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Experience with a Streamlined Examination

—Hot Springs National Park Cancer Investigation Center

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Since cancer often presents no symptoms in its early stages, it has been suggested that symptom-free individuals submit to periodic examination in the hope that incipient disease can thus be discovered. More than 200 cancer detection centers or clinics have been established for this purpose, and a widespread educational campaign has been conducted for a number of years to make every doctor's office a cancer detection center.

At present, periodic examinations for the early detection of disease, which are relatively comprehensive and include a history, physical examinations, and laboratory tests, are not available to an appreciable proportion of the population. Overworked doctors are forced to devote their time to the patient with symptoms and find it difficult to encourage symptomless persons to undergo periodic examinations. Low income wage earners and the indigent, who cannot afford to purchase medical care during obvious illness, are not likely to seek examinations when symptom free. Since comprehensive periodic health examinations are not yet generally available, other more expedient techniques have been developed.

Multiphasic screening of whole community and industrial plant populations is one possible answer to the problem of early detection. A "streamlined" health examination is another. Evaluation of one trial of the examination technique for detecting cancer can be made through the experience gained by a pilot cancer investigation unit affiliated with the Public Health Service Medical Center at Hot Springs, Ark.

The effectiveness of the Hot Springs technique, described here, is measured in terms of cancer discovered and the costs of discovery. The coincidental discovery of other significant defects by means

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of this procedure is also evaluated. Since the aim of detection is prompt treatment and care, the follow-up system used is described.

The study was conducted on venereal disease suspects at the Hot Springs Public Health Service Medical Center, where such persons are examined and given rapid treatment if necessary.[1] Persons in the older age groups were examined at the cancer investigation center established within the medical center for this purpose.

The Examination Procedure

The History

A brief screening history was taken by specially trained nonmedical assistants. All positive or suggestive replies to questions designed to elicit cancer symptoms were called to the attention of the examining physicians by means of a special history check-sheet.[2] This procedure was completed in about 15 to 20 minutes.

The Physical Examination

Specially trained examining physicians performed a limited physical examination. This included, among other things, breast, pelvic, and rectal examination in females, and rectal examination in males.[3] Wherever suspicious lesions were observed, biopsy was performed. Laboratory procedures, such as complete blood counts, hemoglobin determinations, serologic tests for syphilis, and urinalyses were also performed. Patients with rectal bleeding, a history of hemorrhoids, or melena, or other signs and symptoms of lower bowel disease, were instructed to return in 24 hours, after preparation, for proctoscopy and sigmoidoscopy. The cytologic test for uterine cancer was provided all females and will be evaluated more extensively in a separate report.

Referral for Further Diagnosis and Treatment

All patients requiring further diagnostic work-up and treatment were informed of abnormal findings and given specific advice as to when and where further examinations and treatment could be obtained. Cancer suspects were followed up to insure prompt treatment. Patients with incomplete presumptive findings were summoned back to the center.

Role of the Public Health Nurse in Pretreatment Follow-up

The public health nurse was an important member of the investiga-

[1] The use of a largely syphilitic population was considered satisfactory for the evaluation of an examination technique, especially in view of the availability of a well-equipped service facility. No epidemiologic research was intended, and the only epidemiologic observations made deal with the relationship between syphilis, cervical lesions of all types, and cervical cancer.

[2] See "Patient's History" form, Hot Springs Cancer Investigation Center.

[3] See "Physical Examination" form, Hot Springs Cancer Investigation Center.

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HOT SPRINGS CANCER INVESTIGATION CENTER

Patient's History

Cancer Control

Clinic No. .....

C. C. U. No. .....

Name (Last)	(First)	(Middle)	Date

Age	Date of birth (Month, year)	Sex ☐ Male ☐ Female	Color	Marital status S M W D	Weight

I. Family history of cancer (Died of cancer? Age at death, type)

II. Past history

(1) Medical

(2) Surgical

(3) Venereal disease

Menstrual history	Cycle	L. M. P.
	Metrorrhagia	Menorrhagia
	Menopause (date)	Hormonal treatment
	Post menopausal bleeding	X-ray treatment
Obstetrical	Number of pregnancies	Number of children
	Were babies breast fed?	Average length of time

III. Habits (Smoking)

IV. Systemic review

(1) General	Weight loss		Weakness
(2) Head and neck	Chronic hoarseness	Dysphagia	Mouth sores
(3) Lungs	Chronic cough	Hemoptysis	Chest pains
(4) Stomach	Appetite	Abdominal pain	Indigestion
(5) Rectum	Change in bowel habits	Blood in stool	Melena
(6) Skin	Lumps	Sores	Skin operations
(7) Genito-urinary	Hematuria	Frequency	Dysuria
(8) Breasts	Lumps	Nipple discharge	Tenderness
(9) Gynecologic	Vaginal discharge	Bleeding	Pelvic pain

HOT SPRINGS CANCER INVESTIGATION CENTER

PHS-777-2 (NCI)
4-48
Physical Examination
Cancer Control

Clinic No. .....
C. C. U. No. .....

Name (Last) (First) (Middle) | Date

Age	Date of birth (Month, year)	Sex ☐ Male ☐ Female	Color	Marital status S M W D	Weight

Local evidence tumor disease:

General physical condition:

Skin:
Inspection:
Palpation:

Intraoral:
Inspection:
Palpation:

Neck:
Masses:
Tenderness:
Thyroid:

Breasts:
Masses:
Tenderness:
Nipple discharge:

Lungs:
Auscultation:
Percussion:

Heart:
BP _____ P _____
Rhythm: Apex:
Murmurs:

Abdomen:
Masses:
Tenderness:
Rigidity:
Palpable viscera:
Scars:

Pelvic:
Ext. Genitalia: Urethra:
Vagina:
Cervix:
Uterus:
Adnexae:

Male genitalia:

Rectal:
Anus: Hemorrhoids:
Masses:
Tenderness:
Prostate:

Back and extremities:

Lymphatic system:

Tumor diagnosis:
Provisional:
Cytological:
Final:

Other diagnoses:
(1)
(2)
(3)

Disposition:

Physical done by Dr. .....

Follow-up notes:

tion center staff. In general, she was responsible for bridging the gap between the presumptive diagnosis of cancer and definitive treatment. "Pretreatment follow-up" by the nurse included vigorous efforts to obtain hospitalization and treatment of patients, and the maintenance of detailed follow-up records for all cancer patients and others requested to return for rechecks. The Arkansas State Cancer Commission, the University of Arkansas Hospital, various community hospitals and clinics, and private physicians cooperated in providing diagnostic service and treatment.

Although the public health nurse assumed a specialized function in a pilot study of this type, this does not imply that a similar specialized nurse would be necessary in the average detection center. Aside from broad administrative planning and staff education, which are usually the function of top-level cancer nursing consultants, most of the follow-up duties could logically be assigned to a staff level nurse. While carrying a generalized program, staff nurses could, for example, serve community detection centers in much the same manner as they serve well-baby clinics and adult health clinics. In all three, duties would be very similar; for example, discovering suspects in the home; scheduling appointments; interviewing patients; following-up on doctors' recommendations; drawing upon community resources in order to obtain medical care for patients; and providing or demonstrating nursing care in the home.

Analysis of Case Material

Description of the Study Group

The study group consisted of 1,987 women who were examined between November 13, 1947, and July 14, 1948.[4] The group was composed largely of impoverished share croppers living in a Southern rural environment and usually dependent upon the cotton crop as their sole source of income. Of those examined, 92.6 percent were Negro and 7.4 percent were white.

