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Childhood Firearm Fatalities in Virginia

In 1995, the Virginia General Assembly established the State Child Fatality Review Team (hereafter called the Team). The purpose of fatality review is to analyze child deaths systematically to determine if the deaths could have been prevented and to make recommendations for education, training, and prevention. The Team is multidisciplinary and includes physician representatives from the Medical Society of Virginia, the Virginia Pediatric Society, and the Virginia College of Emergency Physicians, as well as representatives from state and local agencies that provide services to families and children or may be involved in the investigation of death in children. The Chief Medical Examiner chairs the Team.

The Team conducted a review of 1994 firearm deaths among children and youth that offers a uniquely public health perspective on firearm mortality among children and youth. In Virginia, firearm mortality consistently ranks second behind motor vehicle accidents as the leading cause of injury-related death among children and youth through 17 years of age. The fatality review reported here suggests that prevention of firearm mortality in children and youth requires multidimensional responses that address the social, economic, psychological, and legal aspects of this problem.

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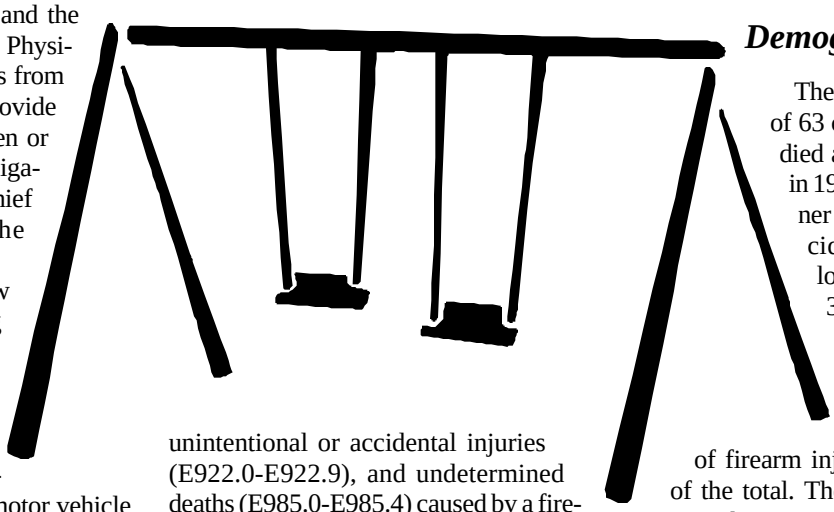
Methods

In Virginia, statewide child fatality review is retrospective and includes only Virginia residents <18 years old. Firearm fatalities were selected from the 1994 vital statistics data by using ICD-9 (International Classification of Diseases, Ninth Revision) codes for homicides (E965.0-E965.4), suicides (E955.0-E955.9), legal interventions (E970), unintentional or accidental injuries (E922.0-E922.9), and undetermined deaths (E985.0-E985.4) caused by a firearm. (Legal intervention refers to a homicide in which a law enforcement officer kills a person in the line of duty.)

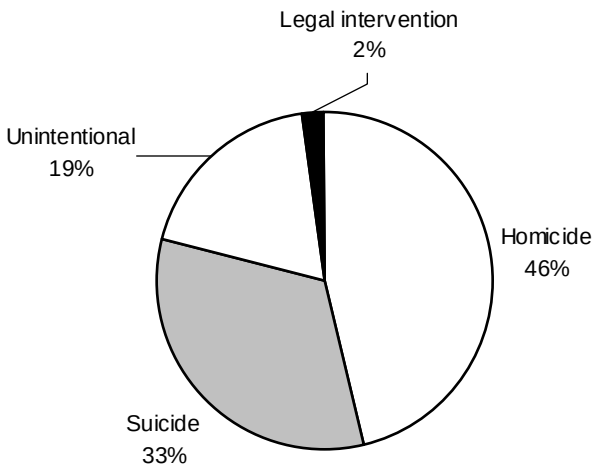


The Team used a standard protocol to request the law enforcement, medical examiner, educational, court service unit, social service, mental health, and medical records of the children in the review and gathered information that helped to characterize the children and adolescents who died. The child fatality team statute, §32.1-283.1, authorizes the Chief Medical Examiner to obtain records from all these sources and it provides for strict confidentiality of the records reviewed by the Team. Thus, a rich collection of medical, social, educational, and other records was available for review. The Team discussed each case to determine if there may have been opportunities to prevent the death. This multidisciplinary discussion was the heart of the fatality review: it yielded insights, interventions, and strategies that formed the basis for the recommendations that were developed to decrease the occurrence of childhood firearm fatalities in Virginia.

