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Blastomycosis Outbreak—Virginia

On March 23, 1984 a physician reported that he was treating two hospitalized young men with probable blastomycosis. These two patients were close friends and had both experienced onset of fever and cough during the first week of March. This physician learned that a mutual male friend of both patients had been admitted to another hospital with pneumonia unresponsive to antibiotics. All three were avid raccoon hunters from southeastern Virginia. When hunting they were usually accompanied by a fourth male companion; he was subsequently examined, found to have radiographic evidence of pneumonia, and hospitalized for treatment.

All four patients were diagnosed as having blastomycosis based on clinical and radiographic findings; for three of the four, *Blastomyces dermatitidis* was confirmed in bronchial washings by direct smear and/or culture.

On March 26, 1984 a veterinarian reported that he was treating one of the six hunting dogs used by the four patients described above. This dog had radiographic evidence of pneumonia, had onset of illness in mid-March and was suffering, he felt certain, from blastomycosis. Over the past 15 years he had confirmed the diagnosis of blastomycosis in several other dogs belonging to the owner of the dog he was currently treating.

An investigation was initiated and is still continuing to determine the extent and source of this outbreak. Preliminary findings indicate that several of the hunting dogs used by these patients did, in fact, have blastomycosis. Pending are the results of environmental cultures for *B. dermatitidis* taken from a wooded area where they last went hunting on February 24, 1984. A matched case-control study is being conducted to test the hypothesis that, in this outbreak, raccoon hunting led to exposure to the fungus, and to examine other possible risk factors for acquisition of disease.

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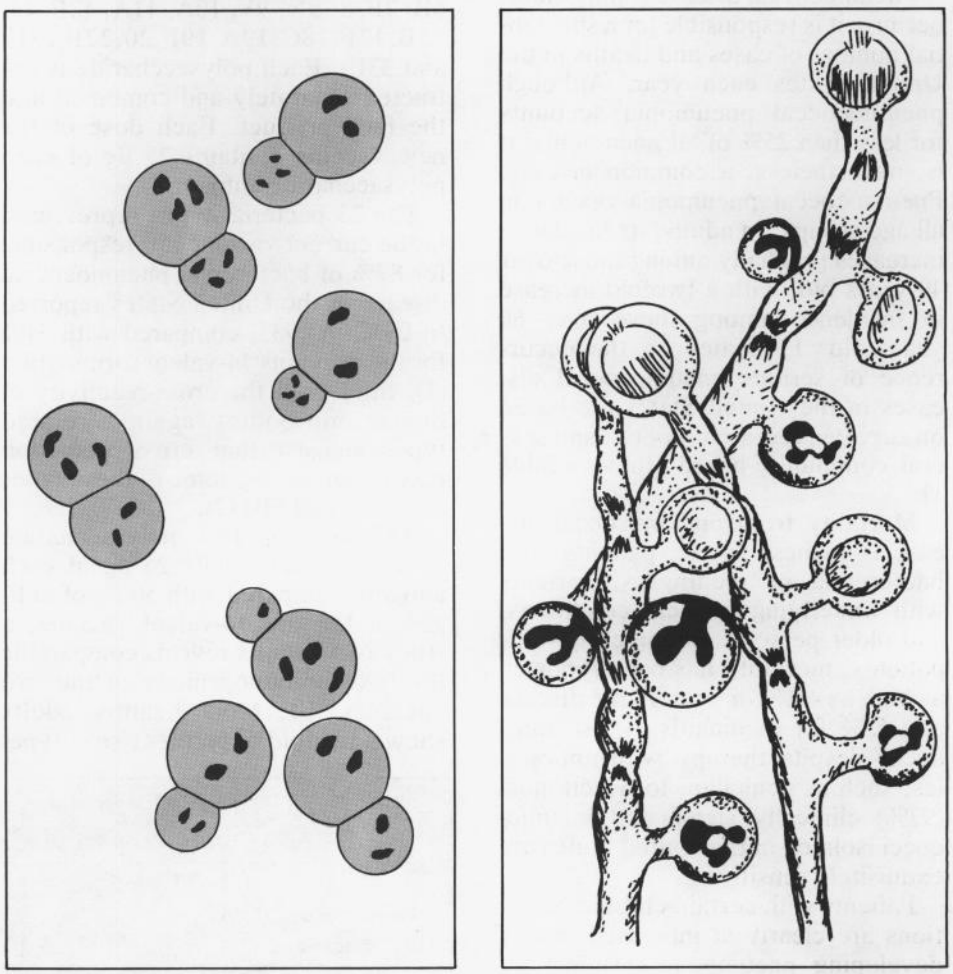
Figure 1. Schematic diagram of the dimorphic fungus Blastomyces dermatitidis.



