



VIRGINIA

EPIDEMIOLOGY BULLETIN

Robert B. Stroube, M.D., M.P.H., Commissioner
Grayson B. Miller, Jr., M.D., Epidemiologist

Editor: Carl W. Armstrong, M.D., F.A.C.P.

May, 1993

Volume 93, Number 5

Lyme Disease in Virginia, 1982-1992

Lyme disease became a reportable disease in 1989, but cases have been recorded since 1982. Since 1983, the number of cases increased each year until 1992, when there were 123 confirmed cases (see figure on p2). This was a decrease from the previous year's total of 154.

To be counted as a case, a person must have either a physician-diagnosed erythema migrans rash (EM) at least 5 centimeters in diameter or positive serology with at least one other major clinical manifestation. These manifestations may be rheumatologic (arthritis characterized by brief attacks of joint swelling), neurologic (Bell's palsy or other cranial neuritis, radiculoneuropathy, lymphocytic meningitis, encephalitis/encephalomyelitis) or cardiac (2nd or 3rd degree atrioventricular block). This case definition was developed for surveillance purposes, not for use in making decisions on appropriate treatment.

The symptoms reported for the 1992 cases included: EM (71%), arthritis (29%), Bell's palsy or other cranial neuritis (6%), radiculoneuropathy (9%), lymphocytic meningitis (1%), encephalitis/encephalomyelitis (2%), and 2nd or 3rd degree atrioventricular block (1%). Ten of the cases were hospitalized for their current episode. No deaths were reported.

Serology was positive for 44% of the cases, negative for 20%, and not done for 36%.

In This Issue:

Lyme Disease in Va	1
Rocky Mountain Spotted Fever	2
APIC-Virginia Conference	2
Ehrlichiosis in Va	3
Shigellosis in Va	5

DRESS TO REPEL!

USE INSECT REPELLENTS SAFELY

DON'T DO THIS STUFF

- DON'T SPRAY REPELLENT ON YOUR FACE!
- DON'T BREATHE REPELLENTS!
- DON'T PUT ON CUTS, SUNBURNS OR RASHES!
- DON'T PUT ON HANDS!

DO THIS STUFF

- WEAR LIGHT COLORED CLOTHING! (That way you can see ticks on you)
- FOLLOW LABEL DIRECTIONS!
- SPRAY ONLY OUTDOORS!
- WEAR LONG-SLEEVED SHIRTS AND LONG PANTS!
- WASH OFF REPELLENT WHEN YOU GET HOME!
- TUCK YOUR PANT LEGS IN YOUR SOCKS!

Figure credit (adapted): New York State Department of Health

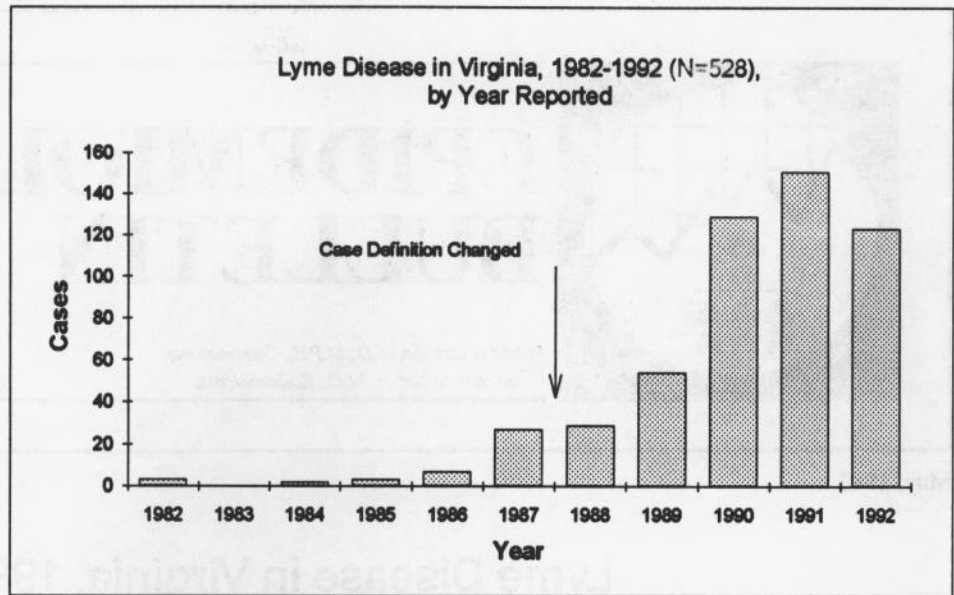
The majority of cases (62%) were reported between June and September (see figure, p3). Most cases were white (87%). The gender ratio was 1 to 1. The average age of Lyme disease cases was 39 years, with a range of 2 to 84 years. Of these, 18% were less than 20 years of age, 65% were between the ages of 20 and 59, and 17% were over 60.

