

VIRGINIA EPIDEMIOLOGY BULLETIN

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The Detection and Treatment of Early Stage Breast Cancer, Virginia, 1986-1995

Introduction

Breast cancer is the most commonly diagnosed cancer in women. Over 3,500 Virginia women are diagnosed each year with this disease.¹ The early detection of breast cancer is important for improving prognosis, in terms of both length and quality of life. The purpose of this article is to assess how well we are doing in Virginia with diagnosing breast cancers in the early stages and to describe the treatment patterns for women with early stage breast cancer.

Early detection is achievable by adherence to the American Cancer Society recommendations that all women practice monthly breast self-examination starting at 20 years of age and continuing for life; receive breast clinical examination also starting at 20 years of age with the frequency of every three years up to age 40 and yearly from 40 years of age and older; and undergo annual mammography starting at 40 years of age.²

A measure that is used to identify whether cancers are being detected early is called stage of cancer at diagnosis. Staging cancer helps physicians plan the treatment for each patient, evaluate the treatment, and evaluate the outcome of the treatment, such as patient survival. One staging system that is used is the National Cancer Institute's Sum-



mary Stage. In that system, cancers are designated as in situ, local, regional, or distant. In situ means that the cancer has been detected as early as possible, before the tumor has penetrated surrounding tissue. A tumor in the local stage means that the invasive tumor remains confined to the site of origin. Regional stage applies when the tumor has spread by direct extension to immediately adjacent organs or tissues and/or metastasized to regional

lymph nodes but no further. Distant stage cancers have spread by direct extension beyond the immediately adjacent organs or tissues and/or metastasized to distant lymph nodes or other distant tissues.

The National Cancer Institute (NCI) has published recommended treatment protocols for breast cancer.³ Recommendations for the treatment of early (in situ and local) stage breast cancer are summarized below. The treatment of carcinoma in situ of the breast depends on whether the cancer is of ductal or lobular histology. Lobular carcinoma in situ (LCIS) is usually an incidental finding when a biopsy is conducted for another abnormality. LCIS is a risk factor for invasive cancer. The NCI-recommended treatment for LCIS is either no treatment other than careful observation or bilateral prophylactic mastectomies. Axillary lymph node dissection is not necessary.

For intraductal carcinoma in situ (DCIS), partial mastectomy and breast irradiation is an acceptable alternative to total/simple mastectomy. No role for chemotherapy has been defined, and hormonal therapy is under clinical evaluation. For local stage breast cancer, the treatment depends on the location and size of the tumor, breast size, patient age, appearance of the mammogram, and how the patient feels about breast conservation. Surgical treatment options include breast conserving surgery, such as partial mastectomy with axillary lymph node dissection and radiation therapy, or modified radical mastectomy. The use of adjuvant chemotherapy and/or tamoxifen depends on multiple factors including patient age, tumor size, axillary lymph node status, and the estrogen receptor status of the tumor.

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Methods

All hospitals, clinics, and independent pathology laboratories are required to report cancers diagnosed and/or treated in Virginia to the Virginia Cancer Registry. Reporting to the registry has been mandatory since 1990; before that it was done on a voluntary basis. As of July 1998, physicians are required to report cases that are not reported by any of the other reporting sources, e.g., cases that are not hospitalized and whose pathology is read by an out-of-state laboratory or a physician's office laboratory.

This study analyzed data on breast cancer cases reported to the Virginia Cancer Registry from 1986 through 1995. The study population was limited to females age 17 years or older who were residents of Virginia at the time they were reported to the registry. The analysis included an assessment of percentage of cases detected in the in situ or local stages, and thus considered early stage disease according to the NCI summary staging system, and a description of the trends in treating early stage breast cancer by stage and histology.

Results

During the ten year study period, 35,106 cases of female breast cancer were reported to the Virginia Cancer Registry, with the number reported per year ranging from 2,442 cases reported in 1986 to 4,361 in 1995. The average age at diagnosis was 60 years, with a range of 17 to 106 years. Approximately one-fourth (27.2%) of the women reported with breast cancer were under 50 years of age.

