Oral Propionyl Erythromycin in Treating Early Syphilis

WILLIAM J. BROWN, M.D., W. G. SIMPSON, M.D., M. BRITTAIN MOORE, M.D., ELEANOR V. PRICE, and SEYMOUR WEINSTEIN, M.D.

IN THE FALL of 1958 the Public Health Service initiated an evaluation "to establish a firm basis for recommendations on antibiotics other than penicillin to be used in syphilotherapy; to evaluate further the effectiveness clinically of the most promising of the current antibiotics for the treatment of syphilis." A 10-member Ad Hoc Committee appointed to plan the evaluation included, in addition to staff members of the Venereal Disease Branch, Communicable Disease Center, two well-known syphilologists, Dr. Evan W. Thomas and Dr. Sidney Olansky. The protocol outlined by the committee appears on p. 916.

The Ad Hoc Committee considered the possible use of carbomycin and chloramphenicol, but both drugs were rejected after exploration of problems connected with their projected use. Although planned as an evaluation of antibiotics other than penicillin in the treatment of syphilis, the study materialized as an evaluation of propionyl erythromycin in the treatment of early syphilis. The erythromycin evaluated was Ilosone, supplied by the Lilly Laboratory for Clinical Research.

Three of the authors are with the Venereal Disease Branch, Communicable Disease Center, Public Health Service, Atlanta, Ga. Dr. Brown is chief of the branch, Dr. Moore is director of the Venereal Disease Research Laboratory, and Mrs. Price is a statistician. Dr. Simpson, former assistant chief of the branch, is chief of epidemiology and immunization, Division of Foreign Quarantine, Public Health Service, Dr. Weinstein is the acting venereal disease control officer, Chicago Board of Health.

Minimum dosage requirements and practicability for outpatient treatment were the principal considerations of the committee in suggesting schedules of treatment for evaluation. The manufacturer expressed reservations concerning the 2-gram dose on the first and eighth days of treatment in the clinic. Although 1 gram was well tolerated, it was feared that 2 grams might cause some gastric intolerance. In this event, it was recommended that the schedule be modified to 1 gram a day for 10 days.

The remainder of the protocol was adhered to as far as possible. Pretreatment and posttreatment blood specimens were sent to the Venereal Disease Research Laboratory where the VDRL slide test, the KRP (Kolmer Reiter protein), the FTA (fluorescent treponemal antibody), and the tpcf-50 (a modification of the *Treponema pallidum* complement fixation test) were performed on all specimens. Spinal fluid tests consisted of the VDRL, Kolmer, and total protein determination.

Twenty health departments in high-incidence areas throughout the country accepted our invitation to participate in the evaluation (see box).

Results of Study

Reactions to treatment. A total of 554 patients with early syphilis positive by darkfield examination were treated with erythromycin and reported to the Venereal Disease Branch. The initial schedule of 10 grams was used from December 1958 through September 1959. A total of 241 patients were treated on this dosage and reaction data were reported for 210, or 87.5 percent. Complaints (principally gastrointes-

tinal) were registered by 60 patients, representing 25 percent of the patients treated or 29 percent of the patients for whom data were reported.

Apparently concern over reactions lessened as the study progressed. In October 1959 the dose was increased to 15 grams and in October 1960 to 20 grams. Reaction data were reported for only 46 percent of those receiving the 15-gram schedule and 14 percent of those on the 20-gram schedule. Using the number of cases with reaction data reported as the base, the reaction rate for the three schedules combined is 29 percent, or the same as for the 10-gram schedule.

Forty-four percent of the 87 patients reacting experienced chills and fever (chiefly Herxheimer reactions occurring within 24 hours after the initiation of treatment), 28 percent nausea, 24 percent headache, and 23 percent diarrhea. One patient developed an erythemato-papular eruption on the 13th day following the initiation of treatment, but no serious reactions were reported.

Recently there have been reports (*1–4*) of jaundice following the use of propionyl erythromycin ester lauryl sulfate, the type of erythromycin used in the latter part of this evaluation. It is suspected that cholestatic hepatitis of allergic etiology causes jaundice only in individuals receiving the drug longer than 10 days or with repeated courses of shorter duration. This problem was not encountered in this study. It should be noted, however, that treatment did not exceed 10 days in the schedules evaluated.