Eighty percent were between 35 and 49 years of age. Less than 2 out of every 10 examinees were 50 years of age and over. The virtual absence of examinees under 30 years of age is the result of selection, for only the oldest individuals admitted to the center each day were chosen for examination (table 1).

Cancer Cases Compared With Other Defects

Excluding venereal disease, 1,836 (92.4 percent) of the 1,987 examinees were found to have defects, and 151 (7.6 percent) were found free of defects. Cancer was found in 41 (2.1 percent) of the

[4] Male patients were being examined routinely at the completion of the study period, but the number was too small for inclusion in this analysis.

Table 1. *Distribution of females in study group by age and color, Hot Springs cancer investigation center, Nov. 13, 1947, to July 14, 1948*

Age in years	All classes		White		Negro	
	Number	Percent of all ages	Number	Percent of all ages	Number	Percent of all ages
All ages	1,987	100.0	147	100.0	1,840	100.0
Under 30	15	.8	2	1.4	13	.7
30–34	33	1.7	9	6.1	24	1.3
35–39	650	32.7	44	29.9	606	32.9
40–44	500	25.5	38	25.9	470	25.5
45–49	433	21.8	25	17.0	408	22.2
50–54	164	8.2	15	10.2	149	8.1
55–59	93	4.7	5	3.4	88	4.8
60–64	47	2.4	3	2.0	44	2.4
65–69	33	1.7	5	3.4	28	1.5
70–74	6	.3	1	.7	5	.3
75 and over	5	.2	0	0	5	.3

examinees. (See table 2.) The proportion of cancer cases found is slightly higher than that of other similar cancer detection centers (*2*), and the proportion of individuals with other nonvenereal defects (90.3 percent) is very much higher than the average reported for other centers. The composition of the study group is, of course, not comparable with the urban clientele of most cancer detection centers and may explain in part the higher incidence of cancer and other defects.

The incidence of cancer compared with other defects, excluding venereal diseases, follows:

	Number	*Percent*
Total examinees	1,987	100.0
With defects	1,836	92.4
Cancer	41	2.1
Other	1,795	90.3
Without defects	151	7.6

Cancer Case—Age and Site

The fact that one-third of all cancer patients were in the age group 35–39 may be in keeping with the growing belief that cancer, particularly cervical cancer, occurs rather frequently in young Negro women of child-bearing age. Cervical cancer made up four-fifths of all cancer cases (table 2). The high incidence of cervical cancer, both in the Hot Springs study and in the experience of other detection centers, may possibly be attributed to two factors: (1) Cervical cancer is known to occur more frequently than cancer of many other sites among female examinees in the child-bearing ages; (2) the cervix is easily accessible to the examiner so that biopsy may be performed with little difficulty, and therefore the diagnosis is made more often than in cancer of less accessible sites.

There was a relative dearth of breast cancer cases. The absence of cancer of the uterine fundus, the gastrointestinal tract, and other

Table 2. *Number of Negro female examinees with cancer, by age and site*

Age in years	Site of cancer						
	All sites	Cervix	Breast	Vulva	Mouth	Tonsil	Liver
All ages	[1] 40	32	3	2	1	1	1
Under 30							
30–34							
35–39	13	12					1
40–44	9	9					
45–49	7	6	1				
50–54	6	3	1	2			
55–59	2	2					
60–64							
65–69	1				1		
70–74	1					1	
75 and over	1		1				

[1] In addition, there was 1 white examinee, 35 years of age, with advanced adenocarcinoma of the thyroid.

important sites points to a possible deficiency in the examination technique used. Diagnostic dilatation and currettage and routine gastrointestinal X-ray studies were not performed since these extensive procedures were not considered suitable for a large-scale screening program. The problem of devising streamlined techniques to detect the so-called "internal" or "inaccessible" cancers in a large group of presumably well individuals has yet to be solved.

Results of Follow-Up of Cancer Cases

Of the 41 cancer cases, 6 had advanced to the stage where only palliative treatment was indicated. The 35 remaining cases were candidates for prompt attention, and 29 were placed under treatment. Twenty cases were admitted for treatment within 5 weeks after diagnosis. The longest delay between discovery and admission to a treatment facility was 203 days and the shortest, 4 days; the average delay was approximately 49 days.

Nonvenereal Defects Other Than Cancer

Perhaps the most striking aspect of the entire study was the number of defects of all types discovered. In the total group of 1,987 women, 4,512 defects were discovered, an average of 2.3 per examinee. The various kinds of defects in the order of frequency are summarized in table 3. Because the examination procedure was not comprehensive enough to yield a definitive diagnosis in every case, the broad concept of defects was used.

The most prevalent defect in the study group was hypertension which, for the purposes of this study, was defined as a blood pressure consistently higher than 140/90. Hypertension among the Negroes accounted for over 25 percent of all defects, while among the whites it accounted for only 15.3 percent. This seems to corroborate the observations of others (*3*, *4*) regarding the high incidence of hypertension among Negroes.

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Cancer stood in twelfth place from the standpoint of frequency in the group.

Table 3. *Nonvenereal defects in study group, by specific defect and by race* [1]

Defects	Number			Percent		
	All classes	White	Negro	All classes	White	Negro
Total	4,512	307	4,205	100.0	[2] 100.0	100.0
Hypertension	1,124	47	1,077	24.9	15.3	25.6
Cervical lesions	1,060	96	964	23.5	31.3	22.9
Cervicitis	643	52	591	14.2	16.9	14.0
Cervical erosion	157	21	136	3.5	6.9	3.2
Cervical cyst	144	11	133	3.2	3.6	3.2
Cervical polyp	77	8	69	1.7	2.6	1.6
Cervical laceration	32	4	28	.7	1.3	.7
Cervical leukoplakia	7	0	7	.2	0	.2
Benign tumors	539	32	507	[2] 11.9	[2] 10.4	12.1
Fibroid tumors	390	16	374	8.6	5.2	8.9
Fibroma of skin	47	5	42	1.0	1.6	1.0
Lipoma	25	3	22	.6	1.0	.5
Multiple nevi	19	3	16	.4	1.0	.4
Thyroid adenoma	15	0	15	.3	0	.4
Ovarian tumor	15	1	14	.3	.3	.3
Fibroadenoma of breast	12	0	12	.3	0	.3
Hyperkeratotic warts	9	2	7	.2	.6	.2
Hemangioma of nose	5	2	3	.1	.6	.1
Neurofibromatosis	2	0	2	.0	0	.0
Chronic and disabling pelvic disorders [3]	388	39	349	8.6	12.7	8.3
Senile vaginitis	150	13	137	3.3	4.2	3.3
Pelvic adhesions	75	7	68	1.7	2.3	1.6
Cystocele	41	5	36	.9	1.6	.9
Rectocele	27	4	23	.6	1.3	.5
Retroverted uterus	20	2	18	.4	.7	.4
Barthelin cyst	14	2	12	.3	.7	.3
Tubo-ovarian mass	12	2	10	.3	.7	.2
Procidentia	9	1	8	.2	.3	.2
Anal or rectal stricture	9	0	9	.2	0	.2
Rectovaginal fistula	8	1	7	.2	.3	.2
Perineal lacerations	7	0	7	.2	0	.2
Vaginal stricture	6	1	5	.1	.3	.1
Chronic salpingitis	4	0	4	.1	0	.1
Monilia vaginitis	4	1	3	.1	.3	.1
Oophoritis	2	0	2	.0	0	.0
Cardiac pathology	262	15	247	5.8	[2] 4.9	5.9
Aortic insufficiency	175	11	164	3.9	3.6	3.9
Mitral murmur	26	2	24	.6	.6	.6
Hypertensive heart disease	26	2	24	.6	.6	.6
Extrasystoles	18	0	18	.4	0	.4
Pulmonic murmur	11	0	11	.2	0	.3
Hypertension with decompensation	3	0	3	.1	0	.1
Rheumatic heart disease	2	0	2	.0	0	.0
Coronary insufficiency	1	0	1	.0	0	.0
Anemia	255	11	244	5.7	3.6	5.8
Hemorrhoids	219	25	194	4.9	8.1	4.6
Dental caries	118	12	106	2.6	3.9	2.5
Buccal leukoplakia	87	1	86	1.9	.3	2.0
Obesity	56	3	53	1.2	1.0	1.3
Thyroid disease	49	3	46	1.1	1.0	1.1
Goiter, nontoxic	45	3	42	1.0	1.0	1.0
Goiter, toxic	4	0	4	.1	0	.1
Cancer	41	1	40	.9	.3	1.0
Glycosuria	27	1	26	.6	.3	.6
Hernia	21	1	20	.5	.3	.5
Hypertrophic tonsils	18	1	17	.4	.3	.4
Urethral caruncle	14	1	13	.3	.3	.3
All other defects	234	18	216	5.2	5.9	5.1