The most common histologic type of cancer was infiltrating ductal carcinoma, responsible for 64.2% of all cases. The second most common type was non-infiltrating intraductal carcinoma (8.1%), followed by lobular carcinoma (6.9%). Adenocarcinoma was the histologic type of 3.2% of cases.

American Cancer Society Recommendations for the Early Detection of Breast Cancer

Population			
Test or Procedure	Sex	Age	Frequency
Breast self-examination	Female	20 and over	Every month
Breast clinical examination	Female	20 - 40	Every 3 years
		Over 40	Every year
Mammography	Female	40 and over	Every year

noma (6.9%). Adenocarcinoma was the histologic type of 3.2% of cases.

Early Detection

Overall, 12.7% of the reported cases were detected in the in situ stage, 51.5% as local stage, 26.0% as regional, 4.9% as distant, and 4.9% were of unknown stage.

Some regional variation was observed across the state, as shown in Figure 1. In the northern health planning region, 66.8% of the

breast cancers were detected early, i.e., in situ and local stage. This was followed by 65.2% in the northwest region, 64.1% in the central region, 63.5% in the eastern region, and 61.7% in the southwest region ($\chi^2 = 45.93$, $p < .0001$).

Early detection also occurred more often in older women. Only 59.8% of the cancers in women under 50 years of age were detected early compared to 64.8% in women age 50-64 years, 68.3% in women age 65-74, and 64.7% in women age 75

years or older ($\chi^2 = 145.38$, $p < .0001$). For all women age 50 years or older, 65.9% of the breast cancers were detected early, which is significantly more than the proportion of breast cancers detected early in younger women ($\chi^2 = 163.97$, $p < .0001$).

The percent of breast cancers detected early was relatively stable over the ten years, as illustrated in Figure 2. In situ cases represented from 10.9% to 14.1% of the total from 1986-1995. Early stage disease, including in situ and local stage cancers, ranged from 57.6% to 66.9% of reported female breast cancer cases per year.

Treatment

LCIS — Lobular carcinoma in situ was diagnosed in 663 Virginia women between 1986 and 1995. Of these, 101 (15.2%) had no treatment recorded. The percentage of women with LCIS who had no treatment recorded was 8.0% in 1986. This increased to 25.0% in 1994, then decreased to 11.5% in 1995. Most cases of LCIS (510 cases, 76.9%) were treated with surgery only. An additional 5.9% were treated with surgery plus chemotherapy, surgery plus hormonal therapy, or surgery plus radiation. Further assessment was done on the patients who received surgery as their only treatment.

Over the entire ten year period, the most common surgical procedure for LCIS was modified radical mastec-