Efficacy of treatment. The 10-gram erythromycin schedule was used in the treatment of 204 patients with previously untreated dark-field-positive primary or secondary syphilis who had at least one post-treatment examination. The schedule was given as originally planned (10 grams in 8 days) to 59 percent. In the remainder the duration of treatment was prolonged to 9 or 10 days.

Results obtained with the 10-gram schedule are shown in table 1 by stage of syphilis. The cumulative re-treatment rate (*5*) at 15 months post-treatment is 36.2 percent for seronegative primary syphilis, 26.5 percent for seropositive primary syphilis, and 48.2 percent for secondary syphilis. The re-treatment rate of 37 percent for all patients includes 23.1 percent treatment failures (serologic or clinical relapse) and 13.9 percent reinfections.

Because of the high failure rate, the schedule was increased to 15 grams in 10 days and later to 20 grams in 10 days. The re-treatment rate for the 15-gram schedule was 15.4 percent and for the 20-gram schedule, 14.8 percent. Since there was no difference in results and because of the smaller number of cases treated, these two schedules have been combined in table 2. In all stages the re-treatment rate is lower following these higher dosage schedules, but the greatest difference (statistically significant at the 1 percent level) is in the secondary stage where the re-treatment rate was reduced from 48.2 to 12.5 percent.

A comparison of results by sex in nonwhite patients with untreated secondary syphilis (table 3) suggests that the efficacy of erythromycin is greater than the foregoing statistics indicate. On the 10-gram schedule the cumulative re-treatment rate for females is only 21.4 percent as against 64 percent for males; and on the 15- and 20-gram schedules, none of the females

Participating Health Departments

The 20 health departments cooperating in the evaluation were the Chicago Board of Health; Dade County Health Department, Miami, Fla.; Seattle-King County Health Department, Seattle, Wash.; New York City Department of Health; District of Columbia Health Department; San Francisco City Health Department; Davidson County Health Department, Nashville, Tenn.; Los Angeles City Health Department; El Paso City-County Health Unit, El Paso, Tex.; Baltimore City Health Department; Memphis-Shelby County Health Department, Memphis, Tenn.; St. Louis City Health Department; Philadelphia Department of Public Health; Pulaski County Health Department, Little Rock, Ark.; Charlotte (N.C.) City Health Department; Fulton County Health Department, Atlanta, Ga.; Louisville-Jefferson County Health Department, Louisville, Ky.; Hinds County Health Department, Jackson, Miss.; Wichita-Sedgwick County Department of Public Health, Wichita, Kans.; and Detroit Department of Health.

required additional treatment, but the cumulative re-treatment rate for males is 18.6 percent. For the total of all schedules, the re-treatment rate for females is 11.9 percent and for males, 39.4 percent, a difference which is statistically significant at the 1 percent level.

Comparison of serologic techniques. The battery of tests performed at the Venereal Disease Research Laboratory affords an unusual opportunity for a comparison of treponemal and nontreponemal antigen tests in early syphilis.

The pretreatment results of the VDRL slide, KRP, FTA, and tpcf-50 tests and their response following treatment for primary and secondary syphilis are shown in table 4. This table also includes the cumulative re-treatment rate which has a direct bearing on the seronegativity rate. (By the statistical method employed the seronegativity rate can be no greater than 100 percent minus the cumulative re-treatment rate.)

The FTA test gave the lowest percentage of nonreactive results in 260 patients with previously untreated primary syphilis, 24.2 percent. This was followed closely by the tpcf-50, 25.4 percent, and the VDRL, 27.7 percent. The

Table 1. Results of oral propionyl erythromycin treatment (10 grams total in 8 to 10 days) of patients with early syphilis and no history of syphilis or of treatment