[1] Includes multiple defects found in many examinees.
[2] Due to rounding of numbers the percentages do not add up to indicated total.
[3] Benign tumors are excluded.

A multiplicity of nonvenereal defects was revealed by the examinations: 27.5 percent of the examinees had at least two defects, and 21.6 percent had at least three defects. Only 151 individuals, or 7.6

percent, had no demonstrable defects. The distribution of female examinees by number of nonvenereal defects is given below:

Number of defects per examinee	*Number of examinees*	*Percent of total examinees*
Total	1, 987	100. 0
None	151	7. 6
1	502	25. 3
2	546	27. 5
3	430	21. 6
4	229	11. 5
5	85	4. 3
6	25	1. 2
7	15	. 8
8	4	. 2

The high prevalence of defects observed among the Hot Springs examinees is not surprising considering the socioeconomic status of the patients. For example, the incidence of cervical lesions (almost 23 percent of all defects) has been related to lack of obstetrical and gynecological care. Although syphilis must be considered a potential factor in the development of cervical lesions, it is shown below that the incidence of cervical lesions among syphilitic examinees was not significantly higher than in the nonsyphilitic group.

Syphilis and Cancer

For many years it has been generally believed that cancer of certain sites, that is, tongue and uterine cervix, is more prevalent among individuals with syphilis than among the general population (*5*, *6*). In the present study, however, which deals with a predominantly syphilitic-female population, this relationship has not been observed. For example, out of 1,987 women examined, 1,753, or 88.2 percent, had proven syphilis, while 210, or 10.6 percent, were nonsyphilitic. Yet, as seen in table 4, the proportion of all types of cervical lesions and of cancer itself among both groups was very similar.

Table 4 represents an attempt to correlate the presence of syphilis, cervical lesions, and cancer in the study group. Although 40.3

Table 4. ***Comparison of the number and percent of examinees having cervical lesions and cervical cancer in the syphilitic group, in the nonsyphilitic group, Hot Springs Cancer Detection Center, Nov. 13, 1947, to July 14, 1948***

Item	Number of examinees				Percent of total examinees			
	Total	With syphilis	Without syphilis	Unknown syphilis	Total	With syphilis	Without syphilis	Unknown syphilis
Total	1, 987	1, 753	210	24	100. 0	100. 0	100. 0	100. 0
Without cervical lesions	1, 190	1, 046	128	16	59. 9	59. 7	61. 0	66. 7
With cervical lesions of all types	797	707	82	8	40. 1	40. 3	39. 0	33. 3
With cancer of cervix	32	27	4	1	1. 6	1. 5	1. 9	4. 1

percent of the syphilitic group had cervical lesions, almost an equal proportion of the nonsyphilitic group, 39.0 percent, also had cervical lesions.

Cervical cancer occurred in only 1.5 percent of the syphilitic group in comparison with 1.9 percent of the nonsyphilitic group. Since the age distribution of both groups is similar, and since there is no significant difference between the proportion of cancer cases in each group, any etiologic relationship between syphilis and cancer may be nonexistent or masked by other unknown factors. It has also been suggested that the syphilitic infections were of insufficient duration to warrant the conclusion that their influence on the development of cancer will not become apparent later.

Histologic and Cytologic Examinations

There were 503 examinees who had at least one biopsy during the study, and of this number 456 individuals had at least one biopsy of the cervix uteri. The frequent use of the cervical biopsy is not surprising in view of the prevalence of cervical lesions among the study group. During the study period, 797 of the 1,987 examinees, or 40.1 percent, were found to have at least one type of cervical lesion.

Costs

The costs of operating the "pilot" cancer detection center are presented in table 5. All initial expenditures for nonexpendable items, such as microscopes, centrifuges, and water baths, which would be found in any hospital laboratory are excluded. The figures presented are therefore estimates of operating costs only.

Very little material in the literature deals with the subject of cancer detection center costs. Many general statements have appeared estimating the cost of discovering a case of cancer from as

Table 5. *Analysis of costs of operation, Hot Springs cancer investigation center, Nov. 13, 1947, to July 14, 1948*

Total operating expenses [1]	$37,505.84	
Number of visits	2,104	
Total cost per visit		$17.82
Number of operating days	169	
Total cost per operating day		221.93
Number of cancer cases found	41	
Total cost per cancer case		914.78
Number of examinees with defects	1,836	
Total cost per examinee with defects		20.43
Number of defects found	4,512	
Total cost per defect found		8.31

[1] Total operating expenses include: salaries, $25,488.59; supplies (expendable), $3,471.09; transportation, $1,273.87; overhead, $4,002.29, plus $3,270 for biopsy expense. Total, $37,505.84 (cytologic test, $12,756.32, and clinic, $24,749.52).

low as $1,000 (*7*), or less, up to $25,000 (*8*). Others have placed costs at about $7,000 to $8,000 (*9*) per case of cancer discovered—somewhere between the two extremes. In one of the few actual analyses of detection centers in which costs were determined for 10 detection centers in New York City (*10*), costs ran about $6,486 per cancer case discovered. In the Hot Springs project, using the described examination technique, the cost came to approximately $914.78 per case.

Table 5 shows that for the study period operating expenses amounted to $37,505.84. The cost per visit was $17.82. The cost per defect found was but $8.31. When the costs of the cytologic test are deducted, the net costs are reduced to $11.76 per visit, and $5.48 per defect found.

Discussion

Until the laboratory investigator provides the clinician with better diagnostic tools, detection centers probably cannot be considered practical for the discovery of inaccessible asymptomatic cancer. This would seem to justify further contraction or streamlining of the procedure to eliminate all procedures, such as auscultation of the heart, and blood pressure determination, except those capable of detecting accessible cancer.

On the other hand, the yield of other defects suggests that with minor expansion the Hot Springs routine might be adapted to serve as a streamlined general examination, either in the physician's office or in adult health clinics, for the detection of all statistically significant diseases of adults. (The cost per case of hypertension was only $33.37.)

