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Cryptosporidiosis in Virginia

Introduction

Cryptosporidiosis is a diarrheal disease caused by microscopic parasites of the genus *Cryptosporidium*.[1] The parasite was first detected in mice in 1907, but the first human case was not documented until 1976. The public health significance of *Cryptosporidium* infection became more apparent with the onset of the Acquired Immunodeficiency Syndrome (AIDS) epidemic in the 1980s.[2]

Over the past two decades, cryptosporidiosis has become recognized as one of the most common causes of waterborne diseases in humans in the United States. In recent years, the incidence of cryptosporidiosis has increased in Virginia. This article describes the pathogenesis and clinical characteristics of *Cryptosporidium* infection, and the epidemiologic pattern in Virginia from 1999 to 2006.

Fast Fact: Coccidia are obligate, intracellular protozoa that also include the agents of cyclosporiasis and toxoplasmosis, as well as cryptosporidiosis.

In This Issue:

Pathogenesis, Symptoms, Diagnosis, and Treatment

Organisms of the genus *Cryptosporidium* are small (diameter: 4–6 μm) coccidian parasites that infect the mucosal epithelium of a number of vertebrates including humans. There are 16 known species within the genus—*Cryptosporidium parvum* and *C. hominis* are the most common pathogens in humans, and account for more than 90% of infections. Human infection with *C. meleagridis*, *C. felis*, *C. canis, C. muris, C. suis*, and the monkey and cervine genotypes of *Cryptosporidium* has been reported rarely.[1]

The parasite survives in the intestines of infected hosts (humans or animals) and passes through the stool as an oocyst. The oocyst's outer shell makes it highly resistant to chlorine-based disinfectants and capable of surviving in the environment for a year or more. Environmental contamination, particularly in drinking and recreational water, are the main sources of outbreaks and sporadic infection.

Cryptosporidium causes illness at low doses.[1] Once ingested, the oocyst survives to reach the gastrointestinal tract and release infective sporozoites to invade the epithelial cells of the intes-

tines. The parasite then forms parasitophorous vacuoles and triggers survival signals such as the nuclear factor-kappa B (NF-*k*B) in the infected cells. This enables the parasite to propagate and induces alterations in adjacent uninfected cells that impair absorptive and secretory function, leading to clinical manifestations of infection.[3]

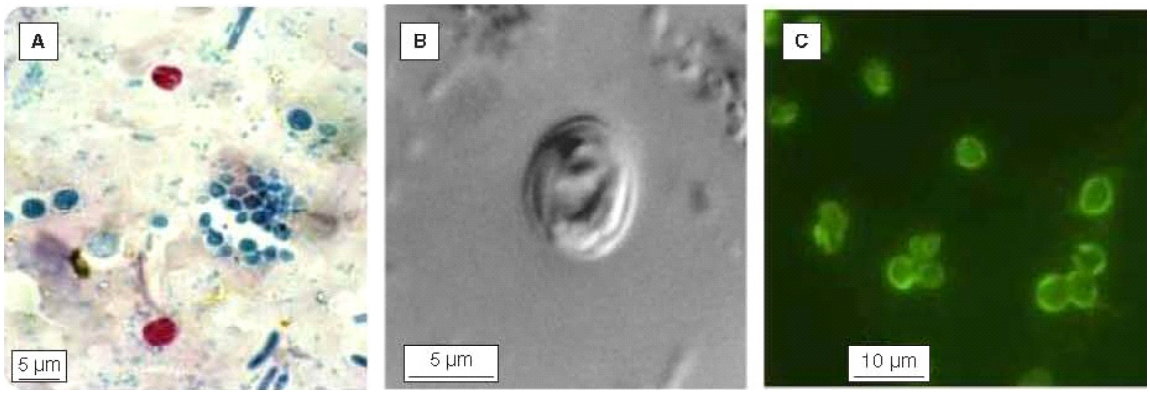


Figure 1. Microscopic detection of *Cryptosporidium* oocysts: A. Oocysts (red) stained by the acid-fast method. B. Oocysts under the differential interference contrast microscope. C. Oocysts labeled with immunofluorescent antibodies. (Caccio, SM, *Expert Rev Anti Infect Ther* 2006: 4:429-443)

Incubation of *Cryptosporidium* infection is usually 1 to 12 days with an average of seven days. The predominant symptom is profuse, watery diarrhea with mucus; this may be accompanied by abdominal cramps, nausea, vomiting, fever, dehydration, and weight loss. Asymptomatic infection is also common and constitutes an important source of infection of others.