Figure 1
Percent of Breast Cancer Cases Detected Early, by Region, 1986-1995

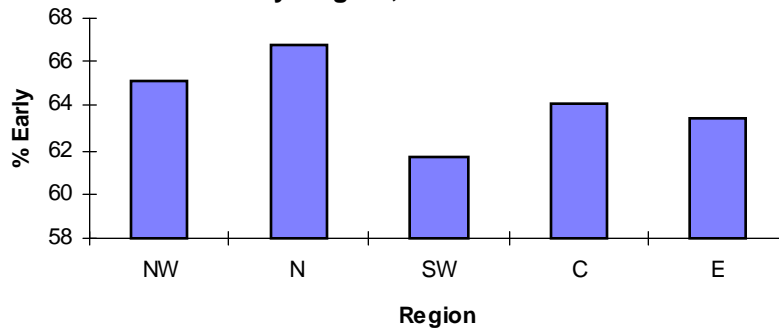


Figure 2
Trend in Early Detection of Breast Cancer, Virginia, 1986-1995

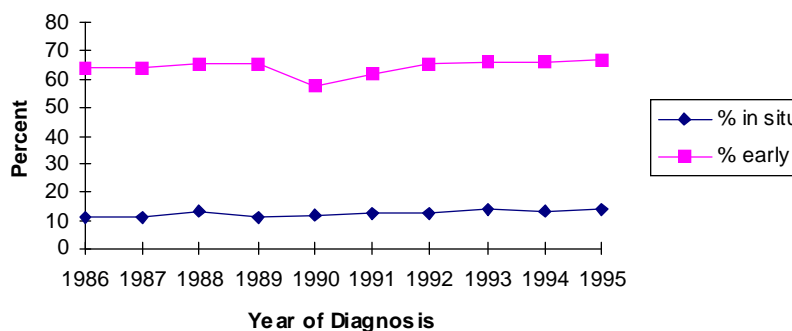
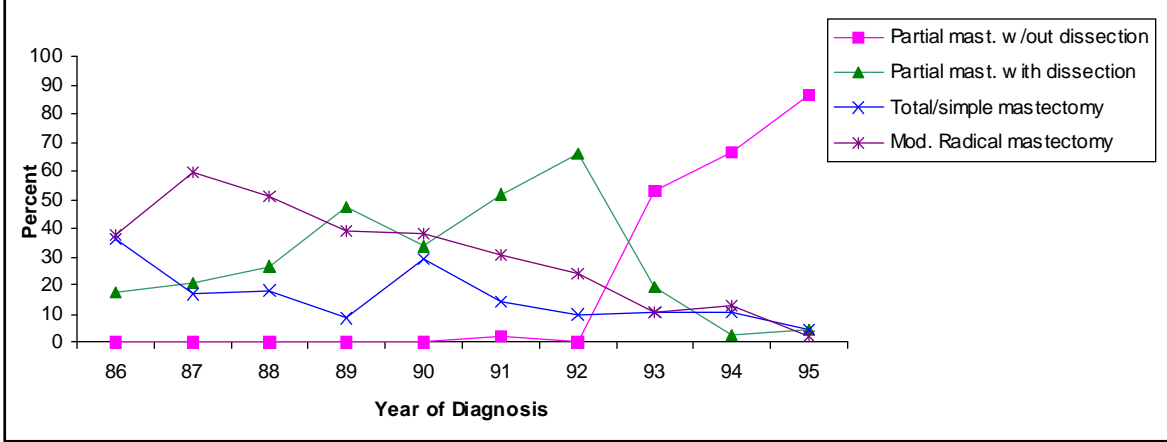


Figure 3. Trends in Surgical Treatment for Lobular Carcinoma In situ of the Breast, Virginia, 1986-1995



tomy (163 cases, 32.0%), followed by partial mastectomy with node dissection (150 cases, 29.4%), partial mastectomy without node dissection (91 cases, 17.8%), and total/simple mastectomy (84 cases, 16.5%).

The use of these surgical procedures was not stable over the ten year study period, as shown in Figure 3. A steady decrease was observed in the percentage of LCIS cases treated with modified radical mastectomy, from a high of 59.3% in 1987 to 2.2% in 1995. A reduction in the use of total/simple mastectomy was also observed, from 35.9% in 1986 to 4.4% in 1995. Partial mastectomy with node dissection rose from 17.2% in 1986 to 66.0% in 1992 and then dropped to 4.4% thereafter. Partial mastectomy without node dissection was used in only one case from 1986 through 1992 but then became the most common form of surgical treatment for LCIS from 1993 through 1995. It should be noted that excisional biopsies are included in the partial mastectomy category.

These results should be interpreted with caution. It may be that many cases of LCIS are not reported to the Virginia Cancer Registry and that those that are reported are those that receive surgical treatment. That is, selection bias may exist in these data on LCIS.

DCIS — The most common histologic type of in situ breast cancer was intraductal carcinoma in situ, accounting for 2,833 cases. Of these, 2,663 (94.0%) received treatment; 1,958 (73.5%) received surgery only, 504 received surgery and radiation, and 48 re-

ceived surgery and radiation plus some other therapy, such as hormonal or chemotherapy. Selecting the 2,510 patients who received either surgery alone or surgery plus radiation with or without additional therapy, a further assessment of trends in surgical treatment and the use of radiation therapy was conducted.

