggs are difficult to kill – but can be killed with heat and disinfectants such as ammonia or chlorine bleach. Once eggs are in the soil, nearly impossible to inactivate or kill them.

Both Roundworms and Hookworms are zoonotic – causing visceral and ocular larval migrans.
Bacterial & Protozoal GI infections

• Bacteria
  – *Campylobacter* spp.
  – *Clostridium* spp.
  – *Escherichia coli* (E. coli)
  – *Helicobacter* spp.
  – *Salmonella* spp.
  – *Yersinia* spp.

• Protozoa
  – *Giardia* spp.
  – *Tritrichomonas foetus*
  – *Cryptosporidium* spp.
  – *Cystoisospora* spp.
  – *Toxoplasma gondii*
Bacterial & Protozoal GI infections

• Transmission
  – Direct Fecal/oral – contact with feces, contaminated food, water or fomites
  – Indirect/Fomite – spread by intermediate hosts (rodents) or carried by flies or cockroaches

• Zoonotic – all of these organisms can infect people. *Toxoplasma gondii* can affect developing fetuses in pregnant women. All should be of concern for immunosuppressed people.
Dermatological diseases

• Dermatophytosis AKA “Ringworm”
  – Causes: more than 30 species
    • *Microsporum canis*
    • *Microsporum gypseum*
    • *Trychophyton* spp.
  – Transmission by infective hairs and fungal spores
    • Direct contact
    • Indirect/Fomite – environment, external parasites
    • Airborne (not likely, but possible)
  – Incubation
    • 2 to 4 weeks
    • Spores can persist in the environment and remain infectious for weeks to months unless environment is thoroughly cleaned and disinfected.
Dermatological Diseases

• Ectoparasites
  – Fleas
  – Ticks
    • Rhipicephalus (Brown dog tick) – RMSF, Rickettsia, Ehrlichiosis, Babesiosis
    • Dermacentor (American dog tick) – RMSF, Tuleremia, Rickettsia
    • Ixodes (Blacklegged ticks or Deer ticks) – Lyme, Babesiosis, Anaplasmosis
    • Amblyomma (Lone Star tick) – Ehrlichiosis, RMSF
  – Mites
    • Demodex
    • Sarcoptes (scabies)
    • Notoedres cati (feline scabies)
    • Cheyletiella (“walking dandruff”)
    • Otodectes (ear mite)
  – Lice
  – Flies
Other diseases

• Rabies (Rhabdovirus)
  – Transmission – bite wounds and rarely, scratches and aerosolization

• Feline leukemia virus (FELV)
  – Shed in saliva, nasal secretions, feces, milk & urine
  – Transmission – Close, intimate contact, nursing, grooming, sharing dishes/litterboxes, bites, fomites

• Feline immunodeficiency virus (FIV)
  – Transmission primarily through bites, also sexual contact, in utero and nursing
Other diseases

• Feline Infectious Peritonitis (FIP)
  – Cause: Feline Coronavirus – mutated
  – Transmission: Fecal/oral, but also Indirect/fomites

The pathogenesis is still not fully known and diagnosis is frustrating to say the least.
Other diseases

• Vector-Borne diseases
  – Mosquitos
    • Heartworms, West Nile virus, Zika virus
  – Ticks
    • RMSF (Rickettsia), Babesiosis, Anaplasmosis, Ehrlichia, Lyme disease (Borrelia), Q fever (Coxiella), Tuleremia (Francisella)
  – Fleas
    • Cat scratch fever (Bartonella), Rickettsia, Plague (Yersinia)
Other diseases

- Heartworm disease
  - Cause: Dirofilaria immitis (nematode/worm)
  - Affects: Dogs, cats, ferrets
  - Transmission – mosquito -> 70 spp. of mosquitoes can transmit the disease. 22 spp. have been shown to be significant vectors. *Culex* spp. are even found indoors.
  - Incubation: 5-6 months from bite of infected mosquito. However, immature worms have been found in pulmonary arteries 3 months post infection.
Treatment Strategies

• Prevention is key
  – Vaccination: provides the best option. However, most vaccinations only minimize the severity of the disease.