In clinical material and in cultures incubated at 37° C it exists in yeast form, shown on the left (cells reproduce by budding). At room temperature, growth on culture is in the mycelial phase, shown on the right.

Update: Pneumococcal Polysaccharide Vaccine Usage—United States

These recommendations of the Immunization Practices Advisory Committee of the U.S. Public Health Service update the previous statement on pneumococcal polysaccharide vaccine (Virginia Epidemiology Bulletin *1981; 81, #10) to include current information and practices.*

Introduction

A 23-valent polysaccharide vaccine against disease caused by *Streptococcus pneumoniae* (pneumococcus) was licensed in the United States in 1983. It replaces the 14-valent polysaccharide vaccine licensed in 1977. This statement includes new data that have become available about pneumococcal vaccine and its effectiveness and new recommendations regarding its use for selected persons and groups.

Pneumococcal Disease

Pneumococcal disease is important, because it is responsible for a substantial number of cases and deaths in the United States each year. Although pneumococcal pneumonia accounts for less than 25% of all pneumonia, it is, nevertheless, a common disease. Pneumococcal pneumonia occurs in all age groups. In adults, its incidence increases gradually among those over 40 years old, with a twofold increase in incidence among those over 60 years old. Estimates on the occurrence of serious pneumococcal diseases in the United States are based on surveys, research reports, and several community-based studies (Table 1).

Mortality from pneumococcal disease is highest among patients with bacteremia or meningitis, patients with underlying medical conditions, and older persons. In some high-risk patients, mortality has been reported as high as 40% for bacteremic disease and 55% for meningitis. These rates occur despite therapy with antibiotics, such as penicillin, to which most (97%) clinically significant pneumococci isolated in the United States are exquisitely sensitive.

Patients with certain chronic conditions are clearly at increased risk of developing pneumococcal infection, as well as experiencing more severe pneumococcal illness. These conditions include: sickle cell anemia, Hodgkin's disease, multiple myeloma, cirrhosis, alcoholism, nephrotic syndrome, renal failure, chronic pulmonary disease, splenic dysfunction, and history of splenectomy or organ transplant. Other patients may be at greater risk of developing pneumococcal infection or having more severe illness because of diabetes mellitus, congestive heart failure, or conditions associated with immunosuppression. Patients with cerebrospinal fluid (CSF) leakage complicating skull fractures or neurosurgical procedures can have recurrent pneumococcal meningitis.

Pneumococcal Polysaccharide Vaccines

The new pneumococcal vaccine is composed of purified, capsular polysaccharide antigens of 23 types of *S. pneumoniae* (Danish types, 1,2,3,4,5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B,17F,18C,19A,19F,20,22F,23F, and 33F). Each polysaccharide is extracted separately and combined into the final product. Each dose of the new vaccine contains 25 μg of each polysaccharide antigen.

The 23 bacterial types represented in the current vaccine are responsible for 87% of bacteremic pneumococcal disease in the United States reported to CDC in 1983, compared with 71% for the previous 14-valent formulation (*1*). Studies of the cross-reactivity of human antibodies against related types suggest that cross-protection may occur among some of these types (e.g., 6A and 6B) (*2*).

Although the new polysaccharide vaccine contains only 25 μg of each antigen, compared with 50 μg of antigen in the old 14-valent vaccine, a study of 53 adults reveals comparable levels of immunogenicity of the two vaccines (*3*). Most healthy adults show a twofold or greater rise in type-specific antibody, as measured by radioimmunoassay, within 2-3 weeks after vaccination. In contrast, the vaccine is generally less antigenic for children under 2 years old than for other vaccinees. However, because the precise protective titers of antibody for any of these serotypes have not been established, measuring antibody levels in vaccinated persons is not indicated.