Exposures were reported in 39 different counties and cities. The locations with the highest number of exposures were: Prince William (17), Floyd (12), Accomack (11), and Fairfax (9).

Exposure rates (per 100,000 population), as shown on the map, were highest in the counties of: Floyd (98), Accomack (34), Northampton (21). Rappahannock (15), Louisa (15), James City (13), Cumberland (12), and Isle of Wight (11).

The cluster of cases in Floyd County had an age range of 29 to 80 years with a mean of 56. The male to female ratio was 1 to 11. Only 25% of the patients had EM. The other symptoms reported were: arthritis (77%), Bell's palsy or other cranial neuritis (38%), radiculoneuropathy (62%), lymphocytic meningitis (8%), and encephalitis/encephalomyelitis (8%). None of the Floyd County patients were hospitalized for their episodes. Serum tested by a commercial laboratory was positive for 92% of the patients. Five serum samples from Floyd County patients were tested by the Centers for Disease Control and Prevention and were negative; 4 of these had been reported as positive by the commercial laboratory.

Submitted by Nida V. Mickus, BS, and Suzanne R. Jenkins, VMD, MPH, Office of Epidemiology, VDH.



Rocky Mountain Spotted Fever, Virginia, 1992

In 1992, 26 cases of Rocky Mountain spotted fever were reported that fit the case definition of a compatible clinical picture and a four-fold or greater change between acute and convalescent titers or a single titer of $\geq 1:64$ by immunofluorescent antibody or $\geq 1:16$ by complement fixation. This number of cases is higher than the mean yearly total for the last five years (20.6 cases), but much lower than the mean of 120.6 cases for the five year period 1974 through 1978. There were no deaths reported in 1992, but during the previous five years 4 deaths were reported; during the