Months observed	Cases observed [1]	Cumulative percent re-treated		
		Clinical or sero-relapse	Probable reinfection	Total re-treated
	Seronegative primary syphilis (34 cases)			
3	30	3.3	10.0	13.3
6	28	6.8	10.0	16.8
9	24	11.0	14.1	25.1
12	19	11.0	18.8	29.8
15	16	11.0	25.3	36.2
	Seropositive primary syphilis (85 cases)			
3	76	2.5	2.5	5.0
6	62	8.6	8.4	17.1
9	53	13.7	8.4	22.2
12	44	13.7	12.7	26.5
15	35	13.7	12.7	26.5
	Secondary syphilis (85 cases)			
3	78	2.5	1.3	3.8
6	62	23.4	2.9	26.3
9	51	32.5	2.9	35.4
12	40	34.7	10.3	45.0
15	33	37.8	10.3	48.2
	Total (204 cases)			
3	184	2.6	3.2	5.9
6	151	14.6	6.3	20.8
9	128	21.1	7.1	28.1
12	102	21.9	12.7	34.6
15	84	23.1	13.9	37.0

[1] Adjusted for patients lost from observation.

Table 2. Results of oral propionyl erythromycin treatment (15 or 20 grams total in 10 days) of patients with early syphilis and no history of syphilis or of treatment

Months observed	Cases observed [1]	Cumulative percent re-treated		
		Clinical or sero-relapse	Probable reinfection	Total re-treated
	Seronegative primary syphilis (38 cases)			
3	34	0.0	2.9	2.9
6	29	0.0	9.6	9.6
9	23	0.0	13.9	13.9
12	16	0.0	13.9	13.9
15	9	0.0	13.9	13.9
	Seropositive primary syphilis (103 cases)			
3	90	0.0	3.3	3.3
6	75	7.6	4.5	12.2
9	57	9.2	6.1	15.3
12	39	9.2	8.7	17.9
15	32	9.2	8.7	17.9
	Secondary syphilis (94 cases)			
3	82	0.0	0.0	0.0
6	64	4.4	4.4	8.8
9	54	4.4	8.1	12.5
12	42	4.4	8.1	12.5
15	29	4.4	8.1	12.5
	Total (235 cases)			
3	206	0.0	1.9	1.9
6	167	5.2	5.2	10.4
9	134	5.8	8.1	13.9
12	98	5.8	9.1	14.9
15	69	5.8	9.1	14.9

[1] Adjusted for patients lost from observation.

KRP was nonreactive, however, in 51.5 percent. The wide disparity between the KRP and VDRL and the KRP and FTA was maintained for several months following treatment but gradually diminished until 1 year or more following treatment when the seronegativity rates for these three tests fell within a 4 percent range. The tpcf-50 test, which gave results similar to the FTA test in untreated primary syphilis, maintained reactivity for a longer period of time following treatment. It is not unusual for patients who are on the threshold of seropositivity to revert from negative to positive with treatment, a state which generally lasts for a matter of days. With the tpcf-50 test, however, it was 4 months after treatment before the pretreatment seronegativity rate had been regained.

Table 3. Comparative results of treatment with erythromycin in nonwhite males and females with previously untreated secondary syphilis

Months observed and schedule	Cases observed [1]	Cumulative percent retreated	All other cases	
			Percent seropositive	Percent seronegative
	Nonwhite males			
10 grams:				
3 months	32	9.1	90.9	0.0
6 months	27	38.1	58.4	3.7
9 months	24	53.8	37.9	8.4
12 months	19	64.0	25.7	10.3
15 months	19	64.0	25.7	10.3
15 or 20 grams:				
3 months	40	0.0	100.0	0.0
6 months	32	11.7	78.8	9.5
9 months	28	18.6	53.1	28.3
12 months	20	18.6	35.6	45.8
15 months	14	18.6	37.0	44.4
Total:				
3 months	72	4.0	96.0	0.0
6 months	59	23.2	70.0	6.8
9 months	52	34.2	46.4	19.3
12 months	38	39.4	31.6	29.0
15 months	30	39.4	33.6	26.9
	Nonwhite females			
10 grams:				
3 months	36	0.0	100.0	0.0
6 months	28	17.3	57.5	25.2
9 months	24	21.4	37.2	41.4
12 months	19	21.4	41.9	36.7
15 months	14	21.4	42.9	35.7
15 or 20 grams:				
3 months	29	0.0	96.6	3.4
6 months	22	0.0	72.7	27.3
9 months	20	0.0	45.0	55.0
12 months	18	0.0	38.9	61.1
15 months	12	0.0	50.0	50.0
Total:				
3 months	65	0.0	98.5	1.5
6 months	50	9.6	64.3	26.1
9 months	44	11.9	40.7	47.5
12 months	37	11.9	40.1	48.1
15 months	26	11.9	46.0	42.2

[1] Adjusted for cases lost from observation.