This study has demonstrated the potentialities of a field follow-up mechanism established as an integral part of a detection center's operation. Since cancer control is not achieved with cancer detection alone, it should be possible for those with responsibility for first suspecting its presence to make arrangements to expedite treatment, thereby preventing fatal delays.

Summary

The examination procedure used in a "pilot" cancer investigation unit affiliated with the Public Health Service Medical Center, Hot Springs, Ark., is described and evaluated from the standpoint of disease discovered and costs.

Defects were reported in 92.4 percent of the 1,987 examinees. Cancer was found in 2.1 percent of all examinees. About one-third of all cancer patients were in the 35–39 year age group. Cervical cancer accounted for four-fifths of the cases and only one cancer of an internal site was discovered. Of the 35 patients with cancer who

were candidates for prompt treatment, 29, or about four-fifths, were placed under treatment as a result of the follow-up mechanism described.

Nonvenereal defects other than cancer were reported in 90.3 percent of examinees, and the majority had two or more defects.

Examinees having biopsies totaled 503, and 456, or 90.7 percent, of these had cervical biopsies. More than 40 percent of all examinees had at least one type of cervical lesion. A definite relationship between syphilis and cervical cancer was not observed.

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Some Conditions Leading to Medical Dependency in Hagerstown, Md.

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The Maryland medical care program was started in 1945 in Washington County, Md. This program provides for payment by the State of medical expenses for all public assistance recipients and for others who, although not on assistance rolls, are unable to pay for their medical requirements (*1*). Although persons receiving public assistance are automatically certified for medical care under the program, many assistance recipients have requested no medical services. Persons who are not assistance recipients may be certified for medical care for a specific illness or for a limited time. From November 1945 through May 1950, a total of 5,503 white residents of the county were receiving public assistance or were individually certified and thus were eligible for this medical service.

Some of these 5,503 persons had been included in a survey of health and socioeconomic status conducted by the Public Health Service 25 years earlier. It is therefore possible to examine certain general features in the history of the surveyed persons who later received medical care under the State program. These persons were found to differ in 1923 from the remainder of the survivors of the original survey in the following general characteristics:

1. They were, even in 1923, within the lowest income group of the population. Only 1.7 percent of the medical care recipients in 1945–50 were in well-to-do or comfortable circumstances in 1923, while 78.0 percent were poor or very poor in 1923. Among those who were not certified for medical care under the Maryland program in 1945–50, 10.5 percent were in well-to-do or comfortable economic circumstances in 1923, while 43.9 percent were poor or very poor at that time. Of all families that were very poor in 1923, 15.4 percent had one or more members who were recipients of State medical care in 1945–50.

2. During the period 1923–43, as could have been expected, a larger proportion of recent medical care recipients than of others had suffered a gross decline in socioeconomic status, the percentages being 15.3 and 4.4, respectively. About 1 percent of the persons in families that had improved in economic status and 10.5 percent of

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those in families with a decline in status became medical care recipients under the State program in 1945–50.

3. The medical care recipients were, as a group, older persons than persons who were not medical care recipients, and the proportion of such recipients increased with age. This finding presumably reflects the financial burdens imposed by chronic illness and the high proportion of recipients of old-age assistance (aged 65 and over) who are chronically ill.

4. The prevalence of chronic illness in 1923 was significantly higher among persons who became medical care recipients in 1945–50 than among other persons included in the survey. The prevalence rates, adjusted for differences in age and economic status, were 35.3 and 19.2 per 100 for the two groups, respectively. No difference was found between the two groups with respect to the extent of acute illnesses in 1921–23.

Material

From 1921 through 1923, a family survey was conducted in Hagerstown, Md. (*2*). This survey included all classes of the population. Each family was rated as well-to-do, comfortable, moderate, poor or very poor, with ratings based on occupation and the interviewers' observation of the apparent general standard of living, rather than on actual family income. At 6-week intervals a trained field worker visited each family and recorded information on the acute illnesses and attacks of chronic diseases that had occurred since the previous visit. Table 1 shows that in the 1923 survey there were 5,622 persons who had been observed for 12 months or longer and who were members of 1,310 unbroken families (husband and wife both alive and in the same household). By 1945 the number of families in which at least one parent was still alive and living in the Hagerstown area had decreased to 1,002 and, through death or departure from the household of parents or children, the number of remaining persons was 2,181.

Among the 2,181 persons remaining in 1945 were 59 persons who received medical care under the State program in 1945–50 and 28 others who were not themselves certified for medical assistance but

Table 1. *Distribution of persons and families in the original 1923 survey according to status of family members under State medical care program, 1945–50*

Status	1923 survey population		Status under State medical care program, 1945–50			
			Nonrecipient		Recipient	
	Persons	Families	Persons	Families	Persons	Families
Included in 1923 survey	5,622	1,310	5,392	1,260	230	50
Died in 1923–45	1,148	308	1,113	308	35	----
Left household during 1923–45	2,293	----	2,185	----	108	----
Remaining in 1945	2,181	1,002	2,094	952	87	50

who were in the families and households of the 59, making a total of 87 in these families.

In all, 2,094 persons canvassed in 1923 and residing in the households reviewed in 1945 were not related to the 59 medical care recipients. These 2,094 persons are compared with the 59 recipients of medical care under the State program as to their socioeconomic history and prevalence of chronic and acute illnesses during the 1923 survey. Similar comparisons are made between 952 families of persons who did not receive State medical care and 50 families of medical care recipients. Throughout this report the use of recipient and nonrecipient refers to status under the State medical care program in 1945–50. No one in this study was receiving organized medical or welfare aid during the 1921–23 survey.

Socioeconomic History

Table 2 shows the percentage of persons in each socioeconomic class in 1923 among persons who procured their own medical care and among persons whose care was provided by the State in 1945–50. The difference in the 1923 socioeconomic distributions of the two groups is evident. In the last column of this table, the percentage of medical care recipients varies inversely with economic status in 1923. These proportions are adjusted by the indirect method [1] for age differences between the recipients and the nonrecipients.

When similar comparisons are made for families, rather than for individuals, one finds that among the families that were in well-to-do circumstances in 1923 none had members who were medical care recipients in 1945–50, and among the families in comfortable circumstances 1.0 percent became medical care recipients. Among the families in moderate circumstances 2.2 percent, among the poor, 8.3

Table 2. *Socioeconomic status in 1923 of persons who were nonrecipients or recipients of State medical care, 1945–50*

Socioeconomic status in 1923	Total		Status under State medical care program					
			Nonrecipient		Recipient		Percent in recipient group	
	Number	Percent	Number	Percent	Number	Percent	Observed	Adjusted [1]
All	2,153	100.0	2,094	100.0	59	100.0	2.7	2.7
Well-to-do	61	2.8	61	2.9	0	0	0	0
Comfortable	165	7.7	164	7.8	1	1.7	.6	.2
Moderate	981	45.6	969	46.3	12	20.3	1.2	1.2
Poor	853	39.6	813	38.8	40	67.8	4.7	4.6
Very poor	93	4.3	87	4.2	6	10.2	6.5	7.9

[1] Adjusted for differences in age between the recipient and nonrecipient groups.

[1] This is the method described by Pearl (*5*) as "adjusted rates (a)." The total population of the sample is used as the standard.

965090—51—3

percent, and among the very poor 15.4 percent had members receiving medical care from the State in later years. These proportions are adjusted for age differences between the two groups.