Demographics

The Team examined the records of 63 children <18 years old who died as a result of firearm injury in 1994. The most frequent manner of firearm death was homicide (29 deaths, 46%), followed by suicide (21 deaths, 33%), unintentional injury (12 deaths, 19%), and legal intervention (1 death, 2%) (Figure 1). Boys were far more likely than girls to die of firearm injuries, accounting for 81% of the total. The distribution of deaths by race/ethnicity and sex is shown in Figure 2. Although white children accounted for a higher number of deaths (30 deaths, 48%) compared to black children (28 deaths, 44%), the annual incidence rate was much higher in blacks than in whites (7.5 deaths per 100,000 population vs. 2.7 deaths per 100,000 population). In Virginia, the relatively small population size of other racial and ethnic groups makes rate calculations less meaningful for those groups. Figure 3 shows the age distribution of firearm fatalities. Children <10 years of age accounted for only seven (11%) deaths. Forty (63%) deaths occurred in the 15-17 year age group and 16 (25%) deaths occurred among the 10-14 year

Figure 1. Firearm Fatalities by Manner of Death, Virginia, 1994 *(Total= 63)*



age group. Handguns were the most frequently used firearm, accounting for 54 (86%) deaths (Figure 4). Firearm fatalities occurred in all of the Health Service Areas in the state, though some variation can be seen in the manner of death (Figure 5). The Central and Eastern areas accounted for the majority of the homicides, while a third of the suicides occurred in the Northwest area.

Firearm Fatality by Manner of Death

Homicide

The 29 homicide victims ranged in age from 2-17 years. Nearly half (14) of these homicides were drug-related, drive-by shootings, or gang-related. Another four deaths occurred in the context of an argument, three occurred as a result of children playing with firearms, one as a result of a struggle over a firearm, one in the context of a robbery, and in one case the motive could not be determined. Five children were murdered in the context of family annihilations. Handguns were used in 26 (90%) of these homicides.

Suicide

The 21 suicide firearm fatalities occurred in children and adolescents aged 9-17 years; 90% occurred in males. There are several factors associated with adolescent suicide that were observed in this case review. These included a history of a psychiatric diagnosis, academic difficulties, legal problems, and the presence of firearms in the home.[1-4] Seven of the 21 firearm suicide victims had a behavioral or psychiatric diagnosis, or both. Of these, six had received some type of counseling or psychiatric treatment. Of the 14 youth without a psychiatric diagnosis, nine had academic difficulties and/or juvenile justice system records. Household firearms were used in 95% of the suicides; 86% of these were handguns.

Unintentional Injury

Twelve unintentional injury deaths occurred in children and adolescents aged 9-17 years, with 83% of the deaths occurring among boys. In these deaths, children and adolescents were either playing with firearms, showing them to their friends or, less frequently, playing Russian roulette. As with the other fatalities, handguns were involved most frequently, accounting for 83% of the deaths. All but one of these firearms was a household weapon.

Access to Firearms in the Home

Thirty-four (54%) fatalities were due to a firearm kept in the home. These included 3 homicides, 20 suicides, and 11 unintentional injury deaths.

When the firearm used in the fatality was a household weapon, the Team collected information regarding storage practices for the firearm and ammunition. Of the 34 deaths in which a household weapon was used, the method of storage of the weapon was documented in only 19 cases. Nine firearms were stored unlocked in a cabinet, closet, bedside table, or other piece of furniture. Five firearms were on a coffee table, an open shelf, a dresser, or leaning against a piece of furniture. Five firearms were stored in locked cabinets or boxes. In each case, the children and youth knew where the keys were stored. Of the firearms kept unlocked or out in the open, ten handguns and one shotgun were kept loaded.