The serologic pattern in secondary syphilis is similar to that observed in primary syphilis, but with all tests reverting to negative much more slowly. The KRP was nonreactive in 6.7 percent of the 179 patients with untreated secondary syphilis and had remained or reverted to negative in more than 25 percent of the patients by the third month after treatment. For the other three tests, seronegativity at this period ranged from 0.0 to 1.3 percent.

Discussion

In nonwhite patients treated with erythromycin for secondary syphilis, more than three males for every female required additional treatment for reinfection or treatment failure. One possible explanation for this difference would be homosexual activity with greater opportunity for reinfection among males. In an analysis of therapeutic results in more than 6,300 patients treated for early syphilis, Bauer and Price (*6*) found that reinfection played an important role in re-treatment rates in primary syphilis but not in secondary and that there were no race-sex differences among patients treated for secondary syphilis on comparable schedules of therapy. This suggests that the erythromycin schedules differed in males and females; either females received a larger amount of the drug on a milligram per pound basis than males, or females more carefully followed the prescribed schedule of oral therapy. It is felt that the second reason is the more plausible explanation of the sex differential. The female, whether as a housewife or as an employee, is usually better situated than the male to take oral medication at a specified time.

Table 4. Comparative evaluation of serologic tests before and after treatment for early syphilis for all schedules of treatment

Month of observation	Cases observed [1]	Cumulative percent re-treated	Other cases nonreactive (percent)			
			VDRL	KRP	FTA	tpcf–50
	Primary syphilis					
Pretreatment	260		27. 7	51. 5	24. 2	25. 4
1	260	0. 0	29. 6	54. 2	21. 9	20. 0
2	254	. 8	37. 4	62. 6	29. 5	20. 1
3	230	5. 2	47. 0	67. 4	35. 2	23. 1
4	212	9. 0	54. 3	69. 4	42. 5	30. 7
5	202	12. 0	60. 4	72. 8	50. 5	38. 6
6	193	14. 1	63. 2	73. 1	53. 4	41. 5
7	184	15. 7	65. 9	75. 7	56. 1	44. 7
8	171	16. 9	68. 0	75. 0	60. 4	45. 7
9	156	18. 8	68. 5	74. 3	64. 0	48. 0
10	143	19. 5	69. 4	74. 3	64. 5	49. 1
11	129	21. 1	69. 0	72. 9	67. 4	50. 4
12	116	22. 0	69. 6	72. 2	67. 9	50. 7
15	91	23. 1	68. 3	70. 5	67. 2	51. 8
	Secondary syphilis					
Pretreatment	179		0. 0	6. 7	0. 0	0. 0
1	179	0. 6	0. 0	5. 6	0. 0	0. 0
2	177	. 6	0. 0	10. 7	0. 0	0. 0
3	160	1. 9	. 6	25. 6	1. 3	0. 0
4	147	6. 0	4. 8	27. 3	2. 0	0. 0
5	136	11. 9	12. 5	31. 6	4. 4	2. 2
6	123	17. 5	18. 3	32. 6	8. 7	5. 5
7	120	19. 2	25. 9	34. 2	13. 4	5. 8
8	110	22. 8	27. 3	37. 3	17. 3	7. 3
9	105	23. 8	31. 5	39. 2	19. 1	7. 6
10	96	24. 8	34. 5	38. 7	19. 9	7. 3
11	86	26. 0	33. 6	37. 1	20. 9	8. 1
12	82	28. 4	35. 3	36. 5	20. 7	9. 7
15	60	30. 1	31. 7	40. 1	25. 0	11. 7

[1] Adjusted for cases lost from observation.