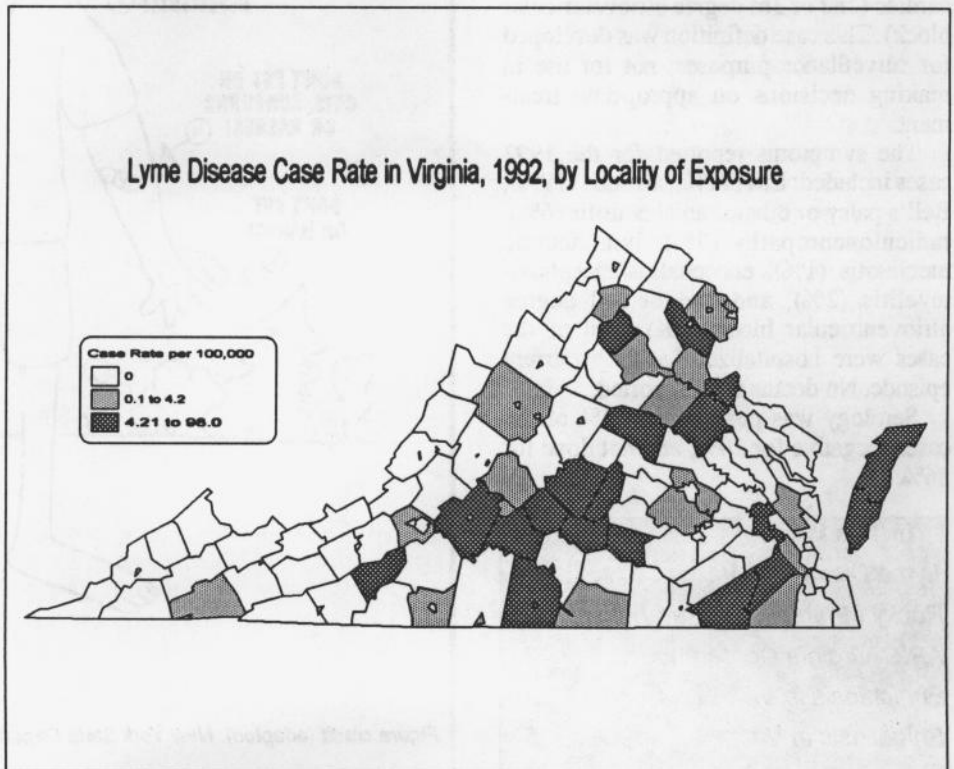
peak years of 1974 through 1978 there were 18 deaths.

The age range of 1992 cases was 2 to 80 years with a mean of 43.5 years. Persons over the age of 20 comprised 77% of the cases, but only 23% were over age 60. The male to female ratio was 1.6 to 1. Cases were reported in the months June through December (these months may not correspond to the months of onset); 81% were reported in July, August, September and October. Cases resided in 18 different counties or cities throughout Virginia with no apparent clustering.

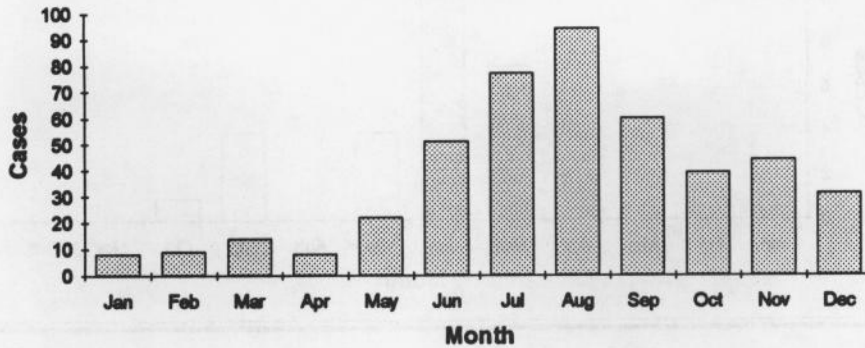
Conference Announcement

Basics to High Tech — the Infection Control Continuum, APIC-Virginia's 19th annual educational conference, will be held in the Fair Oaks Holiday Inn, Fairfax, Virginia, on September 22, 23 and 24, 1993. The conference is sponsored by the Association for Practitioners in Infection Control, Virginia Chapter.

For more information contact Mary Thorensen, RN, Fauquier Hospital, 330 Hospital Drive, Warrenton, Virginia 22186, phone: (703) 347-2550 x295



Lyme Disease in Virginia, 1989-1992 (N=457),
by Month Reported



Ehrlichiosis in Virginia, 1986-1992

Although ehrlichiosis is not a reportable disease in Virginia, the Office of Epidemiology has maintained a data base on cases since 1986 and welcomes reports of suspected and confirmed cases. *Ehrlichia* is a small, pleomorphic organism that survives in leukocytes and causes acute, febrile, bacterial illness in humans. In canines there is a chronic form which often results in exacerbations of generalized hemorrhage which lead to death. *Ehrlichia canis* is transmitted to dogs by the brown dog tick, *Rhipicephalus san-*

guineus. The vector of *E. chaffeensis*, the cause of human ehrlichiosis in the United States, has not been identified.