• Treat the causative agent
  – This may be challenging for viral infections

• Treat secondary infections (usually bacterial)

• Supportive care
  – Hydration, fluids
  – Nutrition
  – Decrease stress

• Reduce likelihood of spread
Respiratory Diseases

• Feline upper respiratory disease
  – Majority are viral infections
    • L-Lysine
  – Secondary bacterial infections (purulent ocular/nasal discharge)
    • Doxycycline 5-10 mg/kg PO BID x 10 days
    • Amoxicillin/Clavulanic Acid (Clavamox) 15 mg/kg BID
    • Cephalosporins (Cefa-Drops)
  – Ocular disease (topical ointments)
    • Tetracycline or Erythromycin (Terramycin) BID
    • NeoPolyBac BID
  – Supportive care – make sure eating/drinking
Respiratory Diseases

- Canine Kennel Cough Complex
  - Viral component
  - Bacterial component
    - Doxycycline – 3-5 mg/kg q 12 hrs x 7-14 days (g.i. effects)
    - Amoxicillin – 10-20 mg/kg q 8-12 hrs x until 2 days after symptoms
    - Amoxicillin/Clavulanate (Augmentin) – see amoxicillin
    - Azithromycin – 5-10 mg/kg q 24 hrs x 3-5 days
    - Cephalexin – 20-40 mg/kg q 8 hrs
    - Clindamycin – 10 mg/kg q12 hrs
    - Enrofloxacin – 5-20 mg/kg q24 hrs (bone effects)
    - Trimethoprim/Sulfonamide – 15 mg/kg q 12 hrs x 14 days (dry eye)
  - Antitussive/Anti-inflammatory/Bronchodilator
    - Hycodan (hydrocodone) – 0.22 mg/kg q 6-12 hrs
    - Temaril P – see label for dosing
    - Prednisone – 1-2 mg/kg divided q 8-12 hrs, reducing dose q 7 days
    - Aminophylline – 10 mg/kg q 8 hrs
Respiratory Diseases

• Canine Distemper
  – Prevention is best option: vaccination
  – Supportive care: fluids, nutrition
  – Antimicrobials used for Canine Kennel cough

• Canine Influenza
  – Supportive care: fluids
  – Antimicrobial used for Canine Kennel cough if secondary bacterial infection
Gastrointestinal Diseases

• Canine Parvovirus/Canine Coronavirus
  – Antiviral therapy
    • Antiendotoxin serum
    • Hyperimmune Plasma
    • Interferon – 30 IU q 24 hrs
    • Tamiflu – 2.2 mg/kg q 12 hrs (efficacy not proven)
  – Supportive care: fluids, nutrition
  – Symptomatic therapy
    • Vomitiing
      – Cerenia – 1 mg/kg q 24 hrs x 5 days max
    • Diarrhea
      – Metronidazole (Flagyl) – 15-25 mg/kg q 12-24 hrs (neuro effects)
    • Secondary bacterial infections
      – Cephalosporins – 20-30 mg/kg q12 hrs
      – Enrofloxacin – 5-20 mg/kg q 24 hrs (bone effects)
      – Ampicillin – 20-40 mg/kg IV q6-8 hrs
      – Gentamicn – 6 mg/kg IV q 24 hrs (kidney effects)
Gastrointestinal Diseases

• Feline Panleukopenia
  – Supportive therapy: Fluids, nutrition
  – Symptomatic therapy

• Internal parasites
  – Pyrantel Pamoate (Strongid T)
    • 1 cc per 5 lbs body weight PO, repeat in 2 weeks
    • Treats Roundworms & Hookworms
  – Fenbendazole
    • 1 cc per 5 lbs PO or 1 cc per 10 lbs PO x 3 days
    • Treats Whipworms and certain Tapeworms
Gastrointestinal Diseases