For several years the Reiter protein test (KRP or RPCF) has been employed by laboratories as an aid in differentiating between syphilis and biologic false positive reactions. When used in this manner, a reactive result is valuable in establishing the presence of syphilis. However, as emphasized by the data presented in this paper, a nonreactive KRP does not mean that syphilis is absent. In untreated primary syphilis, 1 of every 3 patients reactive to the VDRL slide test was nonreactive to the KRP, and even in untreated secondary syphlis, 1 in every 15 patients was reactive to the VDRL and nonreactive to the KRP.

An interesting, unexpected serologic phenomenon noted in this series was that the KRP was valuable as a treatment-control test, particularly when used in conjunction with a quantitative nontreponemal antigen test. A change in the KRP from nonreactive to reactive following treatment was usually a precursor of relapse or reinfection, sometimes preceding but usually substantiating an increase in VDRL titer.

Summary and Conclusions

Oral propionyl erythromycin was used in the treatment of 554 patients with darkfield-positive early syphilis. Reactions, predominantly gastrointestinal disturbances, occurred in 29 percent. In no case did reactions necessitate the discontinuation of treatment. No serious reactions were reported.

Ten grams of erythromycin administered in a period of 8 to 10 days proved inadequate for

the treatment of early syphilis. No significant difference was observed between 15 grams and 20 grams given in a 10-day period. The combined results of the two higher dosage schedules showed a re-treatment rate in secondary syphilis of 12.5 percent compared with a 48 percent rate for the 10-gram schedule. Erythromycin was more effective in the treatment of females than males, probably because of greater adherence to the prescribed schedule.

Results of the VDRL slide, KRP, FTA, and tpcf-50 tests, performed routinely on pretreatment and post-treatment serums, are compared.

PROTOCOL

After consideration of factors such as dosage requirements, cost, side effects, and treatment schedules, the following three drugs were selected for possible use:

1. Oral erythromycin (the new form propionyl erythromycin will be used if available)
2. Oral carbomycin (Magnamycin)
3. Intramuscular chloramphenicol (Chloromycetin acid succinate)

CLINICAL MATERIAL

1. Darkfield-positive primary and secondary syphilis patients. "Repeater" cases will be acceptable but previous treatment will be noted on the record form.
2. Symptomatic neurosyphilis (except primary optic atrophy) patients will be treated on intramuscular chloramphenicol as outlined in the protocol. Spinal fluid must contain a minimum of 10 cells per cubic millimeter for acceptance in this evaluation.

PATIENT WORKUP AND SELECTION

1. History and physical examination.
2. In the initial examination whole blood specimens will be collected in tubes supplied for study cases and mailed individually to the Venereal Disease Research Laboratory. The VDRL test will be performed immediately and reported routinely to the submitting clinic as soon as possible. Other treponemal and nontreponemal serologic procedures will be performed as time permits.
3. Pretreatment examination of spinal fluid will not be requested on primary and secondary syphilis patients. Only one spinal fluid examination, to be performed 1 year after treatment or at time of relapse, is recommended.
4. Selection of the patient would be restricted to those living within a 25-mile radius of the treatment facility. Factors such as permanence of residence, intelligence, and willingness to cooperate should be considered.
5. After treatment schedule has been completed, study form will be completed and sent to Venereal Disease Branch, Communicable Disease Center, Atlanta, Ga.

PATIENT FOLLOWUP:

Early Syphilis

1. Monthly serologic tests for 6 months, then 9th and 12th month post-treatment. Blood will be sent to Venereal Disease Research Laboratory as for initial examination.
2. Examination of spinal fluid at 12th month post-treatment, or at time of serologic or clinical relapse. Cell count will be done at treatment facility, remainder of tests at Venereal Disease Research Laboratory.
3. Reexaminations will be minimal consisting of inspection of mouth, skin, genitalia, and anus. These will not be reported routinely unless abnormal. Blood specimens mailed directly to the research laboratory will be the most important followup procedure. Patient will be observed at followup and reactions, if present, will be noted and reported according to time of appearance, duration, and description (dermatitis, fever, and others).

Symptomatic Neurosyphilis

1. Serologic tests every 3 months for 2 years. Testing will be performed by the research laboratory.
2. Spinal fluid examinations will be performed before treatment and at 6, 12, and 24 months following treatment. Except for cell count, testing will be performed by the research laboratory.