Using a case definition of a four-fold or greater difference in antibody titer between acute and convalescent serum specimens, 29 human ehrlichiosis cases have been identified in Virginia since 1986. Cases occurred in every year with a low of 1 in 1987 and a high of 10 in 1989. Most cases had onset in May and June (see figure, p4). The youngest case was 5 years of age and the oldest 87. The mean age was 48 years.

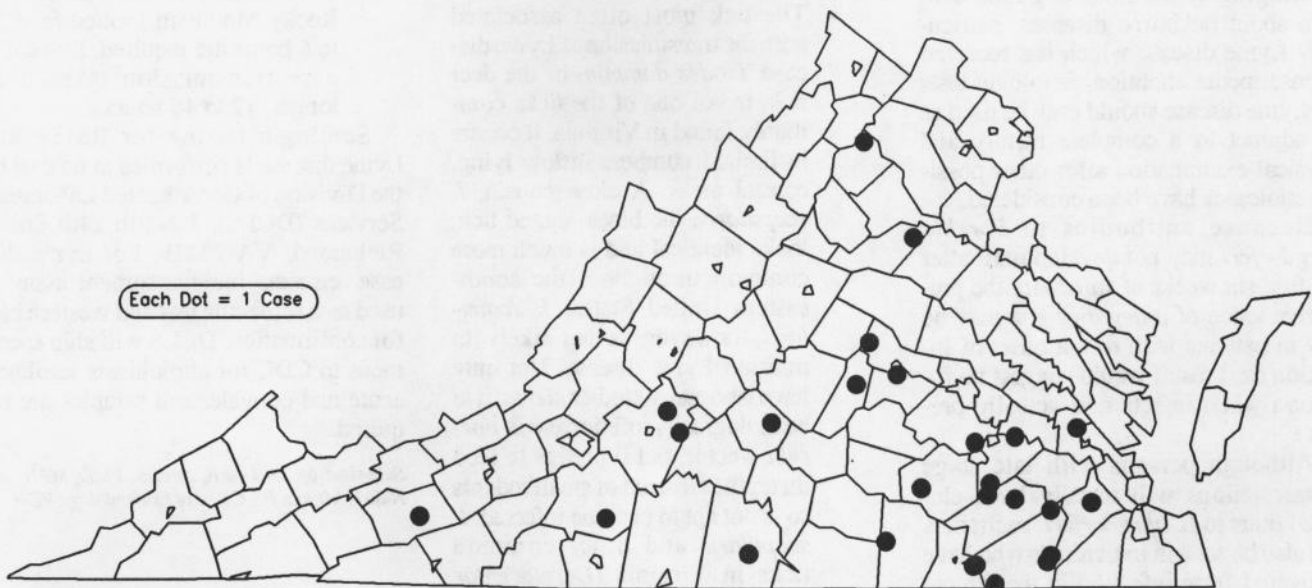
Persons over the age of 20 comprised 86% of the cases; 41% were over 60 years of age. The male to female ratio was 4.8 to 1. Of the 28 for which race was reported, 79% were white and 17% were black.

Tick bites were reported by 97% of the patients. Exposures took place in 19 different counties or cities in Virginia; the majority in the southeastern part of the state (see map). The time between tick exposure and onset of signs ranged from 4 to 30 days with a mean of 14 days.

The most common symptoms reported were: fever between 100.9 and 103.4 (83%), malaise (81%), rigors (73%), headache (70%), myalgia (54%), anorexia (50%), nausea (43%), rash (33%), vomiting (33%), diarrhea (28%), and arthralgias (21%). Of the 7 patients with rashes, only one was described as maculopapular, the rest were non-specific and occurred in a variety of sites. Although hemorrhage is a major component of ehrlichiosis in canines, only 16% of the human cases in Virginia reported bleeding; 2 from the gastrointestinal tract and 2 from unknown sites. The most common clinical laboratory abnormalities were leukopenia, thrombocytopenia, and elevated liver enzymes.