Figure 2. Number and Percent of Firearm Fatalities by Race/Ethnicity and Sex, Virginia, 1994 *(Total=63)*

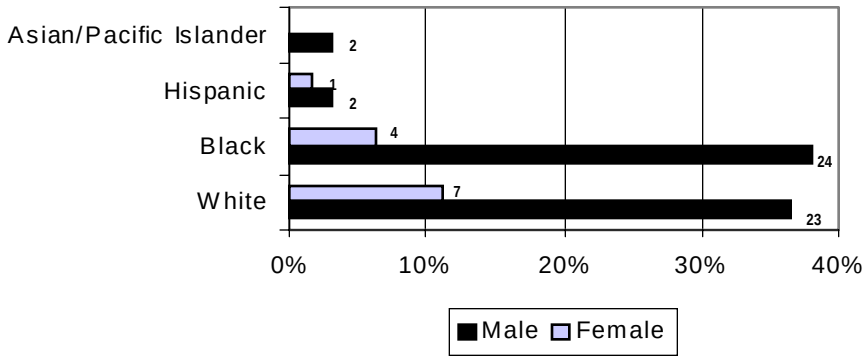
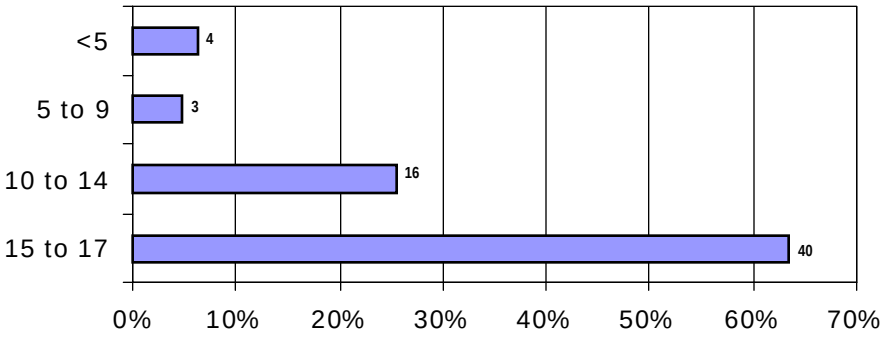


Figure 3. Number and Percent of Firearm Fatalities by Age Group, Virginia, 1994 *(Total=63)*



Characteristics of the Children and Adolescents

While the circumstances of their deaths may have been different, the children and youth killed by firearms had a number of characteristics in common, including school problems, juvenile justice records, psychiatric or behavior disorders, and prior victimization.

Overall, 36/59 (61%) of the school-age children had problems in school. School problems included suspensions, expulsions, absenteeism, and failing a grade or dropping out of school. As a group, they did not perform well; 62% had grade averages of C and below. Poor school performance, as well as the problems described above, were common factors in all manners of death including homicide, suicide, and unintentional injury. Moreover, 42% of the school-age children had records of criminal charges. Again, juvenile justice system involvement cut across all firearm fatalities. Poor school performance and juvenile justice system involvement are both established risk factors for violent death by suicide or homicide.[3,4,5]

Sixteen (25%) of 63 children had psychiatric or behavioral disorder diagnoses. Among the children who had commited suicides, 33% had a diagnosis of attention deficit hyperactivity disorder (ADHD), adjustment disorder, conduct disorder, depression, or a combination of these conditions. Among the unintentional injury deaths, 33% had a diagnosis of ADHD, conduct disorder, major depression, or learning disability. Among the homicide victims, 14% had a diagnosis of conduct disorder, depression, or ADHD.