Figure 4 demonstrates the changes in the surgical treatment of DCIS from 1986-1995. The main features of the figure are the decrease in the use of modified radical mastectomy and the corresponding increase in the use of partial mastectomy without node dissection during the last three years of the study period. The use of partial mastectomy with node dissection rose from 1988-1992, but decreased after that. It was the least common surgery performed for DCIS in 1994 and 1995.

The use of radiation therapy for DCIS increased over the study period. The percent of patients treated with radiation rose from 7.4%

in 1986 to 31.3% in 1995. Almost all (93.3%) of the women who received radiation therapy also had a partial mastectomy. On the other hand, only about one-half of the women who underwent a partial mastectomy received radiation therapy. This percentage of women surgically treated with partial mastectomy who also received radiation therapy did not change very much over the ten year period, going from 45.8% in 1986 to 53.1% in 1995 (χ^2 for trend = 3.2, $p = .08$).

Local Stage — From 1986-1995, 18,096 women with local stage breast cancer were reported to the Virginia Cancer Registry. The histologic types of these cancers are listed in Table 1, which shows that infiltrating ductal carcinoma was by far the most common (73.3%). This is consistent with the distribution of histologic cell type of local stage disease reported in the National Cancer Data Base of the American College of Surgeons in which 74.3% were infiltrating ductal carcinomas.⁴

Treatment combinations used to treat women with local breast cancer are presented in Table 2. Two-thirds of the women received either surgery only or surgery plus radiation. Of note, women age 50 years and older were more likely to be treated with surgery only compared to women under age 50 (53.7% vs. 38.4%, respectively [$\chi^2 = 309.06, p < .0001$]) while women in the younger age category were slightly more likely to receive surgery plus radiation (18.4% of women under 50 years of age compared to 16.7% of women

Figure 4. Trends in Surgical Treatment of Intraductal Carcinoma In situ of the Breast, Virginia, 1986-1995

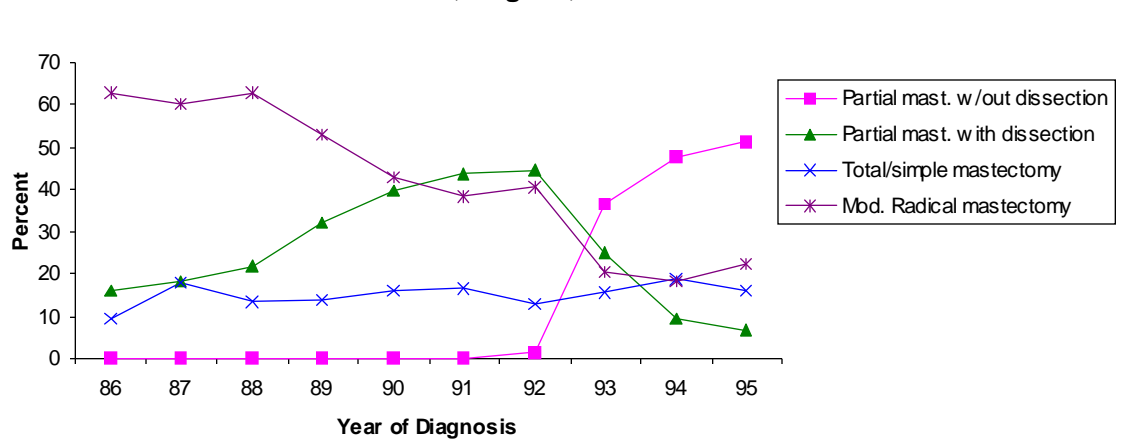


Table 1. Histologic Type Reported for Local Stage Breast Cancer Patients, Virginia, 1986-1995