The duration of illness was 1 to 29 days with a mean of 11.7 days. Twenty-two persons were hospitalized. The duration of stay in the hospital ranged from 3 to 16 days with a mean of 7.3 days. No deaths were reported among the confirmed cases, but the death of a probable case occurred in 1988. This young child died before a con-

Ehrlichiosis in Virginia, 1986-1992 (N=26*), by Locality of Exposure



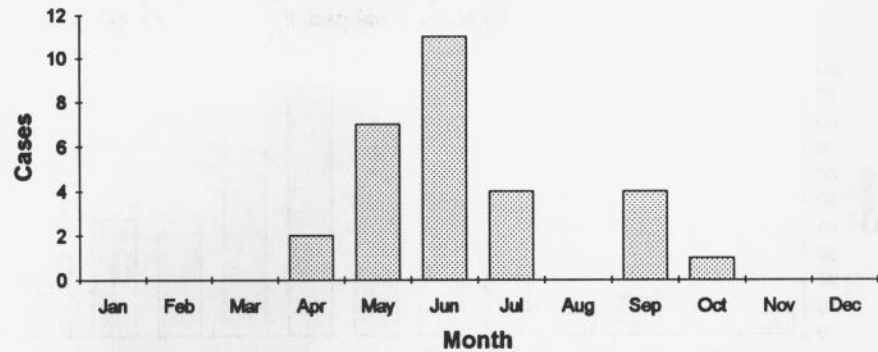
* 3 additional cases not plotted because of unknown locality of exposure

valescent sample was obtained; the acute serum titer was 1:360.

Convalescent titers of the confirmed cases ranged from a low of 1:40 to a high of 1:40,560. Prior to 1992 antibody titers to *E. canis* were used to diagnose human disease. Now that the human agent has been isolated and identified, titers to *E. chaffeensis* are being reported. Sequencing of the rRNAs of both agents show them to be 98.7% related, which helps explain the strong cross-reaction between the two agents.

Submitted by Suzanne R. Jenkins, VMD, MPH, Office of Epidemiology, VDH.

Ehrlichiosis in Virginia, 1986-1992 (N=29),
by Month Reported



Editorial Note:

The preceding summaries of tick-borne diseases in Virginia should reinforce the importance of considering such diseases in patients who have been exposed to ticks and are seen during the warm months with fever or other compatible symptoms. Although anyone may become infected with any of these diseases, Lyme disease appears to affect males and females and all age groups almost equally. Rocky Mountain spotted fever (RMSF) is more likely to occur in young to middle-aged men and ehrlichiosis is predominately a disease of older men. For most patients, antibiotics of the tetracycline family are the drugs of choice for all three diseases; for children, pregnant women, and lactating women, phenoxymethyl penicillin is the drug of choice for Lyme disease.

Diagnostic evaluation is made more challenging by the level of public concern about tickborne diseases, particularly Lyme disease which has received intense media attention. Serologic tests for Lyme disease should only be used as an adjunct to a complete history and physical examination after other possible etiologies have been considered.

Because antibodies to *Borellia burgdorferi* may not develop until after the first six weeks of infection, the predictive value of a negative test may be low in patients with recent onset of infection (test result would suggest no infection when infection is actually present).

Although persons with late stage manifestations will usually have elevated titers to *B. burgdorferi*, such titers can also be seen in individuals who have recovered from infection in the remote past and who now present with symp-

toms resembling late stage Lyme disease but due to some other cause. Because the prevalence of active infection in persons with such nonspecific chronic symptoms is low, indiscriminate use of the serologic test in this population will yield a low predictive value of a positive result (test result would suggest infection is present when it is not).