The clinical manifestations of *Cryptosporidium* infection depend on the infectivity of the oocyst and the host immune response. For those who are immunocompetent, the infection is usually asymptomatic; symptomatic infections are typically self-limited and remit within two weeks. For immunocompromised individuals, the infection can be prolonged and induce more severe illness. Individuals with a CD4+ cell count less than 50 cells/µl have been noted to have the highest risk of developing severe illness and prolonged carriage.[1]

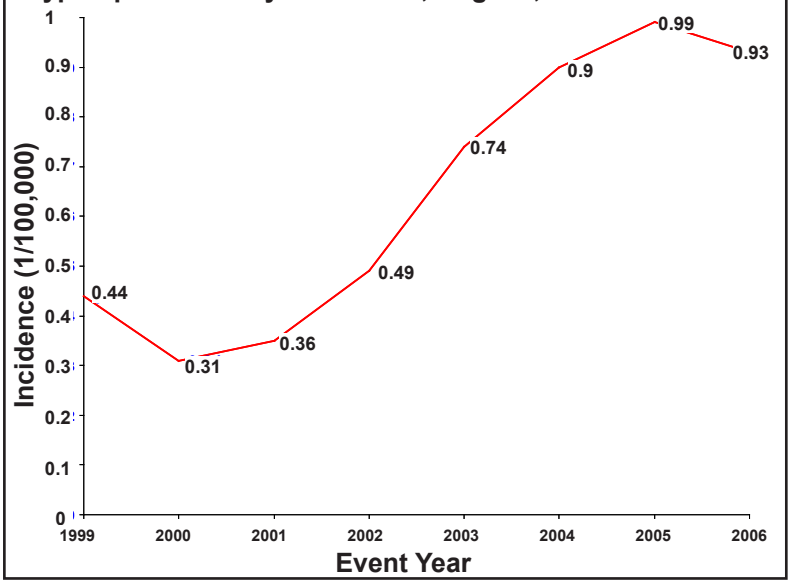
The routine examination for "ova and parasites" does not detect *Cryptosporidium*; clinicians must specifically request *Cryptosporidium* testing. Microscopic identification of oocysts in fecal smears or parasites in intestinal biopsy sections are diagnostic. The most commonly used staining methods include auraminerhodamine, a modified acid-fast stain, and safranin-methylene blue. Immunofluorescence microscopy and enzyme-linked immunosorbent assays provide better sensitivity and specificity and are now commonly used in diagnostic laboratories (Figure 1). A fluorescein-tagged monoclonal antibody is useful in detecting oocysts in stool and in environmental samples. Serologic assays are helpful in epidemiologic studies but are of little diagnostic value because healthy individuals can be positive for antibodies to *Cryptosporidium*, making it difficult to determine when the individual was infected. Molecular techniques such as polymerase chain reaction (PCR) are mainly used for research purposes. If biliary disease due to *Cryptosporidium* infection is suspected, ultrasonography and/or endoscopic retrograde cholangiopancreatography (ERCP) should be considered.[3]

Satisfactory treatment of cryptosporidiosis may be difficult. For immunocompetent individuals, an antidiarrheal treatment that includes fluid and electrolyte supplements is usually sufficient. If the infection is persistent, antiparasitic agents such as nitazoxanide, paromomycin, or azithromycin may be considered. For HIV-infected individuals, treatment includes use of the highly active antiretroviral therapy (HAART), antiparasitic treatment, and supportive care.[1,3]

Epidemiology

Cryptosporidium parasites exist in almost every region of the world. Humans and animals are both susceptible to *Cryptosporidium* infection. The prevalence of *Cryptosporidium* infection in immunocompetent populations is about 2.1% in developed countries and 6.1% in developing countries. Among individuals with HIV infection, the prevalence of *Cryptosporidium* infection is approximately 14% in developed countries and 24% in developing countries.[4]

Figure 2. Incidence (per 100,000 Population) of Cryptosporidiosis by Event Year, Virginia, 1999-2006



From 1999 to 2002, 12,700 cases of cryptosporidiosis were reported in the United States.[5] The highest risk for infection is summer and early fall: in the United States, most cases are reported in July through September.

Contamination of drinking water is the major risk factor for *Cryptosporidium* infection. More than 50 outbreaks have been associated

with contaminated drinking water. Livestock fecal pollution has been documented as a significant source of waterborne outbreaks as well as sporadic infection. Contamination of recreational water, particularly swimming pools, where chlorine is unable to eliminate oocysts has been linked to *Cryptosporidium* infections: an estimated 10,000 people were infected with *Cryptosporidium* in the 1990s due to exposure to contaminated recreational water.[6] Foodborne transmission occurs less often but has been reported for contaminated apple cider, unpasteurized milk, chicken salad, and raw produce.[2] Infection due to person-to-person contact, particularly in settings such as daycare centers and hospitals, as well as to family members and sexual partners of infected persons, has also been reported. In addition, traveling in countries and regions where cryptosporidiosis is common, and frequent contact with animals, are also risk factors for *Cryptosporidium* infection.