Histology	# Cases	% Cases
Infiltrating Ductal Carcinoma	13270	73.3
Adenocarcinoma, NOS*	465	2.6
Tubular Adenocarcinoma	390	2.2
Mucinous Adenocarcinoma	580	3.2
Comedocarcinoma	346	1.9
Medullary Carcinoma	314	1.7
Lobular Carcinoma, NOS*	1447	8.0
Infiltrating Ductal & Lobular Carcinoma	265	1.5
Other	1019	5.6
TOTAL	18096	100.0

*Not otherwise specified.

age 50 or older [$\chi^2 = 7.45, p < .01$]). The younger age group was also more likely to be treated with surgery plus chemotherapy or a combination of surgery, radiation, and chemotherapy than the older age group. Women age 50 or older were more likely to receive hormonal therapy in addition to surgery.

Further analysis was conducted of trends in surgical treatment over the ten year period for women who received either surgery alone or surgery plus radiation. Figure 5 illustrates the decline in the use of modified radical mastectomy, an increase in recent years in partial mastectomy without node dissection, and an increase in partial mastectomy with node dissection. From 1986 to 1995, the use of partial mastectomy with node dissection increased from 26.1% to 46.1% in women under 50 years of age and from 17.7% to 32.9% in women age 50 or older.

The percentage of women with local stage breast cancer whose only recorded treatment was surgery decreased from 73.4% in 1986 to 34.1% in 1995. The use of surgery plus radiation increased only slightly during this period (17.7% in 1986 to 21.9% in 1995). Greater increases were observed for surgery plus hormonal therapy (1.8% in 1986 to 13.1% in 1992 then down

to 9.3% in 1995), and the combination of surgery, radiation, and hormonal therapy (0.8% in 1986 to 13.7% in 1995). Increases were also noted in other treatment combinations such as surgery plus chemotherapy and surgery, radiation, and chemotherapy combined.

Discussion

The major improvement in the early detection of breast cancer most likely occurred prior to the study period. Although little improve-

ment was identified between 1986 and 1995 in the percent of cases diagnosed early, by 1995 two-thirds of all cases of breast cancer in women were detected early. Having that large a proportion of any type of cancer diagnosed in the early stages is a measure of success.

Changes demonstrated in the treatment of early stage breast cancer in Virginia indicate that the trend has been toward less aggressive surgeries, a trend that has also been reported at the national level. For example, the National Cancer Data Base reported that from 1985 to

1995 the use of partial mastectomy increased from 8.9% to 17.0%, partial mastectomy with axillary node dissection increased from 13.1% of cases to 28.7%, and modified radical mastectomy declined from 56.5% to 42.8%, while no change was seen in the use of total/simple mastectomy.⁴

In Virginia, the percentage of women with LCIS who underwent modified radical or total/simple mastectomy decreased. Based on current treatment recommendations, it seems likely that the increased use of partial mastectomy/excisional biopsy without axillary node dissection will continue.

The treatment trends for DCIS appear to be consistent with the recommendations of the NCI. That is, a decrease was observed in the use of modified radical or total/simple mastectomy with a concomitant increase in the use of partial mastectomy and of radiation.

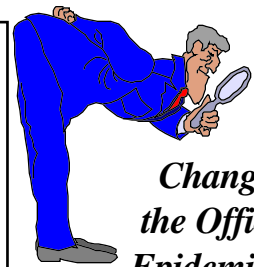
For patients with invasive breast cancer who have localized disease at the time of diagnosis, there has also been a decrease in modified radical or total/simple mastectomy and an increase in partial mastectomy, both with and without axillary lymph node dissection. More combination therapy is being used for local stage breast cancer in recent years. In fact, more combination therapy is probably being used than is reflected in the data. Out-patient treatments may not be captured fully in central cancer registry data. Thus, the use of hormonal therapy and chemotherapy are likely under-represented in this report.