Effectiveness of Pneumococcal Polysaccharide Vaccines

In the 1970s, two randomized, controlled trials were conducted in populations with a high incidence of disease in South Africa and New Guinea using newly formulated pneumococcal vaccine (*4,5*). Both studies demonstrated significant reductions in the occurrence of pneumonia in these young, healthy populations.

It should be noted, however, that two randomized, controlled trials of pneumococcal vaccine in older-aged U.S. adults showed less satisfactory results (*6*). One was of outpatients over 45 years old; the other, of inpatients of a chronic-care psychiatric facility. In neither study was there any difference in the occurrence of respiratory morbidity and mortality between those vaccinated with a polyvalent pneumococcal vaccine and those given a placebo. In the first study, data suggested some vaccine protection against bacteremic pneumococcal disease, but the incidence of pneumococcal disease was low and may not have enabled a valid assessment of vaccine efficacy. In the other study, there were no fewer cases of radiologically diagnosed pneumonia among vaccinees than among controls.

Another method for estimating the efficacy of pneumococcal vaccine compares the distribution of serotypes of pneumococci isolated from

TABLE 1. Current estimated occurrence of serious pneumococcal disease—United States

Pneumococcal disease	Estimated cases (1,000s/yr)	Estimated incidence (per 100,000 pop/yr)	Estimated case-fatality ratio (%)
Pneumonia	150-570	68-260	5
Bacteremia	16-55	7-25	20
Meningitis	2.6-6.2	1.2-2.8	30

the blood of vaccinated and unvaccinated persons (*9*). Recent data obtained by this method are based on comparing 210 *S. pneumoniae* isolates from the blood of persons who received the 14-valent vaccine with 1,475 blood isolates from unvaccinated persons. These data show that among persons over 60 years old with no underlying illness or no chronic pulmonary disease, chronic heart disease, or diabetes mellitus, the estimated efficacy ranges between 60% and 80%. However, among persons with cirrhosis or renal failure, the estimated efficacy appears to be lower.

In another recent study, controls were matched to 90 patients with systemic evidence of pneumococcal infection (isolates from blood, CSF, or other normally sterile body fluids) (*10*). Although vaccine efficacy was 0% for patients with severe immunocompromising conditions, it was 70% for all patients over 55 years of age and 77% for patients at moderately increased risk of pneumococcal infection.

Only a few studies of pneumococcal vaccine efficacy in children have been conducted. In a small, nonrandomized study of children and young adults 2-25 years old who had sickle cell anemia or had had splenectomy, the occurrence of bacteremic pneumococcal disease was significantly reduced by immunization with an 8-valent vaccine (*7*). Pneumococcal vaccine has shown no significant benefit in preventing otitis media in children (*8*).

The duration of protection induced by vaccination is unknown. While elevation of antibody titers has been shown 5 years after immunization, studies of persistence of elevated titers are ongoing.

Recommendations for Vaccine Use

Newly available data regarding vaccine efficacy support the broader use of pneumococcal vaccine in the United States. Vaccination is particularly recommended for the following:

Adults

1. Adults with chronic illnesses, especially cardiovascular disease and chronic pulmonary disease, who sustain increased morbidity with respiratory infections.
2. Adults with chronic illnesses specifically associated with an increased risk for pneumococcal disease or its complications. These include splenic dysfunction or anatomic asplenia, Hodgkin's disease, multiple myeloma, cirrhosis, alcoholism, renal failure, CSF leaks, and conditions associated with immunosuppression.
3. Older adults, especially those aged 65 and over, who are otherwise healthy.

Children

1. Children aged 2 years and older with chronic illnesses specifically associated with increased risk of pneumococcal disease or its complications. These include anatomic or functional asplenia, such as sickle cell disease or splenectomy, nephrotic syndrome, CSF leaks, and conditions associated with immunosuppression.
2. Recurrent upper respiratory diseases, including otitis media and sinusitis, are *not* considered indications for vaccine use in children.