Figure 3. Number of Reported Cases of Cryptosporidiosis by Event Month, Virginia, 1999-2006

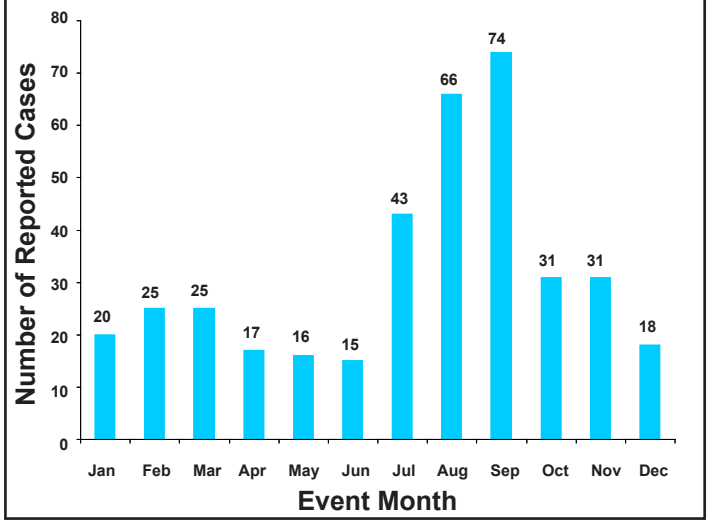
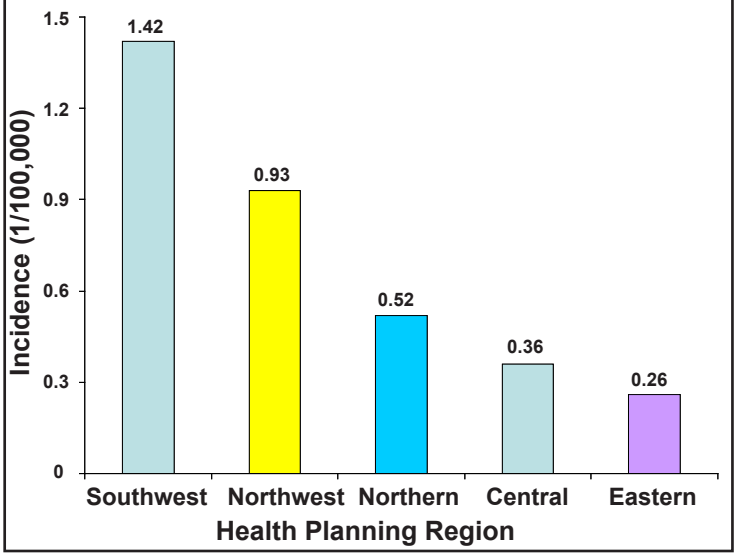


Figure 4. Annual Average Incidence (per 100,000 Population) of Cryptosporidiosis by Health Planning Region, Virginia, 1999-2006



Cryptosporidiosis in Virginia

Cryptosporidiosis became a reportable disease in Virginia in 1999 (State Board of Health's *Regulations for Disease Reporting and Control*: 12 VAC 5-90-80). For this article, a review of *Cryptosporidium* infections reported to local health departments by healthcare professionals and directors of healthcare facilities and laboratories in Virginia from 1999 through 2006 was conducted. Population data for each year in Virginia were obtained from the U.S. Census Bureau (projections were made for 2006 based on 2005 population data since population data were not available for 2006 at the time the analysis was performed).

From 1999 to 2006, a total of 374 cases of cryptosporidiosis were reported in Virginia. The average annual incidence was comparable for males and females (0.69 in males compared with 0.59 in females per 100,000 population). The incidence was highest in infants and young children below nine years of age, followed by adults 30-39 years of age. Despite some fluctuations, the incidence has increased steadily, with the rate in 2006 more than double the rate in 1999 (Figure 2). July, August, and September had the most reported cases, accounting for nearly half of the total cases (Figure 3).

Geographically, the incidence of cryptosporidiosis was highest in the Southwest Health Planning Region, followed by the Northwest, Northern, Central, and Eastern Health Planning Regions (Figure 4). Among the 10 leading districts with the highest incidence, five were in the Southwest Region (Mount Rogers, Central Virginia, Roanoke City, Alleghany, Pittsylvania/Danville) and three were in the Northwest Region (Lord Fairfax, Rappahannock/Rapidan, and Thomas Jefferson) (data not shown). The increase in the incidence of cryptosporidiosis over time was not apparent in the Northern, Central, and Eastern Regions but was evident in the Southwest and

Figure 5. Incidence (per 100,000 Population) of Cryptosporidiosis by Event Year and Health Planning Region, Virginia, 1999-2006