Prior victimization or a history of violence was also evident among the children, with 15/63 (24%) having been subjected to abuse (physical, emotional or sexual), neglect, or domestic violence. Of these, eight were cases proven by Child Protective Services (CPS) to have been abused or neglected sometime in their lives. Of the eight children with CPS records, six died by homicide, one by unintentional injury, and one by suicide. Of the seven children who had a history of abuse, neglect, or domestic violence but no CPS record, one died by homicide, one by unintentional injury, and five by suicide. The relationship between victimization in childhood and the risk for later victimization or juvenile delinquency is a growing area of research and concern.[6]

Figure 4. Number and Percent of Firearm Fatalities by Type of Firearm, Virginia, 1994

(Total=63)

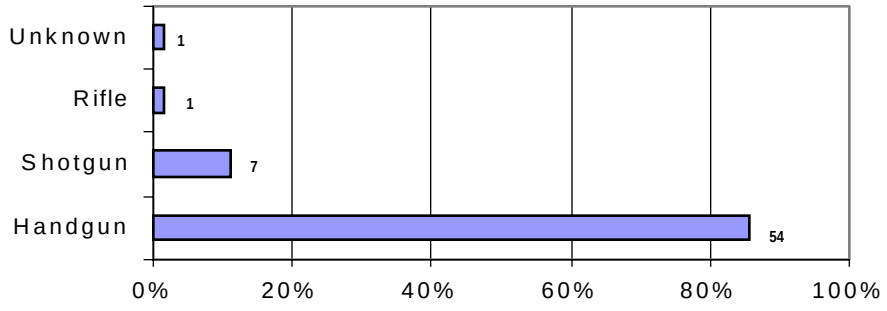
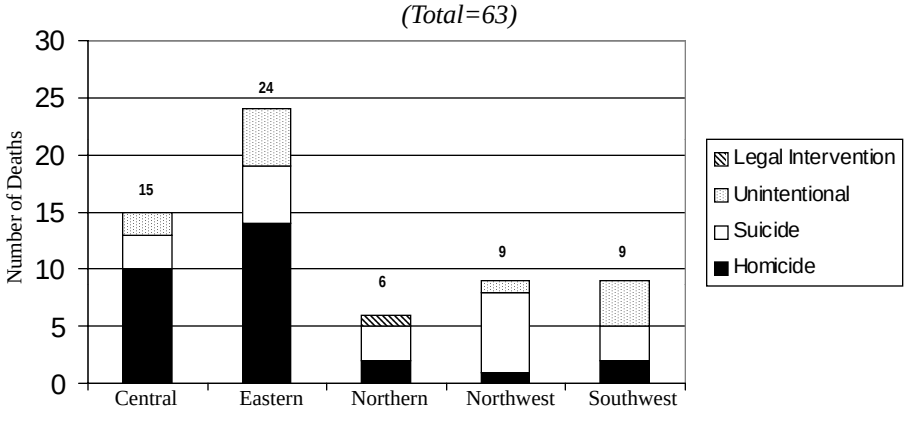


Figure 5. Firearm Fatalities, Manner by Health Service Area, Virginia, 1994

(Total=63)



Preventable Deaths

The Team defined a death as preventable if reasonable interventions, either medical, educational, social, legal, or psychological might have prevented the death. The Team determined that 27 (43%) fatalities could have been prevented had reasonable measures been taken. These preventable deaths included 14 suicides, 10 unintentional injury deaths, and 3 homicides. In addition, the Team concluded that had ideal resources been available, another 16 (25%) deaths could have been prevented, including 11 homicides, 3 suicides, and 2 unintentional injury deaths.

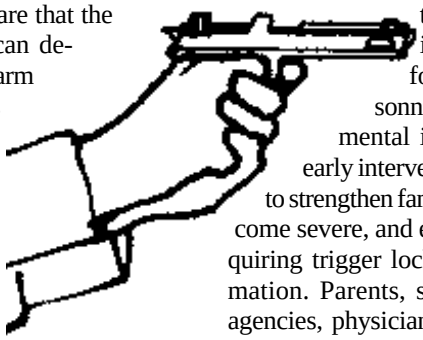
Discussion

The Team's review revealed several patterns in firearm fatalities among children and adolescents in Virginia in 1994. Boys were more frequently the victims of firearm death than girls; handguns were the most frequently used firearms; and black children and youth were disproportionately represented. Other features that stand out include the risks associated with firearms in the home and the prevalence of risk factors for violent death found associated with the cases reviewed. While variability in the quantity and quality of information is an inherent weakness of retrospective record review, the information reviewed by the Team did provide a unique view of child and adolescent firearm fatality in Virginia.