General Considerations

When elective splenectomy is being considered, pneumococcal vaccine should be given at least 2 weeks before the operation, if possible. Similarly, when immunosuppressive therapy is being planned, as in patients who are candidates for organ transplants, the interval between vaccination and initiation of immunosuppressive therapy should be as long as possible.

Although vaccine failures have been reported in some of these groups, especially those who are immunocompromised, vaccination is still recommended for such persons because they are at high risk of developing severe disease.

Strategies for Vaccine Delivery

Programs for vaccine delivery to these high-risk groups need to be developed further to achieve maximum immunization rates in such groups. More effective programs are needed for giving vaccine in nursing homes and other chronic-care facilities, in physicians' offices, and in hospitals, as only a small proportion of severe pneumococcal disease occurs in previously healthy individuals.

Two-thirds of persons with serious pneumococcal disease have been hospitalized within 5 years before the pneumococcal illness (*11*). Vaccine can be given to hospitalized patients—including at time of discharge—to prevent future admissions for pneumococcal disease. In addition, persons who visit physicians frequently and have chronic conditions are likely to be at higher risk of pneumococcal infection than those who require infrequent visits. Office-based programs to identify and immunize the frequent user of medical care should help prevent pneumococcal illness. Furthermore, pneumococcal vaccine and influenza vaccine can be given at different sites at the same time without an increase in side effects (*12*).

Medicare has partially reimbursed the cost of pneumococcal vaccination since 1981. It has been determined that hospitals may be reimbursed for pneumococcal immunization of Medicare recipients independent of reimbursement based on systems of prospective payments.

Adverse Reactions

About half of those given pneumococcal vaccine develop mild side effects, such as erythema and pain at the injection site. In less than 1% of those given pneumococcal vaccine, fever, myalgias, and severe local reactions have been reported (*6,13,14*). Severe adverse effects, such as anaphylactoid reactions, have rarely been reported—about 5 per million doses administered. For additional information, the package insert should be reviewed.

Revaccination

It should be emphasized that pneumococcal vaccine should be given *only once* to adults. Arthus reactions and systemic reactions have been common among adults given second doses (*15*) and are thought to result from localized antigen-antibody reactions involving antibody induced by previous vaccination. Therefore, second or "booster" doses are *not* recommended, at least at this time. Data on revaccination of children are not yet sufficient to provide a basis for comment.

Persons who have received the 14-valent pneumococcal vaccine should *not* be revaccinated with the 23-valent vaccine, as the modest increase in coverage does not warrant the possible increased risk of adverse reactions. However, when there is doubt or no information on whether a person has ever received pneumococcal vaccine, the vaccine should be given. Complete records of vaccination can help to avoid repeat doses.