All persons in this report were included in a second survey (*3*) conducted in 1943. The field worker had the original 1923 data at hand and rated each family as having an improved, unchanged, or reduced socioeconomic status during the 20-year interval. Ratings were made on the basis of comparisons between the 1923 and the 1943 location and condition of their dwellings, their occupations, and the extent and types of their employment. The improvement and decline in economic status represented grossly observable changes, whereas the "unchanged" group necessarily represented a range of slighter changes in socioeconomic condition. During the war, wages and employment in Washington County were at a high level. Principally for this reason only 4.4 percent of the nonrecipient survivors of the original survey group declined in economic status, while 17.1 percent showed an improvement. In contrast, among the medical care recipients 15.3 percent had declined in status and 5.1 percent had experienced an improvement. When each category of change in status is examined according to the percentage of persons who became medical care recipients, one finds that 1.3 percent of all persons in families which had improved their status between 1923 and 1943 had become recipients by 1950, whereas 2.6 percent of all persons whose family economic status remained unchanged and 10.5 percent of all persons in families with a reduced status became medical care recipients. Again these percentages are age adjusted.

Age

How does the age distribution of the medical care recipients compare with that of other persons in the survey group? Table 3 shows that the recipient group is weighted with older persons. This difference in the age composition of the recipient and nonrecipient populations is reflected in the variation shown in the proportion of persons in each age group who later became medical care recipients.

The relationship between age and receipt of medical care under the State program is seen also for families. Only 1.6 percent of the families in which the father was under 30 years of age in 1923 had a member receiving medical care from the State in 1945–50. For fathers 30–39 years of age the proportion of the families that had members who were later receiving medical aid at State expense was 3.4 percent; for fathers 40–49 years of age it was 6.4 percent; and for fathers aged 50 and over it was 8.7 percent.

Certification for care under this program depends upon economic standards and, for persons certified for medical care only, also upon

Table 3. *Age in 1923 of persons who were nonrecipients or recipients of State medical care in 1945–50*

Age in 1923	Total		Status under State medical care program				
			Nonrecipient		Recipient		Percent in recipient group
	Number	Percent	Number	Percent	Number	Percent	
All	2,153	100.1	2,094	99.9	59	100.0	2.7
Under 20	592	27.5	583	27.8	9	15.3	1.5
20-39	1,022	47.5	1,004	47.9	18	30.5	1.8
40-49	376	17.5	354	16.9	22	37.3	5.9
50 and over	163	7.6	153	7.3	10	16.9	6.1

the nature of the disease. Persons with prolonged illnesses which are likely to place a severe strain on already low resources are most readily certified. Since the prolonged illnesses are largely chronic diseases among older persons, the method of selection results in an age differential between the recipient and the nonrecipient groups.

The factor of the older persons having suffered a greater decline in economic resources also has a bearing on the larger proportion of medical care recipients among persons in the older age groups. During the period from 1923 to 1943, 6.7 percent of the persons over age 40 in 1923 suffered a decline in economic status as compared with 3.5 percent among persons under age 20 in that year. In the older group, 8.5 percent improved in status, as contrasted with 23.5 percent in the younger group.

Chronic Illness

To assure complete recording of chronic illness in the 1921–23 survey, this report includes only persons who were observed for 12 months or longer. The causes of chronic illness are listed in an earlier report of these data (*4*). Table 4 presents the percentage of persons who were chronically ill in 1923 among the medical care recipients in 1945–50 and among the nonrecipient group. Because of differences between the two groups in age and economic classification, these figures have been adjusted by the indirect method to make them comparable. The probability is less than 1 in 100 that a difference as great as or greater than the difference between the rates shown could have arisen by chance. It is apparent that those who are now medical care recipients had a greater amount of chronic illness 20-odd years ago than persons who are not now recipients.

In 1923 one or more persons was chronically ill in 51.6 percent of the 952 families that were not medical care recipients in 1945–50, whereas there was chronic illness in 72.0 percent of the 50 families who were medical care recipients in 1945–50. These crude rates, however, exaggerate the difference in the prevalence of chronic illness in the two groups of families. When adjusted by the indirect method

Table 4. *Prevalence of chronic illness in 1923 among recipients and nonrecipients of State medical care in 1945–50*

Status under State medical care program, 1945–50	Chronic illness status, 1923				
	Total	Well, 1923	Chronically ill, 1923	Observed percentage ill	Adjusted percentage ill [1]
All	2,153	1,731	422	19.6	19.6
Nonrecipient	2,094	1,697	397	19.0	19.2
Recipient	59	34	25	42.4	35.3

[1] Adjusted for differences in age and socioeconomic status between the recipient and nonrecipient groups.

for age of father and economic status, the rates are 51.9 and 64.4 per 100 for the nonrecipient and recipient groups, respectively. The probability of chance occurrence of a difference as great as or greater than this is .05.

Acute Illness

During the original survey of 1921, detailed records of acute illnesses were maintained. When adjusted for age and economic differences, the attack rates per person year of observation were 0.92 for persons who are now medical care recipients and 0.86 for those who are not recipients. The two groups therefore show no appreciable difference with respect to the amount of acute illness in 1921–23.

Persons No Longer in Household

The foregoing comparisons are, of necessity, limited to persons who were surviving and in the households in 1945–50. It is of interest to compare the recipient and the nonrecipient groups with respect to family members who died or who left the households before the State medical care program started. Of the 5,392 persons originally in the families of nonrecipients, 61.2 percent were "lost" to the household by 1945. Among the 230 original members of the families containing medical care recipients, 62.2 percent were "lost" to the household. Although these percentages are approximately the same, the mortality rates and the rates of leaving the households vary for the two groups. The mortality rates over the 22-year span were 20.6 per 100 persons in the nonrecipient families, and 15.2 per 100 persons in the families which later had members who were medical care recipients. This difference is largely due to a difference in the age structures of the populations. As explained earlier, persons certified for medical care under the State program were, as a group, older than the others included in the survey. For the original members of families of recipients and nonrecipients the reverse is true; only 0.9 percent of the members of recipient families were over 60 years of age in 1923 as compared with 5.3 percent over age 60 in the other families. The

age difference is in turn associated with the differences in socioeconomic status. The families that had medical care recipient members were, in 1923, in much poorer socioeconomic circumstances than the other families, and the poorest families had the lowest proportion of aged people. When the mortality rates over the 22-year period are adjusted for age and socioeconomic status they are, for all practical purposes, the same, being 19.9 and 18.5 for the nonrecipient and recipient groups, respectively.

Between 1923 and 1943, 40.5 percent of the persons in nonrecipient families and 47.0 percent of those in recipient families had left their original households. Again this difference is largely a matter of age and socioeconomic status since the members of recipient families were, on the average, younger than those of the nonrecipient families, and the bulk of the migration was among young persons. Furthermore, the amount of loss from the households was progressively greater with decreasing economic status, ranging from 19 percent of the well-to-do persons to 48 percent of the poor persons. It was noted earlier that the medical care recipients of 1945–50 were among the poorest families in 1923, and thus a greater amount of departure from the home during the intervening years would be expected in this group. When adjusted for age and socioeconomic status, the rates of leaving the household are 40.7 for the nonrecipient group and 41.7 for the recipient group.

Discussion

The present report, combined with the findings of earlier reports on these data, shows that the problems of aging, chronic illness, socioeconomic status, and certification for medical care under the Maryland State medical care program are closely interwoven. Although at any given time there is a greater proportion of economically comfortable persons in the older age groups than in the younger groups, yet the proportion of persons that suffer a decline in economic status over a span of years is higher among the old than among the young. Concurrent with the reduction of earning power which generally accompanies old age is a marked increase in the incidence of chronic illness (*4*). Chronic illness, regardless of which family member is ill, not only tends to curtail income further but also adds considerably to the costs of medical care and maintaining the home, particularly if the family wage earner is the invalid (*6*, *7*).