The review was consistent with previously published findings regarding the risk of homicide, suicide and unintentional injury death by firearms in the home.[7,8] Thirty-four (54%) fatalities (3 homicides, 20 suicides, 11 unintentional injury deaths) were the result of a household firearm. The careless storage of firearms was documented in a number of cases, and national studies have found that unsafe storage of firearms among gun

owners is common.[9,10,11] Fatality review of law enforcement incident reports indicates not only how recklessly firearms are kept in homes with children, but that children may elude recommended safe storage practices.

Parents need to be aware that the safety of their children can depend upon their own firearm safety storage practices *and* the storage practices in homes where their children may visit. Recommended safe storage practices for firearms in the home include: keeping the firearm unloaded, storing the weapon in a locked location, and storing the ammunition in a separate location. With regard to firearms in the home, physicians can play a critical role by providing guidance to parents about the risks associated with firearms and by conducting routine screening for depression and risk of suicide among their child and adolescent patients. When an assessment concludes that children have depression or risk for suicide, physicians should recommend that parents remove firearms from the home.



Finally, the prevention of firearm fatalities among children and youth is multidimensional. The scope of the Team's recommendations reflects this complexity. The Team made fourteen recommendations based on its findings, including training for law enforcement personnel on adolescent developmental issues, more support for early intervention programs that work to strengthen families before problems become severe, and enaction of legislation requiring trigger locks and gun safety information. Parents, schools, juvenile justice agencies, physicians, law enforcement personnel, and others involved in providing services to families and children can all play a role in reducing firearm fatalities and injuries.

Reported by Suzanne J. Keller, MA, State Child Fatality Review Team Coordinator and Marcella Fierro, MD, Chief Medical Examiner.
(The entire Team report may be found at http://www.vdh.state.va.us/medexam/fatality.htm.)

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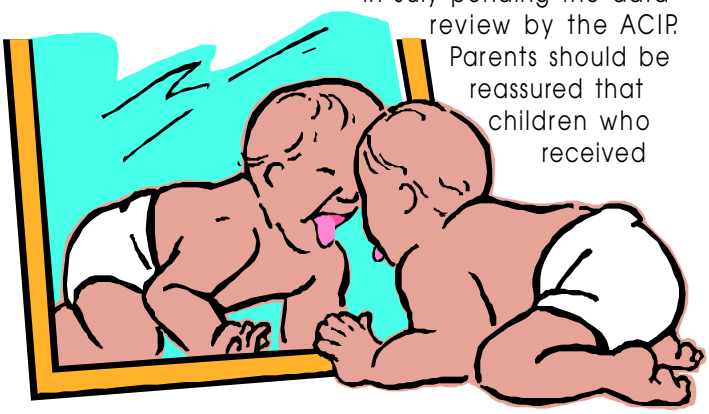
ACIP Recommendation: U.S. Rotavirus Vaccine

On October 22, 1999, the Advisory Committee on Immunization Practices (ACIP) recommended that Rotashield, the only U.S.-licensed rotavirus vaccine, no longer be recommended for infants in the United States. This action is based on the results of an expedited review of scientific data presented to the ACIP by the Centers for Disease Control and Prevention (CDC) in cooperation with the Food and Drug Administration (FDA), National Institutes of Health, other Public Health Service officials, and Wyeth-Lederle, the vaccine manufacturer. Data from the review indicate a strong association between Rotashield and intussusception (bowel obstruction) among some infants during the first 1-2 weeks following vaccination. Use of the vaccine was suspended in July pending the data review by the ACIP. Parents should be reassured that children who received rotavirus vaccine before July and remain well are not at increased risk for intussusception now.