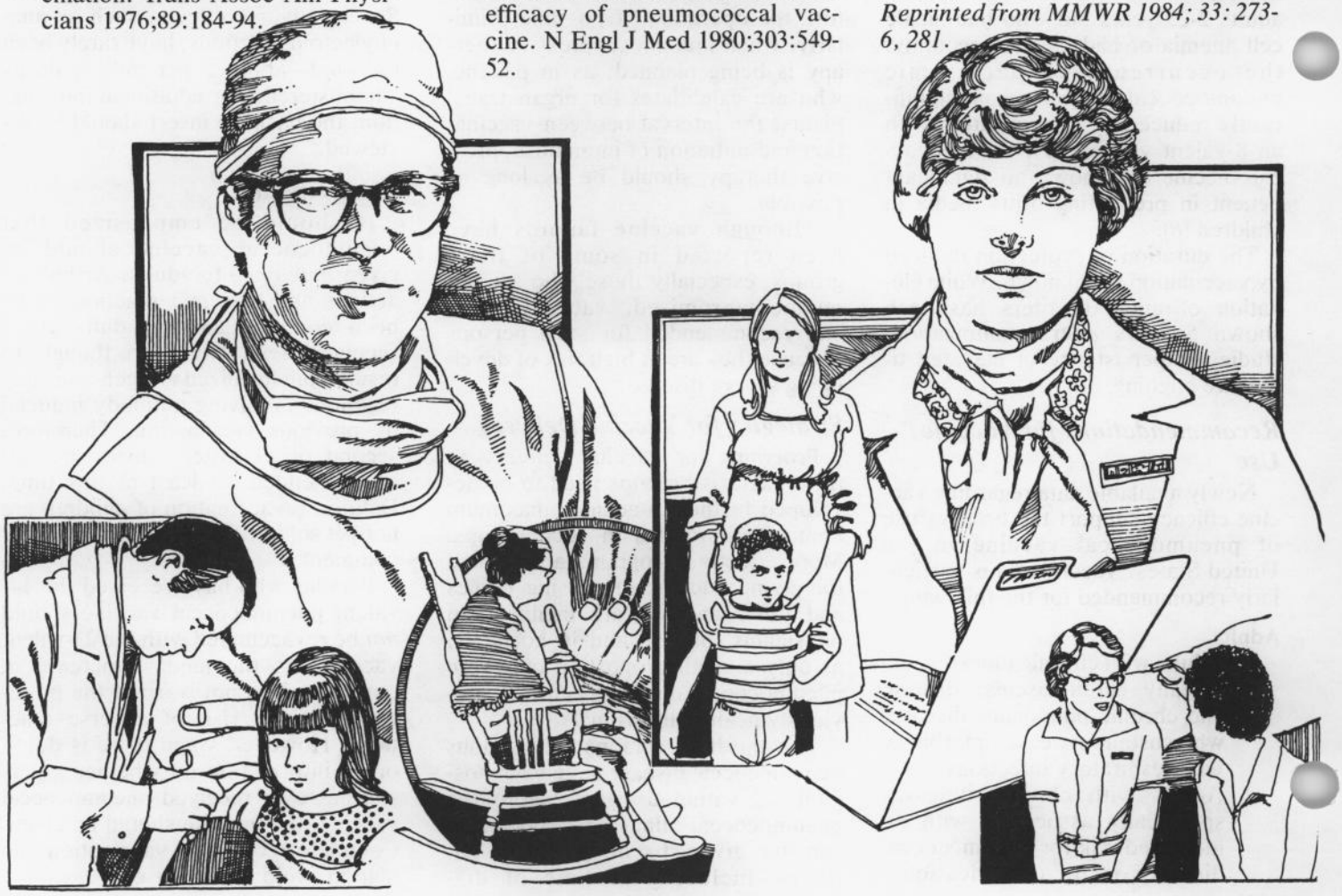
Precautions

The safety of pneumococcal vaccine for pregnant women has not been evaluated. It should not be given to otherwise healthy pregnant women. Women at high risk of pneumococcal disease ideally should be vaccinated before pregnancy.

References

1. Broome CV, Facklam RR. Epidemiology of clinically significant isolates of *Streptococcus pneumoniae* in the United States. Rev Infect Dis 1981;3:277-81.
2. Robbins JB, Austrian R, Lee C-J, et al. Considerations for formulating the second-generation pneumococcal capsular polysaccharide vaccine with emphasis on the cross-reactive types within groups. J Infect Dis 1983;148:1136-59.
3. Pankey G, Schiffman G, The immunogenicity and reactogenicity of a 22 valent pneumococcal vaccine [Abstract]. Clin Research 1982;30:376A.
4. Austrian R, Douglas RM, Schiffman G, et al. Prevention of pneumococcal pneumonia by vaccination. Trans Assoc Am Physicians 1976;89:184-94.
5. Riley ID, Tarr PI, Andrews M, et al. Immunisation with a polyvalent pneumococcal vaccine. Reduction of adult respiratory mortality in a New Guinea Highlands community. Lancet 1977;I:1338-41.
6. Austrian R. Surveillance of pneumococcal infection for field trials of polyvalent pneumococcal vaccines. Report DAB-VDP-12-84, National Institutes of Health, 1980.
7. Ammann AJ, Addiego J, Wara DW, Lubin B, Smith WB, Mentzer WC. Polyvalent pneumococcal-polysaccharide immunization of patients with sickle-cell anemia and patients with splenectomy. N Engl J Med 1977;297:897-900.
8. Klein JO, Teele DW, Sloyer JL, et al. Use of pneumococcal vaccine for prevention of recurrent episodes of otitis media. In: Weinstein L, Fields BN, eds. Seminars in infectious disease. New York: Thieme-Stratton Inc.: 1982:305-10.
9. Broome CV, Facklam RR, Fraser DW. Pneumococcal disease after pneumococcal vaccination: an alternative method to estimate the efficacy of pneumococcal vaccine. N Engl J Med 1980;303:549-52.
10. Shapiro ED, Clemens JD. A controlled evaluation of the protective efficacy of pneumococcal vaccine for patients at high risk for serious pneumococcal infections. Ann Intern Med (in press).
11. Fedson DS, Chiarello LA. Previous hospital care and pneumococcal bacteremia: importance for pneumococcal immunization. Arch Intern Med 1983;143:885-9.
12. DeStefano F, Goodman RA, Noble GR, McClary GD, Smith SJ, Broome CV. Simultaneous administration of influenza and pneumococcal vaccines. JAMA 1982;247:2551-4.
13. Semel JD, Seskind C. Severe febrile reaction to pneumococcal vaccine [Letter]. JAMA 1979;241:1792.
14. Schwartz JS. Pneumococcal vaccine: clinical efficacy and effectiveness. Ann Intern Med 1982;96:208-20.
15. Borgono JM, McLean AA, Vella PP, et al. Vaccination and revaccination with polyvalent pneumococcal polysaccharide vaccines in adults and infants (40010). Proc Soc Exp Biol Med 1978;157:148-54.