The fact that only one family in well-to-do or comfortable socioeconomic circumstances in 1923 had a medical care recipient in 1945–50 indicates that good economic circumstances acted as a buffer against medical dependency in old age even though chronic illnesses developed in some of these families. At the other extreme, 7.9

percent of the individuals and 15.4 percent of the families that were very poor in 1923 were in the recipient group in 1945. The figures indicate the importance of a high economic level from the standpoint of future medical solvency of the family; prevention of illness and rehabilitation of invalids, moreover, help to prevent a decline in economic status.

It is impossible to determine how much larger the number of medical care recipients might have been were it not for the era of relative economic prosperity experienced thus far during the period of the operation of the State program. Certainly the cost of maintaining the program would increase under less favorable economic conditions. Over a period of years costs may also be expected to rise with increases in the proportion of older persons in the population. Not only has chronic illness constituted approximately half of the diagnoses in the Maryland medical care program, but also patients with chronic diseases have, by and large, required the most expensive care. The association demonstrated in this report between age and future medical dependency is of more than mere statistical interest in revealing the probability that certain income and age groups will require medical assistance. The relationships shown also indicate that in years to come provision for medical care may cause an increasing drain on family and community resources.

Aside from the differences found between the recipient and the nonrecipient groups, it is of interest to determine the reasons why certain persons who were very poor in 1923 did not become medical care recipients and why some others who were in moderate circumstances in 1923 did become recipients.

Of the 87 surviving members of nonrecipient families that were very poor in 1923, 46 were classified as having an improved economic status by 1943. This classification indicates a considerable betterment of socioeconomic condition. An additional 37 were recorded as having no change in status according to the broad groupings employed, but these 37 were listed as poor in 1943 whereas they had been very poor in 1923, indicating that there had been some slight improvement in their status. Only 4 persons (members of 2 families) were recorded as still very poor in 1943, and 3 of these persons reported no chronic illness in the later survey. In all, only 18 of the 87 persons had a chronic disease in 1943. This record of improvement in status and freedom from chronic illness largely explains why this group did not become medical recipients in 1945–50. Other factors, however, are more difficult to assess. For example, even though many of these people were still rather poor in 1943, some of them may not have requested public assistance or medical aid because of pride or of ignorance of the availability of the services. Others, in times of financial crisis, may have obtained help from persons outside the

household. Still others, having become accustomed to substandard living conditions may still appear to be poor even though they now have fewer financial responsibilities, greater income, and possibly some savings. Thus they may have been rated poor or very poor in the 1943 survey though able to meet their medical expenses.

A large proportion of persons who were in poor or very poor circumstances in 1923 and remained in this status in 1943 would be expected to come under the State medical care program. But what factors, obtainable from these data, led to the receipt of medical care under the State program by some persons who had been in comfortable or moderate socioeconomic circumstances in 1923? Since only 13 medical care recipients were in this group, a detailed classification of their characteristics would have little justification. It is of interest to note, however, that none of these persons had improved his economic status over the 1923 rating. Five of the thirteen were chronically ill during both surveys, and an additional five had a chronic disease in 1943. Other members of the family and household of each of the remaining three persons were chronically ill. In addition, the husband had died of a chronic disease between 1923 and 1943 in four families and the wife, in two families. This intensive record of chronic illness and death from chronic illness may in large measure account for the recipient status of the group.

The data of this report are not extensive enough to permit determination of all the factors associated with future receipt of medical assistance. Studies on a larger scale could reveal many of these factors and the independent role of each in the probability of becoming medically dependent. Only when the familial factors that lead to medical dependency have been more precisely defined and the importance of their causal effects have been evaluated, can an effective and economical program for prevention of medical dependency be formulated. Such studies should include the effects of existing buffers against dependency such as private, industrial, and governmental provisions for medical care and financial security in old age.

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A National Program for Training Public Health Personnel

By Ellis S. Tisdale*

Massachusetts has shown outstanding evidence of leadership in dealing with the protection of the health of her citizens. In recent months she has responded to the challenge of a Nation-wide and world-wide shortage of trained public health personnel, and is demonstrating effective methods for carrying out field training for all types of public health personnel, including health officers, public health nurses, health educators, sanitary engineers, and sanitarians. The Public Health Service, through its Communicable Disease Center in Atlanta, has participated in the New England Field Training Center where the field training of persons who have completed their academic work is being carried on. Also under way is a training program which offers refresher courses in sanitation to persons throughout New England who are already on the job and need additional instruction in public health methods. I shall outline briefly some of the ways in which the Public Health Service is working with Massachusetts and with many other States in developing improved techniques for field training of public health personnel throughout the Nation.

In developing a national program of field training, the Public Health Service is taking full advantage of its opportunity to draw upon all the available resources in the Nation. These resources include the Kellogg and Commonwealth Foundations, the many schools of public health, the universities which have developed field training to supplement their academic courses, and several States which for years have conducted excellent field training programs.

Communicable Disease Center Training Services

An effort has been made to bring all field training experience and knowledge into focus at one headquarters point. Special opportunities for doing this exist in Training Services, a branch of the Communicable Disease Center at Atlanta, the central headquarters of the field training program of the Public Health Service. Here, over a period of several years, CDC has developed new and improved methods for helping the States develop field training programs. The keynote at this field station is teamwork, a principle which has been followed by a large group of eminent scientists, doctors, engineers, entomolo-

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gists, nurses, and laboratory specialists who carry on a Nation-wide program of applied research in communicable disease control. Because field training is essential in this broad program, CDC is working with the States to assist them in establishing such programs.

During World War II, in Atlanta, sanitary engineers, sanitarians, entomologists, and other public health workers developed effective practical training techniques in malaria and typhus control which were eminently successful. The same principles which were utilized then are now being rapidly expanded to cover the entire field of public health. Perhaps a glance into some of the fundamental concepts upon which the national program of field training for public health personnel is erected will be of interest.

An experimental field training center is continually in operation with headquarters at the Communicable Disease Center. One hundred miles to the south in Columbus, Ga., new field training methods are continually being developed in a city-county health department. The training officers assigned to the Columbus center and to Atlanta headquarters, as well as to all regional training centers, have been selected with great care. Contagious enthusiasm and a missionary zeal as to the relative importance of field training in public health have been basic elements in the specifications for their selection. These training officers must and do have the ability to impart inspiration and enthusiasm to other training officers and trainees studying and doing practical work at these centers.

Public relations is a fundamental concept. The training officer must keep constantly in mind and must practice good public relations. Public speaking and public relations practice are incorporated in all field work given under the auspices of the CDC Training Services Branch.

Periodic working conferences bring the leaders from all regional centers together at headquarters to hold discussions in small groups. Thus, a clearing house on the most effective training methods is operating at Atlanta continuously.

From this central training source, assistance is continually flowing to States which have made beginnings in field training, such as the centers at Gainesville, Fla.; New Orleans, La.; and Austin, Tex. If a special need arises for training in food sanitation in the Florida training center, for example, a request for a training team is dispatched to Atlanta. On the team's arrival at Gainesville, its members place themselves under the direction of the training officer in charge of the State center. Field practice in food sanitation is then made possible through the use of the city-county health facilities.