All ticks go through several stages in their life cycle: from egg, through larvae, to nymph and then adult (see figure, p5). Between each stage they require a blood meal in order to progress. Different species of ticks have different feeding preferences at each stage. The deer tick, by preferring small rodents in its larval and nymphal stages is most likely to become infected with *B. burgdorferi*. Certain rodents, such as the white footed mouse, are effective reservoirs because they remain spirochetemic for long periods.

For patients who are alarmed at finding a tick on themselves, the following information may be helpful:

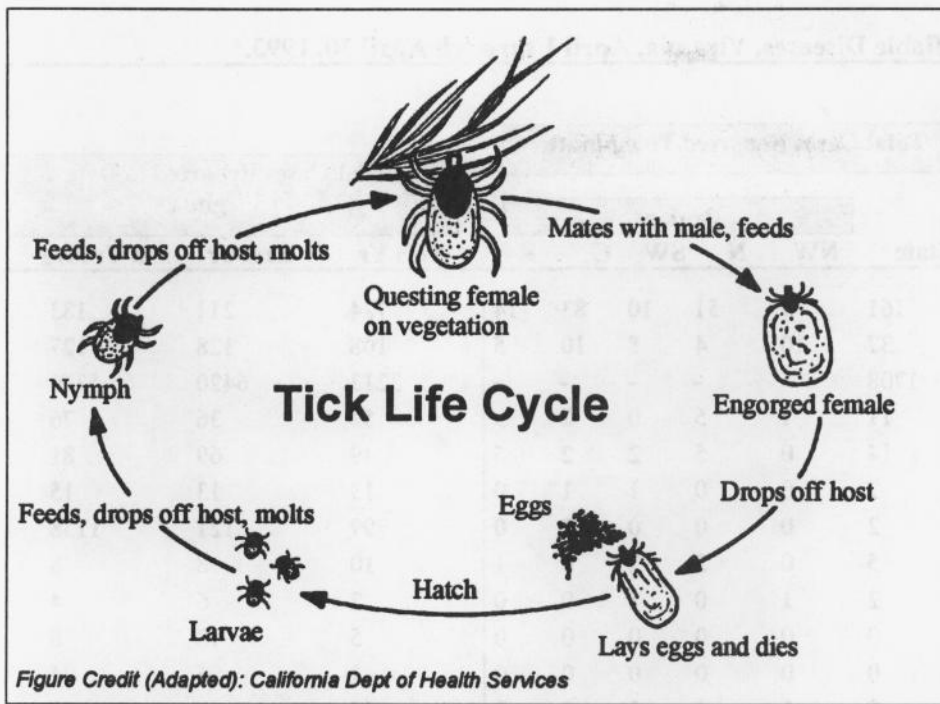
- The tick most often associated with the transmission of Lyme disease, *Ixodes dammini* or the deer tick, is not one of the ticks commonly found in Virginia. It occurs in limited numbers in low lying, coastal areas. A close cousin, *I. scapularis*, the black-legged tick, looks identical and is much more common throughout the southeastern United States. *I. scapularis*, however, is not likely to transmit Lyme disease. Not only have laboratory studies shown it to be biologically inferior as a *B. borrelia* vector, but it prefers to feed on reptiles instead of small rodents so is not apt to become infected. *I. scapularis* and other common ticks in Virginia (*Dermacentor variabilis*, the brown dog tick, and

Amblyomma americanum, the lone star tick) may be responsible for an occasional, sporadic case of Lyme disease, but they are not important in the overall picture. They are, however, vectors of RMSF.

- The deer tick is a small tick, but the tiny ticks that people commonly find on themselves are probably nymphs of some other tick species and not likely to transmit Lyme disease. People who are desperate to know what kind of tick has bitten them can enlist the help of their county extension agent who can send the specimen to the entomologist at Virginia Tech if the tick is not readily identifiable. At the present time there is no laboratory in Virginia where individual ticks can be tested for *B. burgdorferi*.
- Lastly, ticks have to be attached long enough to allow for disease transmission to take place. For Rocky Mountain spotted fever, 4 to 6 hours are required. Lyme disease transmission takes even longer, 12 to 48 hours.