Reprinted from MMWR 1984; 33: 273-6, 281.



(continued from page 1)

Editor's comment: Blastomycosis is an illness caused by the dimorphic fungus *Blastomyces dermatitidis* (see figure 1). Infection is presumably acquired by inhalation of aerosolized spores which convert to the yeast phase in the alveoli of the lung. The spectrum of clinical manifestations is wide. Exposed individuals may remain well or may develop pneumonia that ranges from asymptomatic to life-threatening in character; some go on to develop late disseminated infection. Amphotericin B is frequently required for treatment.[1] The incidence of this disease is low and most cases are sporadic. Very few outbreaks of blastomycosis have been reported in the medical literature.[2-6] Better definition of its epidemiology has been hampered both by the inability to consistently culture the organism from any environmental source and by the lack of a reliable immunologic marker of past infection. Cases are more often male than female, possibly because of differences between men and women in their frequency and/or types of outdoor exposure.[1] Dogs are more susceptible to this infection than other animals and it has been suggested that hunting dogs may be at greatest risk.[1] Investigation of the unique outbreak reported above provides an opportunity to try and learn more about this mysterious disease.

References

1. Sarosi GA, Davies SF. Blastomycosis. Am Rev Respir Dis 1979; 120: 911-38.
2. Centers for Disease Control. Blastomycosis in canoeists-Wisconsin. MMWR 1979; 28: 450-1.
3. Tosh FE, Hammerman KJ, Weeks RJ, Sarosi GA. A common source epidemic of North American blastomycosis. Am Rev Respir Dis 1974; 109: 525-29.
4. Smith JG, Harris JS, Conant NF, Smith DT. An epidemic of North American blastomycosis. JAMA 1955; 158: 641-6.
5. Kitchen MS, Reiber CD, Eastin GB. An urban epidemic of North American blastomycosis. Am Rev Respir Dis 1977; 115: 1063-6.
6. Centers for Disease Control. Blastomycosis-North Carolina. MMWR 1976; 25: 205-6.

Notice of Handling Fees for Certain Specimen Mailing Kits

As a result of the recent Critical Reevaluation of State Government, the General Assembly approved a change in the Code of Virginia permitting the Department of General Services to charge a handling fee for certain specimen collection kits submitted by the medical professions to our microbiology laboratories. A reduction in our operating budget for 1984-86 was also approved by the General Assembly to reflect the anticipated income from these fees.

Effective August 6, 1984, our procedure will be to require that physicians, clinics, hospitals, and other medical facilities in the private sector purchase stamps for certain laboratory specimen kits. Below is a list of these kits and charges.

As proof of payment, these stamps must be affixed to the back of the specimen history/report form when the specimen is submitted for examination. Specimens submitted in laboratory collection kits from other sources will not be accepted. Specimens received without stamps will be tested, but a bill for handling will be sent with the laboratory report.