On another occasion, perhaps, a group of young Latin American medical officers may be completing their master of public health degrees at Tulane University and need a 7- to 14-day period of field

practice in malaria and insect control, with special emphasis on conditions in Latin America. The New Orleans field training center advises Atlanta of its needs, and a two-man training team is dispatched to New Orleans with essential equipment, insecticides, and audio-visual aids. Here, using the State training center as a base, the training officers from Atlanta spend a week or 10 days working with the young medical officers who then return to Latin America to become leaders in organizing and administering public health practices.

Another need might arise in the field of housing sanitation. Key cities and counties in Texas may wish to orient their sanitary engineers and sanitarians in housing evaluation techniques and slum clearance programs. Public Health Service officers in the Federal Security Agency Regional Office at Dallas, working with the State training program at Austin, arrange the time and length of the course to be held at the training center, and request a training team from Atlanta. Members of the team proceed to the State training center and, utilizing local facilities, give the essential orientation and specialized training in housing sanitation that will enable these sanitation leaders in cities and counties in Texas to start housing sanitation programs in their own communities.

For the past year, two-man training teams have been sent on request to Massachusetts, Washington, D. C., Colorado, Missouri, South Carolina, California, and to the Pacific Northwest. The regional training centers, in cooperation with the Regional Offices of the Federal Security Agency, do the essential planning, provide the space, and recruit the personnel. Such decentralized courses of a specialized nature are economical, and fill a real need in many States.

One unique element in the training facilities available from Atlanta is the audio-visual production services. It is a "Hollywood in miniature" without the glamour, but it provides outstanding educational leadership in the preparation of training aids. In this branch are script writers, motion picture and still picture cameramen, editors, sound engineers, and audio-visual production specialists. They produce filmstrips, slides, and motion pictures which can be used at the field training centers. Thus, principles of water supply, waste disposal, rodent and insect control, and milk and food sanitation can be visualized for the trainee. Training officers with teaching experience, who served in the Army and Navy during World War II directing the use of training aids and instructing both officers and enlisted men, are heading this program of putting into practice the rapid-education methods perfected by the armed forces. Now, the effort is being directed toward conserving human life. It is perhaps the first systematic effort in the United States to develop and use training aids which are specially planned and designed for teaching public health principles.

The first course in training methods was scheduled this year at Atlanta. This course is designed for training "trainers"—leaders from regional and from State training centers. Educators from the Georgia Institute of Technology and Emory University and specialists in the use of audio-visual training aids cooperated with the CDC staff in directing these courses. Industrial enterprises have found training courses such as these invaluable, and the U. S. Office of Education had extraordinary success in administering them during the war.

Now, let us briefly glance at the United States as a whole and see how, by utilizing previously mentioned principles and procedures, the field training centers which constitute the nucleus for a national program are distributed across the Nation. We shall start in the East and move first to the South and then to the West.

Amherst, Mass.—Regional field training center serving New England.

Buffalo, Syracuse, and Albany, N. Y.—Regional field training center and assistance to State health department training office.

Pittsburgh and Harrisburg, Pa.—Regional field training center and assistance to State health department training office.

Cincinnati, Ohio.—Nation-wide field training center in environmental sanitation, stream pollution control, and radiological health.

Bloomington, Ill.—Regional field training center.

Charleston and Columbia, S. C.—Field training center and assistance to State health department training office.

Chapel Hill, University of North Carolina, School of Public Health.—Assistance to university field training team of State and regional scope.

Atlanta, Ga.—Headquarters of training services.

Columbus, Ga.—Regional field training center.

Topeka, Kans.—Regional field training center.

Norman, Okla.—Field training center and assistance to State health department training office.

Denver, Colo.—Regional field training center.

San Francisco, Calif.—Assistance to State health department training office.

Seattle, Wash.—Regional field training center and assistance to State health department training office.

It is possible to comment upon only two or three examples of these centers and to indicate briefly their scope and development.

New York Field Training Center Productive Three Ways

Approximately 3 years ago, two Public Health Service officers were assigned to the Troy-Rensselear Health Department under an agreement with the New York State Health Department. They had been engaged for a year or more at Columbus, Ga., in field training courses in environmental sanitation, in which county sanitarians from North Carolina, South Carolina, and Georgia were given 3 months of practical training. In addition to conducting the 12-week regularly scheduled courses for New York State sanitary inspectors, the two

Public Health Service officers developed, upon request, decentralized training activities of different types for the University of Massachusetts at Amherst and for Pittsburgh, Pa. It was found that their help was beneficial, and the time proved ripe for developing field training in both Massachusetts (for the six States in the New England area) and in Pennsylvania, as well as for expanding the excellent but limited field training activities in New York State. Thus, from the original Troy field training demonstration, there have grown three comprehensive training programs: (1) the New England field training center; (2) the development of more complete systems of field training for all public health disciplines in New York State; and (3) full-time field training activities to serve Pittsburgh and the State of Pennsylvania.

New England Field Training Center

Utilizing the resources and facilities at the University of Massachusetts, after an agreement by the State, the Federal Security Agency Regional Office, and the university, two CDC training officers were assigned to Amherst. Instead of sending the University's 4-year graduates in environmental sanitation to Michigan as had been done in the past, facilities were developed and put into use in western Massachusetts. The field training demonstration was successful from the start. Later, Kellogg Foundation assistance, together with funds from the State health department and the university, made it possible to inaugurate a full-fledged Massachusetts field training program, with responsibility resting in the executive office of the State health commissioner. The leadership and enthusiasm of the director of training have moved the program rapidly forward, and it is proposed to have this center serve all New England for the field training of all types of public health workers.

Expansion of New York State Training Program

With the assistance of Public Health Service officers, the office of professional training at Albany has embarked upon a program of giving field training to sanitary engineers and sanitarians on a Statewide basis. The report, dated March 12, 1951, of the Committee on Sanitation Training to the health commissioner, Dr. Herman E. Hilleboe, recommended inauguration of three types of training program: short in-service training courses for all engineers and sanitarians; internship training program for inexperienced engineers and sanitarians; and formal academic training for engineers and sanitarians at universities and colleges. The report also recommended that a public health engineer and sanitarian be employed to operate and supervise the training section and direct all sanitation programs in the State. The necessary funds and personnel, it is reported, have been obtained by New York to make this training program effective.

New York is also expanding field training for health educators and health officers through assignment of training officers.

Inauguration of Field Training in Pennsylvania

The enthusiastic interest of the director of the new School of Public Health in Pittsburgh, of the new State health commissioner, and of the health officer of Pittsburgh have stimulated progress in field training in Pennsylvania. The Public Health Service assigned two training officers with broad experience to the new regional center which the city health department provided and equipped. Twelve-week courses in environmental sanitation for trainees from Pittsburgh, from Pennsylvania Health Department headquarters, and from Ohio are meeting with success.

At the request of the new State health commissioner, the scope of the field training is being broadened by establishing a director of training in the executive office of the commissioner for the purpose of assisting all divisions in training public health personnel. Our training officer has been invited to assist in the work.

This brief recital of the trend toward enlarging field training in the northeastern section of the country indicates how ready the States are to cooperate in more effective training activities. The demonstration at Troy, N. Y., bore fruit far out of proportion to the investment made by CDC.

Specialized Training Services at Cincinnati

Close liaison is maintained between two field stations of the Public Health Service: the Communicable Disease Center and the Environmental Health Center at Cincinnati, Ohio. As Atlanta headquarters provides Nation-wide services in field training through regional centers, the Environmental Health Center provides specialized training along three lines: (a) stream pollution control; (b) laboratory aspects of milk and food; and (c) radiological health.