• Bacterial infections/Protozoal infections
  – Fenbendazole (Panacur)
    • 50 mg/kg SID PO x 3-5 days (Giardia)
  – Sulfadimethoxine (Albon)
    • 50 – 60 mg SID PO x 5-20 days (Cystoisospora/Coccidia)
  – Trimethoprim-sulfa
    • 15mg/kg BID PO x 5 days (Cystoisospora/Toxocara)
  – Metronidazole (Flagyl)
    • 10 – 25 mg BID PO x 7 days (Giardia, bact. overgrowth)
  – Amoxicillin
    • 22 mg/kg SID PO x 5 days (Clostridium)
  – Tylosin
    • 10-15 mg/kg BID PO x 7-21 days (Clostridium/Crypto/Campylobacter)
Dermatological Diseases

• Dermatophytosis (Ringworm)
  – Clipping of hair
  – Topical Miconazole, Enilconazole, Lime sulfur
  – Systemic treatment
    • Itraconazole – week on/week off
      – 5-10 mg/kg daily until cured
    • Fluconazole
      – 10 mg/kg daily until cured
    • Lufenuron (Program)
      – Not recommended
Dermatological Diseases

• Ectoparasites
  – Fleas/Ticks
    • OMG – so many options...
  – Mites
    • Demodex (dogs)
      – Amitraz dips weekly
      – Ivermectin 0.4-0.6 mg/kg SID PO x 90 days
      – Ivermectin 0.1 cc per 10 lb SQ every other week
    • Demodex (cat)
      – Usually secondary to diabetes, Felv/FIV, neoplasia, etc.
      – Treat underlying disease if possible
      – Lyme Sulfur Dips topically
    • Notoedres (earmites)
      – Topical Ivermectin application
  – Sarcoptes
    – Ivermectin 0.2-0.4 mg/kg PO every other week
    – Topical Lyme Sulfur rinses weekly
    – Fipronil Spray (Frontline)
Dermatological Diseases

• Lice
  – Lyme Sulfur rinse twice weekly
  – Fipronil (Frontline) spray every 2 weeks
  – Amitraz every 2 weeks (not for cats)

• Flies
  – Permethrin repellants (VIP Fly ointment) not for cats
  – Do not use products with DEET on animals
  – Remove source of flies (compost heaps, manure piles, puddles of standing water)
Other Diseases

• Rabies
  – Unless postexposure prophylaxis is instituted, rabies in cats and dogs is usually fatal

• FeLV/FIV
  – No specific treatment
  – Supportive care

• FIP
  – Still considered to be 100% fatal
  – Treatment is usually palliative, curative
Other Diseases

• Vector-Borne
  – West Nile/Zika Virus
    • supportive care
  – Babesiosis
    • Imidocarb – 6.6 mg/kg IM or SC q 2 weeks
    • Doxycycline – 5-10 mg/kg q 12 hrs x 7-10 days
    • Metronidazole -30-60 mg/kg q 24 hrs x 5-7 days
    • Clindamycin – 12.5 mg/kg q 12 hrs x 14 days
  – Rickettsial infection
    • Tetracycline – 22 mg/kg q 8 hrs x 14 days (enamel)
    • Enrofloxacin – 5-20 mg/kg q 24 hrs
    • Chloramphenicol – 25-50 mg/kg q 8 hrs x 7 days (bone marrow/anemia)
  – Ehrlichia
    • Doxycycline – 5 mg/kg q 12 hrs or 10 mg/kg q 24 hrs x 14-16 days
Other Diseases

• Vector-Borne
  – Bartonella
    • Tetracycline – 10-15 mg/kg q 8-12 hrs >14 days (enamel)
    • Amoxicillin/clavulanate acid – 12.5 mg/kg q 12 hrs (dog); 62.5 mg q 12 hrs (cats)
    • Enrofloxacin – 5-10 mg/kg q 12 hrs (dog); 5 mg/kg q 24 hrs (cat-blindness)
  – Borrelia (Lyme disease)
    • Doxycycline – 10 mg/kg q 24 hr x 21-28 days (dog); 5-10 mg/kg q 12 hr x 21 days (cats)
    • Amoxicillin – 22 mg/kg q 12 hrs x 21-28 days (dog); 10-20 mg/kg q 12 hrs
    • Azithromycin – 5-10 mg/kg q 24 hrs
  – Yersinia (Plague)
    • Gentamicin – 6-8 mg/kg IV q 24 hrs (kidney)
    • Enrofloxacin – see doses for Bartonella