PREGNANCY

Patients initially in the last trimester of pregnancy will not be included in the study unless they are penicillin sensitive. Pregnancy occurring otherwise will be included and followed as indicated. Treatment schedules will be determined by stage of syphilis.

TREATMENT SCHEDULES AND OBSERVATIONS

ERYTHROMYCIN OR CARBOMYCIN (oral)—for early syphilis only. Ten gm. total, given in a period of 8 days.

Suggested method: 2 gm. stat. in the clinic, 1 gm. daily at home (1 capsule at each meal and at bedtime, total of 4 daily) for 6 days and 2 gm. on the 8th day in the clinic. In this way administration of at least 4 gm. will be observed. The patient will be given a supply of drug to last only until the third day or next clinic visit, at which time a repeat darkfield examination will be done.

CHLORAMPHENICOL (intramuscular)—for darkfield-positive primary and secondary syphilis, 12 gm. total; for symptomatic neurosyphilis, 16 gm. total.

Suggested method: 4 gm. every 3 days for three or four injections. For practical clinic use (not having Saturday clinics) the span of days will be 2–4, with 3 the preferred interval.

The use of intramuscular chloramphenicol in this manner has never produced a reported blood dyscrasia

or serious reaction. For study purposes a white blood cell count and differential should be done initially and repeated monthly to the third month post-treatment.

At the larger treatment facilities, where the caseload justifies it, the three schedules outlined for darkfield-positive syphilis will be alternated, either by patient or by the month, as preferred.

Where arrangements can be made, hospitalization for 3 to 4 days in a teaching hospital is encouraged in order to allow medical students and resident staff to observe darkfield examinations, healing of lesions, and effects of drugs other than penicillin in the treatment of syphilis.

REFERENCES

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Education Notes

Training for Care of the Elderly. A national center for advanced training in care of the elderly opened in September 1963 at the Home for Aged and Infirm Hebrews of New York, N.Y. Made possible by a community health project grant from the Public Health Service, the center offers 40 widely varied courses to meet the needs of administrators, physicians, nurses, social workers, nutritionists, physical therapists, graduate students, and others having, or preparing for, responsibilities in care of the aged.

Courses, many of them scheduled for late afternoon or early evening, can be taken on a part-time or full-time basis in 4-month semesters. General courses include such subjects as the historical development of attitudes and ideas toward old age, the economic status and housing of the aged, social security laws, and retirement problems. Special courses include disease prevention, physical medicine and rehabilitation, heart disease, psychiatry, nursing, social services, architecture, nutrition, and planned recreation as related to old age. Specially qualified students sponsored and supervised by university departments or teaching hospitals may pursue studies leading to a doctoral thesis. Facilities for research projects are available. Dr. Frederic D. Zeman is director of the center.

Course in Tropical Health. A postgraduate course in tropical health, to be held at Stanford Medical Center, Palo Alto, Calif., January 6–March 14, 1964, will afford physicians practicing abroad an opportunity to review basic medicine and surgery with particular reference to tropical health problems encountered overseas. Physicians going abroad for the first time will be oriented in the major fields of tropical health. Designed to provide "an integrated approach to the problems of 'international' medicine," the 10-week course combines intensive training in tropical diseases, health sciences, and public health administration with a comprehensive review in medicine. Registration is limited to 10 physicians. Address inquiries to the course director, Quentin M. Geiman, Ph.D., Department of Preventive Medicine, Stanford Medical Center, 300 Pasteur Drive, Palo Alto, Calif., 94304.

Federal Publications

Survey of Funding and Expenditures for Training of Mental Health Personnel, 1960–1961. *PHS Publication No. 1028; April 1963; 149 pages.* This survey is the first attempt to obtain an estimate of all funds expended annually in the United States for the training of mental health personnel. Emphasis is placed on the cost of graduate professional training in four major mental health professional groups: psychiatry, clinical psychology, psychiatric social work, and psychriatric nursing. Critical data are provided from about 500 institutions and agencies on one aspect of financing in mental health.