Some further limitations in cancer registry data must be noted. One is the unavailability of data on American Joint Commis-

Table 2. Treatment Combinations Used for Local Stage Breast Cancer, Virginia, 1986-1995

Treatment Type	All Women*		Age < 50		Age 50+	
	# Cases	% Cases	# Cases	% Cases	# Cases	% Cases
Surgery Only	9047	50.0	1669	38.4	7370	53.7
Surgery & Radiation	3093	17.1	801	18.4	2289	16.7
Surgery & Chemotherapy	909	5.0	595	13.7	313	2.3
Surgery & Hormonal Therapy	1721	9.5	116	2.7	1605	11.7
Surgery, Radiation, & Chemotherapy	782	4.3	560	12.9	221	1.6
Surgery, Radiation, & Hormonal	1331	7.4	175	4.0	1155	8.4
No Treatment	362	2.0	94	2.2	268	1.9
All Other Treatments	851	4.7	336	7.7	515	3.7
TOTAL	18096	100.0	4346	100.0	13736	100.0

*The number of cases <50 plus the number of cases 50+ may not equal the total for all women because age information is missing for some women.



Changes in the Office of Epidemiology

Robert B. Stroube, M.D., M.P.H., was appointed as Office Director on October 1, 1998, and was welcomed by friends and co-workers throughout Main Street Station. No stranger to VDH, he was most recently the Health

Director for Fairfax County Health Department.

Susan F. Davis, M.D., joined us in mid-November as a Medical Epidemiologist. She comes to us from the CDC and the New Hampshire Division of Public Health and brings experience in acute and chronic disease epidemiology.

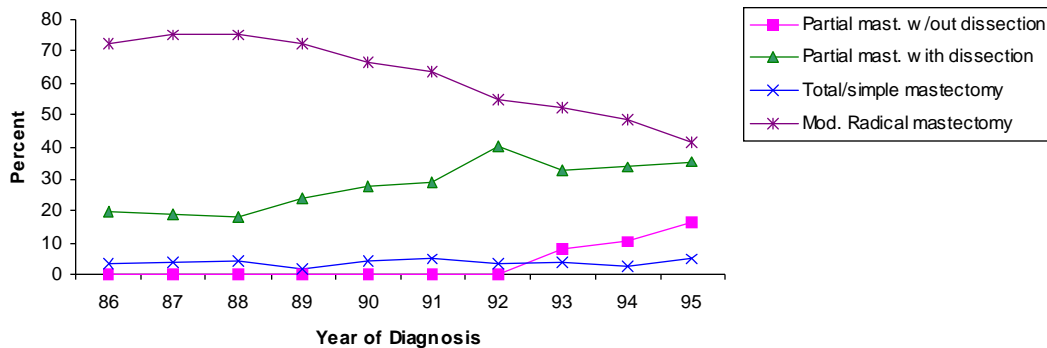
The Virginia Cancer Registry recently got a new director when **Amy M. Pugh, M.A.**, was appointed to that role. Amy has been the Statistical Analysis Coordinator for the Cancer Registry since 1996.

The Division of Tuberculosis Control also has a new Director, **Lex P. Gibson**, who has served the state in tuberculosis control at the local, regional and state levels for 22 years.

Ram K. Rao, M.D., Ph.D., became the Medical Director for the Division of Tuberculosis Control in July. Most recently he served as a Fellow in Pulmonary and Critical Medicine at Washington University School of Medicine in Missouri where he also started and co-directed the Clinic for Mycobacterial Diseases.

Please join us in welcoming these professionals to the Office of Epidemiology!

Figure 5. Type of Surgery Used for Local Stage Breast Cancer, Virginia, 1986-1995



sion on Cancer (AJCC) stage, which provides more specific detail on tumor size, nodal involvement, and metastasis. The use of this staging system has been phased in over the study period and is still not in use by all facilities reporting cancer. Another limitation is that surgery codes do not allow excisional biopsy to be analyzed separately from partial mastectomy.

The data in the registry are not population-based prior to 1990. Reporting was done on a voluntary basis, and the cases reported in the early years of the registry's history may not be representative of all breast cancers occurring in Virginia. Tumor size and estrogen receptor status are also not reported in a manner that is consistent enough to allow the assessment of treatment patterns based on these data elements. Improved reporting of these data would be helpful in the evaluation of treatments, especially for women with local stage breast cancer.