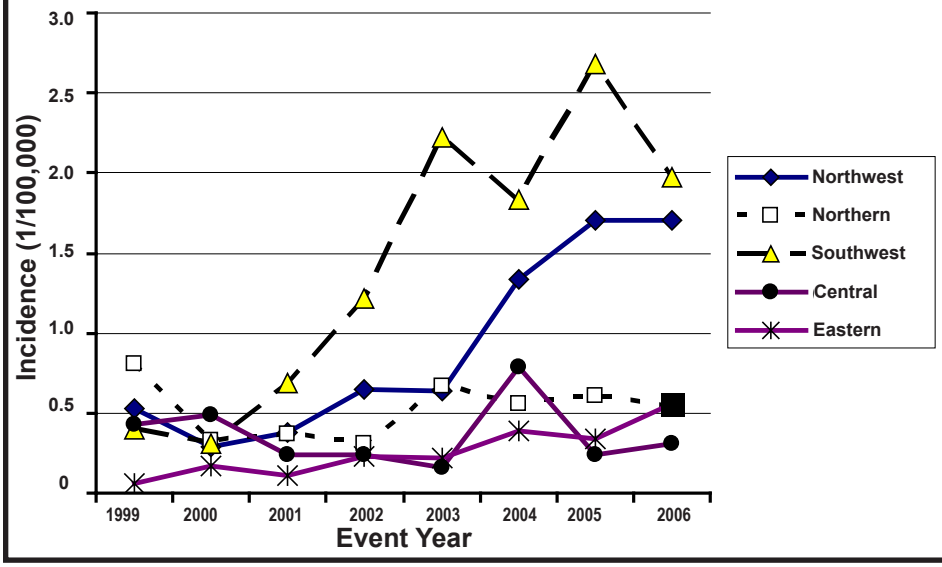
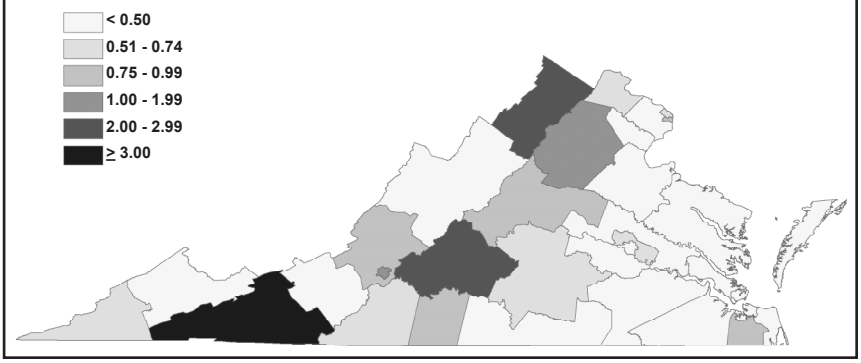


Figure 6. Incidence (per 100,000 Population) of Cryptosporidiosis in 35 Districts, Virginia, 1999-2006



Northwest Regions (Figure 5). The annual average incidence of cryptosporidiosis in the 35 health districts of Virginia is displayed in Figure 6. Overall, the epidemiologic characteristics of cryptosporidiosis in Virginia are similar to the national data in terms of temporal trend, age distribution, and seasonality.[5]

The increase in the incidence of cryptosporidiosis may be in part related to the designation of cryptosporidiosis as a reportable disease in 1999—this may have made healthcare professionals more aware of the condition, and more likely to report cases. Advances in diagnostic technology may also have contributed to the increasing diagnosis and reporting.

Although the underlying reasons for the increase in cryptosporidiosis in the Southwest and Northwest Health Planning Regions require in-depth investigations before specific conclusions can be made, this finding may be a result of livestock fecal pollution given the large farming lands in these areas. Livestock fecal pollution of water sources has been documented as the main cause of sporadic cryptosporidiosis in some countries.[7]

Despite the increasing trend in the levels of cryptosporidiosis reported in Virginia, it is very likely that the surveillance data still significantly underestimate the risk of infection in the state. Reasons for this include the occurrence of asymptomatic infections, the inability to detect affected individuals who do not seek medical care, the omission of testing in the diarrheal workup by healthcare professionals, and incomplete case reporting by clinicians.[5]

Although the reported cases in Virginia from 1999-2006 were sporadic events, the potential for outbreaks exists. In 1993, a large scale waterborne outbreak of cryptosporidiosis occurred in Milwaukee, Wisconsin. This outbreak involved an estimated 403,000 infected persons, and a total of approximately $96.2 million in medical expenses. Cattle fecal contamination of drinking water was determined to be the culprit for the outbreak, but inadequate monitoring of the water supply system and a lack of a test for cryptosporidium in stool samples of patients with diarrhea resulted in delayed detection and intervention.[8] Therefore, awareness and preventive measures are important to reduce the burden of illness due to cryptosporidiosis.

Prevention and Public Health Efforts

The low infectious dose, high communicability, chlorine resistance, and diagnostic challenges in identifying cases make cryptosporidiosis an ongoing public health concern in Virginia. Health education and public health endeavors are necessary to prevent the occurrence of communitywide outbreaks of cryptosporidiosis and to reduce sporadic infections. Local and state agencies must work toward this goal through enhancing public awareness of disease control recommendations (e.g., personal hygiene), ensuring drinking water quality and preventing water contamination, and enhancing disease surveillance.