• Heartworm disease
  • Immiticide
  • See American Heartworm Society website for current recommendations
Outbreak Management

Ideally, the focus is on prevention. However, having a plan in place prior to an outbreak, greatly enhances the ability to control disease spread, minimize mortality, reduce the possibility of panic and protect your reputation.
Tools for Outbreak Management

• Diagnose AND isolate of sick animals
• Identify and manage exposed/at-risk animals
• Decontaminate the environment
• Protect newly admitted animals
• Document the outbreak and treatment
• Communicate with staff, stakeholders, adopters, and the public
Cleaning, Sanitizing & Disinfecting

• Basic principles: selection of an appropriate method, proper use and application, safety of the personnel and the animals being exposed.

• This is where “you can’t disinfect...ew” comes in to the picture...
Commonly Used Disinfectants

• Quaternary ammonium compounds
• Hypochlorites
• Peroxygen compounds (Oxidizing agents)
• Chlorhexidine (Biguanides)
• Alcohol

Note that most disinfectants are inactivated to some extent in the presence of organic material (feces, blood, secretions, excretions)
### Characteristics of Selected Disinfectants

<table>
<thead>
<tr>
<th>Disinfectant Category</th>
<th>Alcohols</th>
<th>Aldehydes</th>
<th>Biguanides</th>
<th>Halogens: Hypochlorites</th>
<th>Halogens: Iodine Compounds</th>
<th>Oxidizing Agents</th>
<th>Phenols</th>
<th>Quaternary Ammonium Compounds (QAC)</th>
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<td>Fast acting</td>
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<td>Broad spectrum</td>
<td>Good efficacy with organic material</td>
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<td>Disadvantages</td>
<td>Rapid evaporation</td>
<td>Flammable</td>
<td>Cardiogenic</td>
<td>Mucous membranes and tissue irritation</td>
<td>Only use in well ventilated areas</td>
<td>Only functions in limited pH range (6-7)</td>
<td>Toxic to fish (environmental concern)</td>
<td>Inactivated by sunlight</td>
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<tr>
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<td>Flammable</td>
<td>Cardiogenic</td>
<td>Never mix with acids</td>
<td>Chlorine gas will be released</td>
<td>May be toxic to animals, especially cats and pigs</td>
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| Vegetative Bacteria    | Effective | Effective | Effective | Effective | Effective | Effective | Effective | YES—Gram Positive Limited—Gram Negative |
| Mycobacteria           | Effective | Effective | Variable | Effective | Limited | Effective | Variable | |
| Enveloped Viruses      | Effective | Effective | Limited | Effective | Limited | Effective | Effective | Variable |
| Non-enveloped Viruses  | Variable | Effective | Limited | Effective | Limited | Effective | Variable | Not Effective |
| Spores                 | Not Effective | Effective | Not Effective | Variable | Limited | Variable | Not Effective | Not Effective |
| Fungi                  | Effective | Effective | Limited | Effective | Variable | Variable | Variable | Variable |
| Efficacy with Organic Matter | Reduced | Reduced | ? | Rapidly reduced | Rapidly reduced | Variable | Effective | Inactivated |
| Efficacy with Soap/ Detergents | ? | Reduced | Inactivated | Inactivated | Effective | ? | Inactivated | Inactivated |

? Information not found

*Disclaimer: The use of trade names does not in any way signify endorsement of a particular product. For additional product names, please consult the most recent Compendium of Veterinary Products.*


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# The Antimicrobial Spectrum of Disinfectants

**Chemical Disinfectants**

*Note: Removal of organic material must always precede the use of any disinfectant.*

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<tr>
<td>coccidia</td>
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<td>prions</td>
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</tbody>
</table>

**Legend:**

- ++ highly effective
- + effective
- - no activity
- N information not available

*a-varies with composition
*b-peracetic acid is sporicidal
*c-ammonium hydroxide
*d-some have activity against coccidia

**Disclaimer:** The use of trade names does not in any way signify endorsement of a particular product. For additional product names, please consult the most recent Compendium of Veterinary Products.