Rotavirus and other causes of severe diarrhea remain a serious health concern for young children. In the U.S., rotaviral disease has been associated with approximately 50,000 hospitalizations and at least 20 deaths per year.

CDC has announced the start of a national education program to help parents manage severe diarrhea in children, the most serious complication of rotaviral illness. Education efforts will include outreach to parents through their health care providers and directly to parents through popular media such as parent magazines and radio public service announcements in English and Spanish. Parents are urged to learn steps to relieve diarrheal symptoms in their children. Most importantly, parents are urged to learn the signs that their child may be suffering from severe dehydration from diarrhea and needs immediate medical care. Signs of severe dehydration in children include crying without tears, sunken eyes, unusual drowsiness or fussiness, and dry, sticky mouth.

Cases of Selected Notifiable Diseases Reported in Virginia*

Disease	Total Cases Reported, August 1999: State	Regions: NW	N	SW	C	E	Total Cases Reported Statewide, January through August: This Year	Last Year	5 Yr Avg
AIDS	95	16	24	2	37	16	558	630	751
Campylobacteriosis	70	20	10	10	14	16	437	452	454
E. coli O157:H7	10	2	5	0	1	2	45	51	40
Giardiasis	62	12	23	6	10	11	261	252	219
Gonorrhea	740	27	59	52	301	301	6342	5520	6531
Hepatitis A	6	1	3	1	0	1	103	153	130
B, acute	5	1	1	1	0	2	63	72	82
C/NANB, acute	0	0	0	0	0	0	10	10	13
HIV Infection	109	9	23	2	60	15	545	579	675
Lead in Children†	57	4	6	9	23	15	257	379	445
Legionellosis	1	0	0	0	0	1	17	16	13
Lyme Disease	28	4	17	1	3	3	76	43	50
Measles	0	0	0	0	0	0	3	2	1
Meningococcal Infection	3	0	1	0	0	2	35	26	41
Mumps	0	0	0	0	0	0	8	5	15
Pertussis	0	0	0	0	0	0	13	10	24
Rabies in Animals	40	15	11	6	5	3	344	396	346
Rocky Mountain Spotted Fever	4	1	1	1	1	0	4	8	15
Rubella	0	0	0	0	0	0	0	0	1
Salmonellosis	189	21	47	33	48	40	851	650	670
Shigellosis	17	2	12	1	1	1	75	128	318
Syphilis, Early§	47	0	4	22	6	15	271	286	614
Tuberculosis	30	1	12	3	9	5	186	188	216

Localities Reporting Animal Rabies This Month: Augusta 1 raccoon; Clark 1 skunk; Craig 1 raccoon; Cumberland 1 raccoon; Dinwiddie 1 raccoon; Fairfax 2 cats, 2 foxes, 5 raccoons; Fauquier 1 raccoon; Floyd 1 raccoon; Fluvanna 1 raccoon; Frederick 1 fox; Hanover 1 skunk; Henrico 2 raccoons; King George 2 skunks; Louisa 1 raccoon; Lynchburg 1 fox; Middlesex 1 raccoon; Montgomery 1 bobcat, 1 skunk; Newport News 1 cat; Orange 1 raccoon; Page 1 raccoon, 1 skunk; Prince William 1 fox, 1 raccoon; Stafford 1 raccoon, 2 skunks; Suffolk 1 fox; Warren 1 raccoon; Wythe 1 bat.
Occupational Illnesses: Asbestosis 24; Lead Exposure 9; Pneumoconiosis 7; Silicosis 1.
*Data for 1999 are provisional. †Elevated blood lead levels ≥10µg/dL.
§Includes primary, secondary, and early latent.

In July, the Public Health Service recommended to parents and health care providers that they postpone use of Rotashield as a precautionary measure following reports from its early alert system of intussusception among some infants following rotavirus vaccination. Also at that time, the manufacturer, in consultation with the FDA, voluntarily ceased distribution of the vaccine and last week, withdrew the vaccine from the U.S. market. Experts agree that continued research is needed to clarify the relationship between intussusception and this rotavirus vaccine and to develop new vaccines against this disease.