Serologic testing for RMSF and Lyme disease is performed at no cost by the Division of Consolidated Laboratory Services (DCLS), 1 North 14th Street, Richmond, VA 23219. For Lyme disease, enzyme immunosorbent assay is used as a screening test and western blot for confirmation. DCLS will ship specimens to CDC for ehrlichiosis serology; acute and convalescent samples are required.

Submitted by Suzanne R. Jenkins, VMD, MPH, and Nida V. Mickaus, BS, Office of Epidemiology, VDH.



Shigellosis Reports Increased in Central and Eastern Virginia*

Between January 1 and April 30, 1993, 96 cases of shigellosis were reported to the Office of Epidemiology, compared to 52 cases reported for the same period in 1992. Sixty-five percent of the 1993 cases were reported from the central and eastern health planning regions of the state, compared to 13% for the same period in 1992. The number of cases reported from the northern and northwest regions for 1993 were comparable to 1992. No cases were reported from the southwestern part of the state for 1993 compared to 15 in 1992.

Fifteen (60%) of the 25 localities that have reported cases of shigellosis this year did not report any cases for the same reporting period in 1992. Approximately 42 percent of the 1993 cases were 5 years old or less, however, only one cluster of cases associated with a daycare in the Richmond metropolitan area was reported. Preliminary analysis suggests that the increase in the number of cases this year over the previous year is due to person-to-person transmission and not due to common source exposure(s).

Diagnosis and Treatment

The diagnosis is suggested by a history of febrile diarrhea and the finding of fecal leukocytes on microscopic examination of a stool or rectal mucus specimen stained with methylene blue. Confirmation is by isolation of the organism from stool or rectal swab.¹

Treatment for shigellosis includes fluid and electrolyte replacement and antibiotic treatment. Antimicrobial agents will shorten the duration of illness and duration of pathogen excretion. Multi-resistance to antibiotics is common, so the choice of specific agents is best made based on the organism's antibiotic susceptibility pattern.

Prevention and Control

Shigella is typically spread by direct contact with an infected person. This mode of transmission is possible because of the strikingly low inoculum required for infection. Personal hygiene, i.e. handwashing, remains the most effective method of prevention. This is especially important in families with children less than five years old.

Persons known or suspected to be infected with *Shigella* should not continue working as foodhandlers or providing care to children or patients until two successive stool samples or rectal swabs, collected ≥ 24 hours apart (but not sooner than two days after discontinuing antibiotics), have been found to be negative for *Shigella* on culture.

Daycare centers provide settings where transmission may be facilitated and implementation of control measures difficult. Control measures are complicated by the low infectious dose, the frequency of mild or inapparent infections, poor hygienic practices of toddlers and the need for

hands-on contact by the care-givers and parents.²

Good hygiene, particularly thorough handwashing following use of the rest room or the changing of diapers, is the most important control measure for children, daycare staff and family members. Suggested measures to reduce transmission in daycare facilities include the following:³

- Reinforce education of staff in basic hygiene.
- Clean diaper-changing surface after each use.
- Avoid having staff who care for diapered children prepare food.
- Exclude children with active diarrhea.
- Consider culturing all children and staff and cohorting infected and non-infected persons into separate groups, or excluding infected persons until cultures of two successive stool specimens taken 24 hours apart after cessation of antimicrobial therapy are negative.

Recommendations

- Collect stool specimens for culture on all patients who present with diarrhea of suspected bacterial etiology (suggested by presence of fever, blood or mucus in stool, >4 stools per day, and/or fecal leukocytes).
- Inquire of the patient or patient's family about high risk settings in which *Shigella* transmission might occur from the patient to others (i.e., daycare, foodhandling, patient care).
- Report confirmed and suspected cases of shigellosis as soon as possible to the local health department so that investigations can be conducted and appropriate control measures implemented.