In particular, it is important that individuals should follow the rec-

(continued on Page 5)

Box 1:Recommendations to prevent and control cryptosporidiosis[5]

1. Always practice good hand hygiene
   - Wash hands with soap and water for at least 15 seconds, rubbing hands together vigorously and scrubbing all surfaces
2. Prevent contamination of recreational water such as swimming pools, spas, interactive fountains, and lakes
   - Do not swim when ill with diarrhea
   - Take children on frequent bathroom breaks and check their diapers often
   - Change diapers in the bathroom, not at the poolside
   - Wash children thoroughly with soap and water after they use the toilet or their diapers are changed and before they enter the water
   - Shower before entering the water
3. Prevent infection and illness caused by water that might be contaminated
   - Do not swallow water in swimming pools, spas, and interactive fountains
   - Do not swallow untreated water from lakes, rivers, springs, ponds, streams, or shallow wells
   - Do not drink inadequately treated water during communitywide outbreaks caused by contaminated drinking water
   - Do not use or drink inadequately treated water when traveling in countries where the water supply might be unsafe
   - If the safety of drinking water is in doubt, disinfect it by heating the water to a rolling boil for 1 minute, or use a filter that has been tested and rated by the National Safety Foundation (NSF) Standard 53 or NSF Standard 58 for cyst reduction; additional treatment is needed to kill or inactivate bacteria and viruses in filtered water
4. Prevent infection and illness caused by eating food that might be contaminated
   - Use properly treated water to wash all food that will be eaten raw
   - Do not eat uncooked foods when traveling in areas where cryptosporidiosis is common
5. Prevent contact and contamination with feces during sex
   - Use a barrier (e.g., a dental dam) during oral-anal sex
   - Wash hands immediately after handling a condom used during anal sex and after touching the anus or rectal area
6. Prevent and control cryptosporidiosis for immunocompromised persons
   - Minimize contact with the stool of all animals, particularly young animals
   - Have others change litter boxes and clean cages; wear disposable gloves when cleaning up after a pet and always wash hands when finished
   - Wash hands after any contact animals or their living areas
   - Wash, peel, and if needed, cool all raw vegetables
   - Boil or filter drinking water to ensure its safety, particularly in an area experiencing an outbreak; filtered water will need additional treatment to kill or inactivate bacteria and viruses

(continued from Page 4)

ommendations in Box 1 to prevent and control cryptosporidiosis. It is also recommended that healthcare professionals consider testing for *Cryptosporidium* infection among patients with diarrhea; all positive tests should be reported to the local health department. Public health surveillance of cryptosporidiosis can identify potential clusters and prompt investigation to recognize local risk factors, thereby preventing large-scale outbreaks from occurring.

Conclusion

Cryptosporidium infection has been increasing in Virginia since 1999. The increase is most evident in the Southwest and Northwest Health Planning Regions. Although the reported cases are sporadic, the risk of large-scale outbreaks exists. Healthcare professionals should educate their high-risk patients, test for the oocysts among patients with diarrheal illness, and report any known or suspected cases to the local health department to facilitate prompt investigation.

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Update to CDC's STD Treatment Guidelines, 2006: Fluoroquinolones No Longer Recommended for Treatment of Gonococcal Infections

On April 13, 2007, the Centers for Disease Control and Prevention (CDC) announced that fluoroquinolones are no longer recommended for the treatment of gonorrhea in the United States.[1] Gonorrhea, the second most commonly reported disease, is a sexually transmitted infection that can cause cervicitis, urethritis, and pelvic inflammatory disease.

This recommendation was based on analysis of new data from the CDC's *Gonococcal Isolate Surveillance Project* (GISP), a sentinel surveillance system that monitors trends in antimicrobial susceptibilities of strains of *Neisseria gonorrhoeae* in the U.S. In the first half of 2006, the proportion of gonorrhea cases in the U.S. that were fluoroquinolone-resistant (QRNG) reached 6.7%, an 11-fold increase from 0.6% in 2001. The most commonly used fluoroquinolones were ciprofloxacin, ofloxacin, and levofloxacin.

This recommendation now limits first line therapy for gonorrhea to a single class of antibiotics: cephalosporins. Injectable ceftriaxone is the preferred cephalosporin for all types of uncomplicated gonorrhea (genital, anal, pharyngeal). Alternative therapies, which can be used for genital or anal infection only, include Spectinomycin (not currently available in the U.S.) or some of the other single dose cephalosporins. A special update to the CDC's 2006 Sexually Transmitted Disease Treatment Guidelines is available online (at www.cdc.gov/std/treatment/2006/updated-regimens.htm). The update also describes appropriate therapies to be given for advanced stages of gonorrhea (e.g., pelvic inflammatory disease).

The CDC is closely monitoring for cephalosporin resistance through the GISP system. In addition, they will work with government and industry partners to identify and evaluate promising regimens.