Public Health Service Film Catalog. *PHS Publication No. 776; 1963; 55 pages; 45 cents.* Annual revision of films available from the film library, Communicable Disease Center, Public Health Center.

Engineers in the U.S. Public Health Service. *PHS Publication No. 455; revised 1963; 36 pages.* Describes Public Health Service career opportunities for all types of engineers in environmental health activities, Indian health, accident prevention, and institutional engineering. Also describes career opportunities at the National Institutes of Health, Communicable Disease Center, Sanitary Engineering Center, and the Arctic Health Research Center.

Eskimos, Indians, and Aleuts of Alaska. A digest, Anchorage area. *PHS Publication No. 615, pt. 7; 1963; 47 pages.*

The history of the Federal health program is described for the 43,000 Eskimos, Indians, and Aleuts who live in remote villages in Alaska, where there are only a few small, thinly populated reservations. The subject matter includes a history of the development of the health program for Alaska natives, information on their health status, and services and resources in each of the health service units under the jurisdiction of the Alaska Native Health Area Office at Anchorage.

A statistical compendium is included which contains vital events trend data for 1949–60, for Indians and Alaska natives compared with all races in the United States.

Studies of the Fate of Certain Radionuclides in Estuarine and Other Aquatic Environments. *PHS Publication No. 999–R–3; May 1963; 73 pages.*

The symposium on the fate of radionuclides in the Savannah River Estuary and the Clinch River (Tenn.), and Mohawk River (N.Y.) is reported. Field and laboratory studies, which form bases for effective sampling and interpretation of radiological data, are discussed, and the accumulation of nuclides by aquatic organisms is described. These studies emphasize the multidisciplinary aspects of radiological surveys of aquatic environments, and serve as guides for monitoring such environments.

Vital and Health Statistics

ACUTE CONDITIONS, INCIDENCE AND ASSOCIATED DISABILITY, UNITED STATES, July 1961–June 1962. *PHS Publication No. 1000, Series 10, No. 1; 1963; 58 pages; 40 cents.* Contains statistics on the incidence of acute conditions and the associated days of restricted activity, bed disability, and time lost from work and school, by age, sex, calendar quarter, residence, and geographic region. Based on data collected in household interviews during the period July 1961–June 1962.

COMPARISON OF TWO VISION-TESTING DEVICES. *PHS Publication No. 1000, Series 2, No. 1; 1963; 33 pages; 30 cents.* Reports a study comparing visual acuity as measured by the sight-screener and by the Sloan-Letter Chart.

These reports from the National Health Survey Division are the first two in the new publication series of the National Center for Health Statistics. The new series presents material formerly published in "Health Statistics From the U.S. National Health Survey" and "Vital Statistics—Special Reports," as well as new kinds of information.

Proceedings of the National Conference on Air Pollution. *PHS Publication No. 1022; 1963; 436 pages; $2.75.* The complete text and discussion of all papers presented at the December 1962 conference by more than 80 health officials, physicians, engineers, industry spokesmen, and representatives of air pollution control agencies are given. Technical and general information on sources, causes, and effects of air pollution with suggestions for control and prevention are provided. Topics covered include specific problem areas and the practical application of current control knowledge. Much of the material is presented in terms meaningful to the informed layman.

Pollution-Caused Fish Kills in 1962. *PHS Publication No. 847; 1962; 21 pages; 20 cents.*

This annual report and national study is compiled from reports from State conservation and fish and game agencies. It tells of fish kills attributable to pollutants in the nation's waterways, provides special quantitative measures of biological water quality, and describes causes of fish kills. Breakdowns are given on types of pollution, approximate number of fish killed, and location of waterway.

Neurological and Sensory Disease 1963 Film Guide. *PHS Publication No. 1033; 1963; 183 pages; $1.* Intended to aid medical and allied professional teaching institutions, hospitals, and other users to find educational material in the neurological and sensory disease field, this guide lists 1,286 films currently available

from national and international sources. The films cover a wide range of these disorders and present technical information on many aspects of them.

The films are listed by subject matter with brief descriptions and alphabetically by title. Also listed are distributors from whom the films may be borrowed or purchased.