Most importantly, health care providers should reassure parents that continued immunization of children against other life-threatening diseases is critical to prevent illness and disease outbreaks. Overall, vaccines are one of the safest and most effective medical interventions of our time, and the decision to immunize children against diseases like polio, whooping cough, bacterial meningitis and diphtheria is a sound one. For more information about vaccines, contact CDC's National Immunization Information Hotline at 1-800-232-2522 (English) or 1-800-232-0233 (Spanish). For more information about managing diarrhea in children, visit CDC's website at www.cdc.gov.

Cases of Selected Notifiable Diseases Reported in Virginia*

Disease	Total Cases Reported, September 1999: State	Regions: NW	N	SW	C	E	Total Cases Reported Statewide, January through September: This Year	Last Year	5 Yr Avg
AIDS	78	3	27	4	20	24	636	716	855
Campylobacteriosis	50	11	9	7	9	14	487	506	530
***E. coli* O157:H7**	13	4	2	5	1	1	58	54	46
Giardiasis	55	13	22	6	7	7	316	298	261
Gonorrhea	582	21	37	179	152	193	6924	7018	7638
Hepatitis A	16	3	11	1	1	0	119	163	150
B, acute	6	3	1	0	2	0	69	79	93
C/NANB, acute	0	0	0	0	0	0	10	11	16
HIV Infection	96	1	35	7	27	26	637	635	768
Lead in Children†	57	7	5	15	17	13	319	476	541
Legionellosis	7	2	2	2	0	1	24	16	14
Lyme Disease	18	3	7	2	5	1	94	50	59
Measles	0	0	0	0	0	0	3	2	2
Meningococcal Infection	5	1	0	3	1	0	40	28	45
Mumps	0	0	0	0	0	0	8	6	17
Pertussis	0	0	0	0	0	0	17	19	32
Rabies in Animals	62	16	18	7	10	11	406	439	402
Rocky Mountain Spotted Fever	0	0	0	0	0	0	12	9	22
Rubella	0	0	0	0	0	0	0	0	1
Salmonellosis	136	25	32	13	49	17	987	775	817
Shigellosis	19	0	14	2	0	3	94	144	361
Syphilis, Early§	16	0	0	8	3	5	287	318	689
Tuberculosis	28	3	13	1	1	10	221	223	243

Localities Reporting Animal Rabies This Month: Accomack 2 raccoons; Alexandria 1 raccoon; Appomattox 1 raccoon; Arlington 1 raccoon; Augusta 1 cow; Bath 2 skunks; Bedford 1 skunk; Charles City 1 fox; Chesapeake 1 fox, 1 raccoon; Chesterfield 1 raccoon; Cumberland 1 raccoon, 1 skunk; Fairfax 1 fox, 5 raccoons, 2 skunks; Fauquier 1 raccoon, 1 skunk; Gloucester 1 raccoon; Halifax 2 raccoons; Hanover 2 raccoons; Henrico 1 raccoon; Loudoun 1 fox, 2 raccoons; Mathews 1 raccoon; Mecklenburg 1 raccoon; Middlesex 1 raccoon; Montgomery 1 cat, 1 groundhog, 1 raccoon, 1 skunk; Nelson 1 skunk; Newport News 1 raccoon; Northampton 1 raccoon; Orange 1 raccoon; Page 1 cat, 1 raccoon, 1 skunk; Pittsylvania 1 raccoon; Prince William 4 raccoons, 1 skunk; Rockbridge 1 skunk; Rockingham 1 raccoon; Shenandoah 1 skunk; Spotsylvania 1 skunk; Stafford 1 bat, 1 skunk; Virginia Beach 1 cat; Westmoreland 1 cat.

Occupational Illnesses: Asbestosis 6; Lead Exposure 15; Pneumoconiosis 13.

*Data for 1999 are provisional. †Elevated blood lead levels ≥10µg/dL.

§Includes primary, secondary, and early latent.

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