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AS00_2010
# Bacterial Group Review Table

<table>
<thead>
<tr>
<th>Gram Positive Cocci</th>
<th>Gram Negative Aerobic</th>
<th>Anaerobic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterococcus</td>
<td>Actinobacillus</td>
<td>Actinomyces—GP</td>
</tr>
<tr>
<td>Micrococcus</td>
<td>Aeromonas</td>
<td>Bacteroides—GN</td>
</tr>
<tr>
<td>Staphylococcus</td>
<td>Barionella</td>
<td>Clostridium—GP</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>Bordetella</td>
<td>Fusobacterium—GN</td>
</tr>
<tr>
<td></td>
<td>Brocchia</td>
<td>Lactobacillus—GP</td>
</tr>
<tr>
<td></td>
<td>Burkholderia</td>
<td>GP = Gram-positive</td>
</tr>
<tr>
<td></td>
<td>Capnocytophaga</td>
<td>GN = Gram-negative</td>
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<tr>
<td></td>
<td>Citrobacter</td>
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<tr>
<td></td>
<td>Enterobacter</td>
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<tr>
<td></td>
<td>Enterobacteriaceae</td>
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<tr>
<td></td>
<td>Escherichia</td>
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<tr>
<td></td>
<td>Franciella</td>
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<td></td>
<td>Haemophilus</td>
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<tr>
<td></td>
<td>Klebsiella</td>
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<td></td>
<td>Legionella</td>
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<td></td>
<td>Moneraella</td>
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<td></td>
<td>Neisseria</td>
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<td></td>
<td>Pasteurella</td>
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<tr>
<td></td>
<td>Pseudomonas</td>
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<tr>
<td></td>
<td>Salmonella</td>
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<td></td>
<td>Serratia</td>
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<td></td>
<td>Shigella</td>
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<td></td>
<td>Vibrio</td>
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</tr>
<tr>
<td></td>
<td>Yersinia</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gram Positive Rods</th>
<th>Gram Negative Rods, Curved-Spiral Shaped</th>
<th>Mycoplasmas and Obligate Intracellular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actinomycetes</td>
<td>Borrelia</td>
<td>Chlamydia</td>
</tr>
<tr>
<td>Bacillus</td>
<td>Campylobacter</td>
<td>Coxiella</td>
</tr>
<tr>
<td>Coryneform</td>
<td>Helicobacter</td>
<td>Ehrlichia</td>
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<tr>
<td>Coryneformurina</td>
<td>Leptothrix</td>
<td>Mycoplasma</td>
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<tr>
<td>Listeria</td>
<td>Leptotrichie</td>
<td>Mycoplasma</td>
</tr>
<tr>
<td>Mycobacterium</td>
<td>Leptospira</td>
<td>Mycoplasma</td>
</tr>
<tr>
<td>Noardia</td>
<td>Treponema</td>
<td>Mycoplasma</td>
</tr>
<tr>
<td>Rhodococcus</td>
<td></td>
<td>Ureaplasma</td>
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<tr>
<td>Streptomyces</td>
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</tbody>
</table>
**DISINFECTANT PRODUCT LABELS**

Understanding the information on a disinfectant product label is essential for effective disease organism removal and the safety of those handling the product. Always read the product label before use. It is a violation of federal law to use a product in a manner inconsistent with its labeling. In order to increase awareness of what a product label contains, this handout will provide you with a step-by-step guide of a disinfectant label.

**PRODUCT X**

**ACTIVE INGREDIENTS:**
- Ethanol (50% v/v)
- Isopropanol (70% v/v)

**INERT INGREDIENTS:**
- Water

**DIRECTIONS FOR USE**

Product X is a germicidal, bactericidal and virucidal agent effective in killing 99.9% of common bacteria, viruses, fungi, and yeasts. Use on non-porous hard surfaces such as countertops, sinks, doorknobs, and other high-touch areas.