Healthcare professionals are urged to report any drug resistant gonorrhea cases to the state or local health department. Doing so helps the Virginia Department of Health and the CDC in their effort to closely monitor and respond to emerging resistance. Local health department staff may also assist healthcare professionals in making treatment decisions in patients for whom ceftriaxone may not be an option.

Uncomplicated Gonococcal Infections of the Cervix, Urethra, and Rectum*

Recommended Regimens

Ceftriaxone 125 mg IM in a single dose

OR

Cefixime† 400 mg orally in a single dose

PLUS

TREATMENT FOR CHLAMYDIA IF CHLAMYDIAL INFECTION IS NOT RULED OUT

*This regimen is recommended for all adult and adolescent patients, regardless of travel history or sexual behavior
†The tablet formulation of cefixime is currently not available in the United States.

1. Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, 4/13/2007, 56(14); 332-336 online at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5614a3.htm

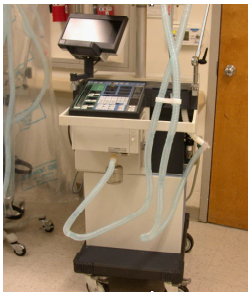
Project XTREME: Respirator Training

The Department of Health and Human Services' Agency for Healthcare Research and Quality (AHRQ) has developed a program entitled "Cross Training Respiratory Extenders for Medical Emergencies (Project XTREME)".

The program, available on DVD, provides training for healthcare professionals who are not respiratory care specialists to provide basic respiratory care and ventilator management to adult patients in any mass casualty event (e.g., influenza pandemic).

Principal target groups for the training are physicians, physician assistants, and nurses. The DVD includes six training modules with interactive quizzes to test viewers' knowledge. The modules cover infection control, respiratory care terms and definitions, manual ventilation (using hand-held bags), mechanical ventilation (using two types of ventilators included in the federal government's Strategic National Stockpile of medicines and medical supplies for emergencies), airway maintenance, and airway suctioning.

A free copy of the DVD and a CD-ROM with the report may be ordered by calling 1-800-358-9295 or by sending an e-mail to ahrqpubs@ahrq.gov.



More information about these projects can be found online (at www.ahrq.gov/prep/).

Compendium of Animal Rabies Prevention and Control, 2007

The National Association of State Public Health Veterinarians' (NASPHV) Compendium of Animal Rabies Prevention and Control serves as the basis for an effective national rabies-control program. This document is of use to practicing veterinarians, wildlife rehabilitators, animal welfare organizations, and officials in animal control, public health, wildlife management, and agriculture.

Significant changes from previous recommendations in the 2007 update include:

- Information on public health education has been added to highlight the importance of educating the public and medical professionals about rabies prevention, transmission, and appropriate veterinary care.
- Expanded information on the potential risk posed by consuming or handling livestock exposed to rabies. Recommendations now include slaughtering an animal immediately after exposure if tissues are for consumption, use of barrier precautions when handling tissues from such animals, and to cook tissues thoroughly. The U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS) district office should be notified and consulted prior to slaughtering exposed livestock. Tissues and products from rabid livestock should not be consumed; however, consumption of pasteurized milk or properly cooked tissues do not constitute a rabies exposure.
- The NASPHV rabies vaccine certificate (Form 51) has been updated, and is posted on the NASPHV website (www.nasphv.org). Revisions to the vaccine certificate include the addition of a line for a microchip number, a box for the animal control license duration, expansion of the species list, more details on the exact age, addition of "markings" to the predominant colors box, modification to the vaccination expiration date box, addition of a check box for a four year duration vaccine, and addition of a line for the vaccine product name.
- The available rabies vaccines licensed and marketed in the U.S. has been updated (see Table). Of note, a vaccine is now available for quadrennial use in cats. In addition, MYSTIQUE II produced by Intervet is no longer available. A rabies vaccine manufacturer contact information table and an adverse event reporting section were also added.

The complete version of the 2007 report is available online (at www.nasphv.org/Documents/RabiesCompendium.pdf).

Information related to rabies in Virginia is available from the Virginia Department of Health (at www.vdh.virginia.gov/epidemiology/DZEE/Rabies/).

Rabies or West Nile Virus Infection?

With the epizootic of West Nile virus nationwide, there has been a dramatic increase in acute, fatal, neurological illnesses in animals, particularly horses. In animals, infection with rabies and West Nile viruses are indistinguishable clinically. Rabies should be considered in any animal that dies or is euthanized due to an undiagnosed neurological illness, to allow for appropriate testing and public health follow-up before disposal of the animal.