Drinking Water Quality of Selected Interstate Carrier Water Supplies, 1960–1961. *PHS Publication No. 1049; June 1963; 175 pages.* Sources of 176 selected interstate carrier water supply sources are listed and the results of analysis of samples of water from each are given. Samples are analyzed for organic chemicals, radio chemicals and trace elements, and other determinations generally classed as sanitary chemical analysis.

Mathematical Programming Models for Selection of Diets to Minimize Weighted Radionuclide Intake. *PHS Publication No. 999–R–4; by Jerome Bracken; August 1963; 18 pages.* A feasibility study presenting mathematical conceptions on the selection of diets having satisfactory nutritional value with minimal radionuclide intake is described. The approach to the problem is flexible in its ability to meet such changing dietary requirements as might be imposed by various assumed radionuclide levels in foods.

Louse Infestation. *PHS Publication No. 103 (Health Information Series No. 26); revised 1962; leaflet; 5 cents, $2 per 100.* Names three types of lice that infest humans and defines areas of the body attacked. Explains causes of infestation and gives preventive measures.

Arthritis and Rheumatism. *PHS Publication No. 29 (Health Information Series No. 9); revised 1963; 5 cents, $3 per 100.* Discusses the more prevalent forms of arthritis and rheumatism, including incidence and symptoms. Covers current concepts in care and treatment, based on progress in related fields of medical research. Defines functions of major lay and professional national organizations concerned with research, education, and better patient care.

Spinal Birth Defects (Spina Bifidia). Hope through research. *PHS Publication No. 1023 (Health Information Series No. 103); 1963; pamphlet; 10 cents, $6.50 per 100.* Describes spina bifidia and its complications, meningocele, meningomylocele, and hydrocephalus, with diagrams. Summarizes symptoms, treatment, and research. Suggests early program arranged by physician for best use of child's abilities and avoidance of crippling contractions.

Muscular Dystrophy. Hope through research. *PHS Publication No. 996 (Health Information Series No. 106); 1963; pamphlet; 22 pages; 15 cents, $11.25 per 100.* Describes diseases grouped under the muscular dystrophies and gives symptoms and supportive treatment. Suggests patients keep in touch with physician because active research may bring improved treatment.

Hospital Emergency Service: Criteria for organization. *PHS Publication No. 930–C–3; 1963; by John R. McGibony; 12 pages; 15 cents.* Discusses hospital emergency services as part of the outpatient services. Suggests criteria for organizing such services. A selected bibliography is included.

Hospital Medical Records: Criteria for administrative evaluation. *PHS Publication No. 930–C–5; 1963; by John R. McGibony; 16 pages; 20 cents.* Outlines some of the basic criteria for administrative evaluation of aspects of the medical audit and organization of the medical records department. Includes appendix which provides guidelines for designing and equipping a medical records department.

Noise in Hospitals. *PHS Publication No. 930–D–11; 130 pages; 70 cents.* Reports the findings and recommendations of a Hill-Burton intramural research project which surveyed major causes of noise in hospitals, with emphasis on noises affecting the hospital patient, and suggests ways to control or eliminate them. Report is presented in five parts: Appraising Noise in Hospitals; Noise Sources and Corrective Measures; Design, Construction, and Functional Considerations; Checklist of Recommendations; and Appendixes.

Electronic and Related Electrical Equipment in Hospitals. *PHS Publication No. 930–D–12; 1963; by Noyce L. Griffin; 20 pages; 25 cents.* Discusses the history and basic principles of medical electronics. Includes a selected listing of equipment items and their use in hospitals. Presents a view of present status and trends as well as projections to future developments in medical electronics. Designed for use by professional people in the medical field such as doctors, nurses, architects, and engineers.

The Hospital Electroencephalographic Suite. *PHS Publication No. 930–D–13; 1963; by Noyce L. Griffin; 15 pages; 20 cents.* Discusses the function of the hospital electroencephalographic suite in terms of architectural and equipment requirements. Location of the suite, adequate space, lighting, air conditioning, and shielding are among the topics. Includes plans, illustrations, and equipment list. This is a revision and amplification of material published in October 1958 as an unnumbered publication under the title "Electroencephalographic Suite."

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington, D.C., 20201.

The Public Health Service does not supply publications other than its own.