In spite of these limitations, data from the Virginia Cancer Registry may be used to as-

sess trends and patterns of care. Everyone involved in cancer care and control needs to ensure that access to clinical breast examination and mammography is maximized so that breast cancer will be diagnosed early as often as possible. Familiarity with current treatment guidelines will help ensure that the best available care is provided to breast cancer patients in Virginia.

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1. Virginia Cancer Registry, Cancer Incidence in Virginia, 1990-1994.
2. American Cancer Society's Web Site, www.cancer.org.
3. NCI's PDQ® Treatment Summaries for Health Professionals, available on the Internet at <http://cancernet.nci.nih.gov/>.
4. National Cancer Data Base Web site, www.facs.org/about_college/acsdept/cancer_dept/programs/ncdb/ncdb.html.

Submitted by C. Diane Woolard, PhD, Director, Division of Surveillance and Investigation, Virginia Department of Health with thankful acknowledgment of input from Roger Perry, M.D., Bonita Bryant, C.T.R., and Richard Glazier, M.D.

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Cases of Selected Notifiable Diseases Reported in Virginia*

Disease	Total Cases Reported, November 1998						Total Cases Reported Statewide, January through November		
	State	Regions					This Year	Last Year	5 Yr Avg
		NW	N	SW	C	E			
AIDS	73	9	6	3	8	47	881	1044	1192
Campylobacteriosis	40	9	23	2	2	4	631	576	654
Giardiasis	46	9	17	6	7	7	432	415	330
Gonorrhea	731	30	45	63	147	446	8348	7936	9738
Hepatitis A	14	4	6	2	1	1	195	212	178
Hepatitis B	4	0	2	2	0	0	92	117	121
Hepatitis NANB	0	0	0	0	0	0	11	25	26
HIV Infection	58	6	11	5	10	26	753	874	868
Influenza	2	0	0	0	0	2	1104	487	666
Legionellosis	2	2	0	0	0	0	20	26	20
Lyme Disease	7	0	2	1	0	4	65	61	72
Measles	0	0	0	0	0	0	2	1	2
Meningitis, Aseptic	28	8	6	6	0	8	217	231	357
Meningitis, Bacterial†	8	0	1	4	1	2	49	80	85
Meningococcal Infections	7	1	0	4	1	1	43	58	57
Mumps	0	0	0	0	0	0	8	18	27
Pertussis	6	5	0	1	0	0	37	52	55
Rabies in Animals	29	7	10	5	2	5	519	637	476
Rocky Mountain Spotted Fever	1	0	1	0	0	0	14	22	27
Rubella	0	0	0	0	0	0	1	1	1
Salmonellosis	74	13	20	13	13	15	1018	988	1042
Shigellosis	10	3	4	1	1	1	186	402	532
Syphilis, Early‡	18	0	4	1	6	7	360	581	973
Tuberculosis	29	2	13	0	5	9	280	305	317

Localities Reporting Animal Rabies This Month: Amherst 1 skunk; Appomattox 1 raccoon; Arlington 2 raccoons; Chesapeake 1 fox; Fairfax 4 raccoons, 2 skunks; Fauquier 1 skunk; Goochland 1 skunk; Halifax 1 raccoon; James City 1 raccoon; King William 1 cat; Loudoun 2 skunks; Middlesex 1 fox; Montgomery 1 skunk; Newport News 1 raccoon; Page 1 cat, 1 skunk; Pittsylvania 1 skunk; Radford 1 skunk; Rockbridge 1 skunk; Shenandoah 1 raccoon; Spotsylvania 1 fox; Stafford 1 skunk.

Occupational Illnesses: Asbestosis 45; Carpal Tunnel Syndrome 38; De Quervain's Syndrome 2; Hearing Loss 13; Lead Poisoning 2; Mercury exposure 1; Mesothelioma 1; Pneumoconiosis 14.

*Data for 1998 are provisional.

†Other than meningococcal. ‡Includes primary, secondary, and early latent.

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