Table. Rabies Vaccines Licensed and Marketed in the U.S., 2007

Product Name	Produced by	Marketed by	For Use In	Dosage	Age at Primary Vaccination[a]	Booster Recommended	Route of Inoculation
A) Monovalent (Inactivated)							
DEFENSOR 1	Pfizer, Inc. License No. 189	Pfizer, Inc.	Dogs Cats	1 ml 1 m	3 months[b] 3 months	Annually Annually	IM[c] or SC[d]
DEFENSOR 3	Pfizer, Inc. License No. 189	Pfizer, Inc.	Dogs Cats Sheep Cattle	1 ml 1 ml 2 ml 2 ml	3 months 3 months 3 months 3 months	1 year later & triennially 1 year later & triennially Annually Annually	IM or SC SC IM IM
RABDOMUN	Pfizer, Inc. License No. 189	Schering-Plough	Dogs Cats Sheep Cattle	1 ml 1 ml 2 ml 2 ml	3 months 3 months 3 months 3 months	1 year later & triennially 1 year later & triennially Annually Annually	IM or SC SC IM IM
RABDOMUN 1	Pfizer, Inc. License No. 189	Schering-Plough	Dogs Cats	1 ml 1 ml	3 months 3 months	Annually Annually	IM or SC SC
RABVAC 1	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs Cats	1 ml 1 ml	3 months 3 months	Annually Annually	IM or SC IM or SC
RABVAC 3	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs Cats Horses	1 ml 1 ml 2 ml	3 months 3 months 3 months	1 year later & triennially 1 year later & triennially Annually	IM or SC IM or SC IM
RABVAC 3 TF	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs Cats Horses	1 ml 1 ml 2 ml	3 months 3 months 3 months	1 year later & triennially 1 year later & triennially Annually	IM or SC IM or SC IM
PRORAB-1	Intervet, Inc. License No. 286	Intervet, Inc.	Dogs Cats Sheep	1 ml 1 ml 2 ml	3 months 3 months 3 months	Annually Annually Annually	IM or SC IM or SC IM
CONTINUUM RABIES	Intervet, Inc. License No. 286	Intervet, Inc.	Dogs Cats	1 ml 1 ml	3 months 3 months	1 year later & triennially 1 year later & quadrennially	SC SC
IMRAB 3	Merial, Inc. License No. 298	Merial, Inc.	Dogs Cats Sheep Cattle Horses Ferrets	1 ml 1 ml 2 ml 2 ml 2 ml 1 ml	3 months 3 months 3 months 3 months 3 months 3 months	1 year later & triennially 1 year later & triennially 1 year later & triennially Annually Annually Annually	IM or SC IM or SC IM or SC IM or SC IM or SC SC
IMRAB 3 TF	Merial, Inc. License No. 298	Merial, Inc.	Dogs Cats Ferrets	1 ml 1 ml 1 ml	3 months 3 months 3 months	1 year later & triennially 1 year later & triennially Annually	IM or SC IM or SC SC
IMRAB Large Animal	Merial, Inc. License No. 298	Merial, Inc.	Cattle Horses Sheep	2 ml 2 ml 2 ml	3 months 3 months 3 months	Annually Annually 1 year later & triennially	IM or SC IM or SC IM or SC
IMRAB 1	Merial, Inc. License No. 298	Merial, Inc.	Dogs Cats	1 ml 1 ml	3 months 3 months	Annually Annually	SC SC
IMRAB 1 TF	Merial, Inc. License No. 298	Merial, Inc.	Dogs Cats	1ml 1ml	3 months 3 months	Annually Annually	SC SC
B) MONOVALENT (Rabies glycoprotein, live canary pox vector)							
PUREVAX Feline Rabies	Merial, Inc. License No. 298	Merial, Inc.	Cats	1 ml	8 weeks	Annually	SC
C) COMBINATION (inactivated rabies)							
Equine POTOMAVAC + IMRAB	Merial, Inc. License No. 298	Merial, Inc.	Horses	1 ml	3 months	Annually	IM
CONTINUUM DAP-R	Intervet, Inc. License No. 286	Intervet, Inc.	Dogs	1 ml	3 months	1 year later & triennially	SC
CONTINUUM Feline HCP-R	Intervet, Inc. License No. 286	Intervet, Inc.	Cats	1 ml	3 months	1 year later & quadrennially[e]	SC
D) COMBINATION (Rabies glycoprotein, live canary pox vector)							
PUREVAX Feline 3/ Rabies	Merial, Inc. License No. 298	Merial, Inc.	Cats	1 ml	8 weeks	Annually	SC
PUREVAX Feline 4/ Rabies	Merial, Inc. License No. 298	Merial, Inc	Cats	1 ml	8 weeks	Annually	SC
E) ORAL (Rabies glycoprotein, live vaccinia vector) - RESTRICTED TO USE IN STATE AND FEDERAL RABIES CONTROL PROGRAMS							
RABOVIRAL V-RG	Merial, Inc. License No. 298	Merial, Inc.	Raccoons Coyotes	N/A	N/A	As determined by local authorities	Oral

a. Minimum age (or older) and revaccinated one year later
b. One month = 28 days
c. Intramuscularly
d. Subcutaneously
e. Non-rabies fractions have a 3 year duration (see label)