**FOR USE IN VETERINARY CLINICS, ANIMAL CARE FACILITIES, LIVESTOCK FACILITIES, AND ANIMAL QUARANTINE AREAS**

Applicable for use in animal care facilities and livestock facilities. For use in areas where disinfection is required. Application rates are as follows:

- **Surface Disinfection:** 1:10 dilution
- **Stadium Disinfection:** 1:5 dilution
- **Environmental Disinfection:** 1:1 dilution

**KEEP OUT OF REACH OF CHILDREN**

**DANGER**

**HAZARD TO HUMANS AND DOMESTIC ANIMALS**

**PRECAUTIONARY STATEMENTS**

**CORROSIVITY:**
- Avoid contact with eyes, mouth, and skin.
- Wash hands thoroughly after use.

**INHALATION:**
- Avoid breathing vapors.
- Use in a well-ventilated area.

**INGESTION:**
- Do not swallow.
- Seek medical attention immediately.

**ENVIRONMENTAL HAZARDS:**

Product X is biodegradable and non-toxic to most environmental organisms. However, it should not be used on sensitive surfaces such as food contact surfaces or surfaces that are sensitive to chemical cleaners.

**PHYSICAL AND CHEMICAL HAZARDS:**

- Flammable
- Use in a well-ventilated area.

**STATEMENT OF PRACTICAL TREATMENT:**

In case of contact:
- Wash with soap and water for at least 20 minutes.
- If irritation occurs, seek medical advice.
- For eye contact, flush with water for at least 15 minutes.

**NOTE TO PET OWNERS:**

Product X is toxic to pets. Keep pets away from treated areas.

**Manufactured by:**
Company X Chemical Company, Springfield, Springfield 12345

**Some products may have multiple uses (e.g., cleaning versus disinfection) and require different dilutions and contact times for such actions.**

**This section describes what disease organism the product controls, as well as where, how and when to use it.**

**Specially applications for the product (e.g., boot baths, vehicle disinfection) will also be listed.**

**AWS P**

**disinfectant_product_label**

**Iowa State University**
Steps to Effective Cleaning and Disinfecting

- Physical cleaning – removal of visible debris is essential as the presence of organic material can inactivate many disinfectants.
- Sanitation/Cleaning – This step alone can remove over 90% of bacteria from surfaces. The area should be soaked with hot water and detergent. When using high-pressure spraying, be aware that organisms can be aerosolized and enhance the spread of some diseases.
Cleaning and Disinfecting cont.

• Disinfection – Use the best product for the area to be cleaned. Make sure to dilute the product appropriately. Follow label directions for contact time and personal protective equipment. Rinse the area or allow the area to air-dry as the label directs.
Remove all grossly visible debris

• The presence of gross contamination or organic material, especially feces will inactive most disinfectants.
Wash the area with water and detergent

• Remember that this can remove over 90% of bacteria.
• Also, be aware of aerosolization.
Thoroughly rinse the cleaned area to remove any detergent

- Some disinfectants may be inactivated by detergents.
- If time allows, let the area dry completely.
- Be aware that residual detergent can be irritating.
Apply the disinfectant

ALLOW PROPER CONTACT TIME!

- This is one of the most overlooked steps
- Contact time varies depending on the product
- Rule of thumb is a contact time of 10 minutes.
Thoroughly rinse the disinfectant

• If time allows, let the area air dry again.
• Can use a squeegee if needed.
• Can also towel dry
• Be aware that the disinfectant can be irritating to the skin, airways and mucous membranes.
What a mess !!
Don’t forget the doors!
• Cage has been “pre-cleaned” and now Accel is applied and allowed to set for 10 minutes.
• Cage is then cleaned and dried.
• Cage is set up for the cat.
Clean & Disinfect other items

• Dishes, toys, litter pans (in that order)
  – Disposable is ideal, stainless steel is preferred
  – Commercial dishwasher is preferred due to use of high temperature cleaning

• Laundry
  – Hot water, detergent and a half cup of bleach per standard household washer load is recommended.
  – Do no overfill/overload the washer.
  – Dry items completely, do no overload the dryer
Factors causing failure of disinfection protocol

• Improper disinfectant selection
• Improper disinfectant concentration
• Inadequate contact time
• Failure to remove organic material
• Inactivation by other chemical compounds
• Improper application
• Failure to allow areas to dry thoroughly
Source information
Questions ??