Public health facilities (state and local) are exempted from these charges. They will be expected to write the word "exempt" on the top of the history form when they submit fee-requiring kits.

Order forms for requesting stamps for laboratory specimen kits may be obtained by calling or writing to the following office: Department of General Services, Division of Consolidated Laboratory Services, Attn: Mrs. Jane Beagle, 1 North 14th Street, Room 231, Richmond, VA 23219, Telephone: 786-3274. Money orders or checks must be made out to the Treasurer of Virginia. The specimen kits themselves may be ordered as previously, from the Microbiology Laboratory in Richmond, Luray, or Abingdon.

Charging handling fees is a new venture for our laboratory, so we solicit your cooperation and understanding while we work out all the details. If you have questions regarding this change in our services, please call (804) 786-3756.

Specimen Collection Kits for Which A Handling Fee Will Be Charged

Kit	Cost Per Kit ($)	Stamp Color
Dermatophytes—for submitting hair, skin, and nails for fungus culture	2.00	BLUE
Enterobiasis (pinworm)—cellophane tape—microscopic slide for collection of eggs of *Enterobius vermicularis* from perianal region	2.00	BLUE
Throat Swab—for Group A Beta hemolytic streptococcus	2.00	BLUE
Intestinal Parasites—fecal specimens for intestinal ova and parasites	2.00	BLUE
Rubella screen—blood specimens for rubella screening for immunity	3.00	GREEN
Enteric Bacteriology—for submitting fecal specimens for salmonella/shigella	2.00	BLUE
Mononucleosis/ASO/AntiDNase B Serology	2.00	BLUE

Month: June, 1984

Disease	State				Mean 5 Year To Date	Regions				
	This Month	Last Month	Total to Date 1984	Total to Date 1983		This Month N.W.	N.	S.W.	C.	E.
Measles	0	0	2	22	115	0	0	0	0	0
Mumps	4	1	12	21	51	0	1	0	1	2
Pertussis	2	0	9	38	12	2	0	0	0	0
Rubella	0	0	0	1	47	0	0	0	0	0
Meningitis—Aseptic	16	6	62	62	48	0	8	0	4	4
Other Bacterial	22	18	139	140	108	2	2	4	2	12
Hepatitis A (Infectious)	9	9	55	62	110	1	2	4	1	1
B (Serum)	47	31	247	274	243	1	16	4	13	13
Non-A, Non-B	7	8	55	44	**28	1	0	1	0	5
Salmonellosis	129	76	482	503	523	9	27	20	36	37
Shigellosis	11	6	119	63	254	0	3	0	1	7
Campylobacter Infections	67	46	245	197	**93	9	21	6	13	18
Tuberculosis	46	27	223	214	—	—	—	—	—	—
Syphilis (Primary & Secondary)	39	37	218	285	299	1	6	6	7	19
Gonorrhea	1911	1342	9615	9248	10,218	—	—	—	—	—
Rocky Mountain Spotted Fever	12	2	16	18	26	3	3	2	3	1
Rabies in Animals	12	18	129	404	140	5	6	1	0	0
Meningococcal Infections	7	3	41	49	47	1	1	1	2	2
Influenza	6	147	1094	861	1418	0	1	5	0	0
Toxic Shock Syndrome	0	1	5	4	4	0	0	0	0	0
Reyes Syndrome	1	0	5	5	10	0	0	0	0	1
Legionellosis	5	2	12	14	8	0	1	2	0	2
Kawasaki's Disease	2	3	8	28	14	0	0	0	1	1
Other:	—	—	—	—	—	—	—	—	—	—

Counties Reporting Animal Rabies: Fairfax 2 raccoons; Loudoun 2 foxes, 1 raccoon; Louisa 1 raccoon; Madison 1 skunk; Orange 1 raccoon; Page 1 skunk; Prince William 1 raccoon; Spotsylvania 1 raccoon; Washington 1 skunk.

Occupational Illnesses: Occupational hearing loss 10; occupational dermatoses 5; occupational pneumoconiosis 13; Carpal tunnel syndrome 5; Asbestosis 3; mesothelioma 1.

*other than meningococcal
**4 year mean

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