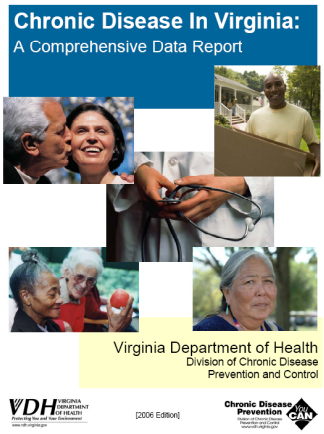
Cases of Selected Notifiable Diseases Reported in Virginia*

Disease	Total Cases Reported, April 2007						Total Cases Reported Statewide, January - April		
		Regions							
	State	NW	N	SW	C	E	This Year	Last Year	5 Yr Avg
AIDS	64	7	33	3	6	15	157	150	215
Campylobacteriosis	18	5	2	4	2	5	112	111	113
Chickenpox	19	4	2	1	0	12	236	613	279
***E. coli,* Shiga toxin-producing**	7	2	1	0	4	0	30	30	11
Giardiasis	25	6	6	5	4	4	126	137	135
Gonorrhea	509	39	23	65	203	179	1,976	2,137	2,823
Group A Strep, Invasive	5	1	0	4	0	0	53	49	33
Hepatitis, Viral									
A	7	0	6	0	1	0	27	21	26
B, acute	5	0	0	1	4	0	39	13	48
C, acute	0	0	0	0	0	0	2	1	3
HIV Infection	63	4	21	1	12	25	211	289	270
Lead in Children†	38	6	2	10	12	8	126	158	155
Legionellosis	2	1	0	1	0	0	7	13	6
Lyme Disease	14	1	11	1	1	0	85	6	12
Measles	0	0	0	0	0	0	0	0	0
Meningococcal Infection	1	1	0	0	0	0	6	10	9
Pertussis	3	1	1	0	0	1	33	53	50
Rabies in Animals	85	24	15	11	15	20	224	196	216
Rocky Mountain Spotted Fever	2	0	0	1	0	1	8	6	2
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	23	6	4	8	2	3	192	180	185
Shigellosis	6	1	3	0	0	2	22	17	96
Syphilis, Early§	25	1	5	0	9	10	120	106	61
Tuberculosis	21	1	13	1	2	4	58	74	67

Localities Reporting Animal Rabies This Month: Accomack 2 raccoons; Amherst 1 raccoon; Appomattox 1 raccoon; Arlington 1 cat, 1 raccoon; Augusta 1 raccoon, 3 skunks; Bath 1 raccoon, 3 skunks; Bedford 1 fox; Botetourt 1 fox, 1 raccoon; Brunswick 1 bobcat; Campbell 1 skunk; Carroll 1 skunk; Charlotte 1 raccoon; Chesapeake 1 fox; Chesterfield 2 raccoons, 1 skunk; Clarke 1 skunk; Dinwiddie 1 fox; Fairfax 1 cat, 1 dog, 5 raccoons, 2 skunks; Fauquier 1 cat, 1 fox, 3 raccoons, 1 skunk; Franklin 1 skunk; Gloucester 1 cat, 2 raccoons; Hanover 1 raccoon, 3 skunks; Highland 1 fox, 1 skunk; James City 1 raccoon, 1 skunk; Loudoun 2 raccoons; Mecklenburg 1 raccoon; New Kent 1 skunk; Newport News 2 raccoons; Northampton 1 fox, 3 raccoons; Prince George 1 raccoon; Prince William 2 raccoons; Roanoke 1 raccoon; Roanoke City 1 raccoon, 1 skunk; Rockbridge 1 skunk; Spotsylvania 2 raccoons, 1 skunk; Stafford 1 raccoon; Suffolk 1 fox, 2 raccoons, 1 skunk; Sussex 1 skunk; Tazewell 1 raccoon; Virginia Beach 1 cat; Warren 2 raccoons.

Toxic Substance-related Illnesses: Adult Lead Exposure 9; Methemoglobinemia 1; Pneumoconiosis 10.

*Data for 2007 are provisional. †Elevated blood lead levels ≥10µg/dL. §Includes primary, secondary, and early latent.



Chronic Disease in Virginia Report, 2006 Edition

The Virginia Department of Health's Division of Chronic Disease Prevention and Control has released its report, entitled *Chronic Disease in Virginia – 2006 Edition*. This report reviews data regarding major chronic diseases in the Commonwealth of Virginia. The report can be a resource to public health program planners, policy makers, healthcare professionals, and researchers in their efforts to identify disparities and barriers and to design solutions to reduce the burden of chronic disease in the state.

The report is available and can be downloaded from the Division of Chronic Disease Prevention and Control website (at www.vahealth.org/cdpc/). For more information on this report, please contact the Virginia Department of Health at (804) 864-7877.