References

1. Rennels MB, Levine, MM. Classical bacterial diarrhea: perspectives and update—*Salmonella*, *Shigella*, *Escherichia coli*, *Aeromonas* and *Plesiomonas*. *Pediatr Infect Dis* 1986;S91-S100.
2. Pickering LK. The day care center diarrhea dilemma (editorial). *Am J Public Health* 1986;76:623-4.
3. The Child Day Care Infectious Disease Study Group. Considerations of infectious Diseases in daycare centers. *Pediatr Infect Dis* 1995;4:124-36.

*Submitted by Leslie M. Branch and Carl W. Armstrong, MD, Office of Epidemiology, VDH.

Cases of Selected Notifiable Diseases, Virginia, April 1 through April 30, 1993.*

Disease	Total Cases Reported This Month						Total Cases Reported to Date in Virginia		
	State	Regions					This Yr	Last Yr	5 Yr Avg
		NW	N	SW	C	E			
AIDS	161	3	51	10	83	14	724	211	183
Campylobacteriosis	37	10	4	8	10	5	108	128	127
Gonorrhea†	1708	-	-	-	-	-	3213	6420	5376
Hepatitis A	11	1	5	0	2	3	52	36	76
Hepatitis B	14	0	5	2	2	5	49	69	81
Hepatitis NANB	2	0	0	1	1	0	13	13	15
Influenza	2	0	0	0	2	0	799	121	1138
Kawasaki Syndrome	5	0	2	2	0	1	10	8	8
Legionellosis	2	1	0	1	0	0	2	6	4
Lyme Disease	0	0	0	0	0	0	5	18	8
Measles	0	0	0	0	0	0	1	6	24
Meningitis, Aseptic	8	1	4	1	0	2	57	61	55
Meningitis, Bacterial‡	9	2	3	2	0	2	26	52	60
Meningococcal Infections	3	0	0	0	0	3	14	24	21
Mumps	3	0	1	0	1	1	13	20	28
Pertussis	3	0	2	0	0	1	6	4	6
Rabies in Animals	31	10	4	9	3	5	103	81	93
Reye Syndrome	0	0	0	0	0	0	0	0	0
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	52	4	17	10	12	9	221	212	279
Shigellosis	28	0	5	0	17	6	96	52	104
Syphilis (1° & 2°)†	55	1	2	9	7	36	200	252	251
Tuberculosis	26	5	4	7	8	2	141	100	114

Localities Reporting Animal Rabies: Albermarle 1 raccoon; Augusta 1 raccoon, 1 skunk; Campbell 1 raccoon; Culpeper 1 raccoon; Essex 1 raccoon; Fairfax 2 raccoons; Floyd 3 raccoons; Goochland 2 raccoons; Grayson 1 raccoon; Lancaster 1 fox, 1 raccoon, 1 skunk; Loudoun 2 raccoons; Middlesex 1 raccoon; Orange 1 raccoon; Page 2 raccoons, 1 skunk; Powhatan 1 skunk; Roanoke County 1 raccoon; Spotsylvania 1 raccoon; Stafford 1 raccoon; Washington 1 skunk; Wythe 1 groundhog, 1 raccoon.

Occupational Illnesses: Asbestosis 29; Carpal Tunnel Syndrome 73; Coal Workers' Pneumoconiosis 13; De Quervain's Syndrome 3; Lead Poisoning 4; Loss of Hearing 13; Occupational Asthma 1; Tendonitis 3.

*Data for 1993 are provisional.

†Total now includes military cases to make the data consistent with reports of the other diseases.

‡Other than meningococcal.

Published monthly by the
VIRGINIA HEALTH DEPARTMENT
 Office of Epidemiology
 P.O. Box 2448
 Richmond, Virginia 23218

Telephone: (804) 786-6261

Bulk Rate U.S. POSTAGE PAID Richmond, Va. Permit No. 936
--