An increasing amount of research in connection with industrial wastes disposal, industrial hygiene, water supply, sewage wastes disposal, and radiological projects makes Cincinnati the logical training center to give help to States through specialized courses. A competent staff of training officers, consisting of sanitary engineers, chemists, bacteriologists, and biologists, organize and give these courses.

During 1950, a staff in radiological health was assembled at Cincinnati under the direction of the Radiological Health Unit, Division of Engineering Resources, in Washington. Leaders from State health departments are welcomed to these 2- to 3-week courses which acquaint the trainee with the various aspects of radiological health in relation to water supply and wastes disposal.

Research laboratory activities in milk and food bacteriology afford an opportunity to develop short courses to assist State laboratory personnel in food and milk sanitation.

The courses scheduled at the Environmental Health Center are developed and directed entirely by the Cincinnati and Washington offices of the Public Health Service, but close liaison is maintained with the CDC Training Services so that the training courses can be incorporated into the published training schedules of the Public Health Service and essential teaching aids can be developed in the categories in which the Cincinnati Training Center specializes.

Contributions from Educational Agencies

Schools of Public Health, universities, and foundations have offered, perhaps, the most stimulation in the improvement of field training methods. In Massachusetts, New York, North Carolina, Pennsylvania, Colorado, Michigan, Illinois, and Oklahoma, contributions have been too numerous to mention. Deans of schools of public health and the Kellogg Foundation have made it possible to hold two outstanding work conferences; the first at Chapel Hill, N. C., in June 1950; the second at Battle Creek, Mich., in April 1951.

The Training Services has noted with interest five recommendations of a committee report developed at the Chapel Hill meeting, relating to the kinds of help which the Public Health Service might give to assist the Nation-wide effort in field training. The recommendations were:

1. To make financial grants available to States for the development and continued support of field training programs.
2. To train field training specialists and to lend them to States to assist in the development and conduct of training programs. Some of these specialists might comprise teams for highly specialized training activities.
3. To develop and make available to States various training materials, such as manuals, visual aids, models, and exhibits.
4. To assist in the development of regional field training programs for areas where individual State programs are not feasible.
5. To serve as research centers for the development of field training techniques.

Participating in this successful Nation-wide working conference were 29 field training officers, and representatives from 13 States, the Public Health Service, the W. K. Kellogg Foundation, the University of North Carolina School of Public Health, and the University of Massachusetts. At a second Nation-wide conference in Battle Creek, Mich., made possible through the Kellogg Foundation, directors of departments handling courses in undergraduate environmental sanitation in universities and schools throughout the country assembled

for a week's work session. The result was substantial agreement upon the curricula for the 4-year courses in environmental sanitation. One point was unanimously agreed upon, namely, that 3 months of field training is a "must" in the educational program of a competent sanitarian.

Training Program Useful in World-Wide Public Health

It is fortunate that the Public Health Service has been developing these field training facilities. Not only are they becoming increasingly useful to the States but they are also proving of value in our international relationships. Every year more than a hundred public health administrators and students from other countries visit and participate in field training at CDC headquarters at the completion of their university study.

The Public Health Service is assigning scores of its medical, nursing, engineering, and scientist officers to the ECA Technical Missions program in southeast Asia. The facilities in Georgia and adjacent States for field training in malaria control, insect and rodent control, basic sanitation, and for learning public health administration techniques, are being put to effective use. In May, 50 Public Health Service officers completed a 4-week period of field training in Atlanta before leaving for the different countries in southeast Asia to teach, to guide, and to demonstrate more effective methods of controlling disease.

CDC training officers are working closely with the Division of International Health in Washington to the end that regional field training facilities in other countries may be patterned after the program described herein—a program which can be summed up as "learning by doing."

An Unusual Enteric Pathogen

By Erich Seligmann, M.D., and Ivan Saphra, M.D.*

The enteric pathogen to be described was isolated in the laboratory of the Brooklyn Jewish Hospital by F. B. Traub from the feces and the blood stream of an 8-month-old male baby suffering from a protracted course of low fever, diarrhea, and malaise. The cultural and serological qualities of the strain put it in-between the *Salmonella* and the paracolon group of enteric bacilli. It is a gram-negative, motile rod, forming acid and gas from dextrose, mannite, and maltose within 24 hours. It promptly ferments sorbitol, arabinose, xylose, rhamnose, and trehalose. No citrate is utilized; H_2S is formed abundantly; indol and urea cleavage are negative. It does not attack dulcitol, inosite, d-tartrate, adonitol, mucate, and salicin. Lactose and sucrose are not acidified within 25 days. Gelatin is liquefied after 2 months. M. R.+V. P.−

Gelatin liquefaction is no longer a differential criterion. Kauffmann enumerates in his manual (*1*) no less than 17 *Salmonella* types capable of liquefying gelatin. Dulcitol fermentation, although characteristic for a great number of *Salmonella*, may be missing in this group (*SS. cholerae suis, pullorum*, variants of *SS. typhi* and *paratyphi B, sendai*, etc.). The utilization of d-tartrate, often indicative of *Salmonella* types, is not performed by quite a number of types of all groups. Mucate may or may not be fermented by *Salmonella*, although as a rule it is attacked by the members of the paracolon group. Altogether, the fermentation reactions of our organism are close to those of typical *Salmonella* strains except for a fecal odor emanating from the culture.

The O antigen is not identical with any of the known *Salmonella* antigens. It corresponds, however, with that of Arizona paracolon S39.[1] Reciprocal agglutinin absorption proved its complete identity. The H antigen belongs to the z_4 . . . group. This H group combined with different other partial antigens (z_{23}, z_{24}, z_{25}, z_{26}, z_{32}) is represented in the *Salmonella* group as well as in the Arizona paracolon group. Detailed examination of the strain with numerous agglutination and absorption tests identified the H antigen as z_4 z_{32}. So far this pattern has only been found in one member of the *Salmonella*

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[1] We are indebted to Dr. P. R. Edwards who drew our attention to this fact and provided us with S39 culture and antiserum.

group, *S. tallahassee* (VI, VIII: z_4 z_{32}). The serological structure of the strain might easily be described in *Salmonella* terminology, using a new O symbol. It could also be described readily in paracolon terminology with the help of the symbols presented by Edwards and collaborators (*2*). The strain was pathogenic for man. It was isolated from the blood stream and feces of a sick infant.

All *Salmonella* are considered pathogenic for man and/or animals. On the other hand, paracolon and coliform organisms have been encountered as potential pathogens in ever increasing frequency. Thus, pathogenicity cannot be relied upon as a differentiating characteristic of the groups. Apparently, the strain presents a parallel to those recently described by Edwards and West (*3*). It is a culture intermediate between *Salmonella* and paracolon which does not easily fit into either group, and thus is another example of the evolutionary trend in the family of Enterobacteriaceae.

REFERENCES

(*1*) Kauffmann, F.: The Diagnosis of Salmonella Types. Charles C. Thomas, Springfield, Ill., 1950.

(*2*) Edwards, P. R., West, M. G., and Bruner, D. W.: Arizona Group of Paracolon Bacteria. Bull. 499 Kentucky Agric. Exper. Station, Lexington, 1947.

(*3*) Edwards, P. R., and West, M. G.: Unusual types of enteric bacteria. J. Infect. Dis. **87**: 184 (1950).

Incidence of Disease

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

Reports From States for Week Ended September 29, 1951

Two of the three cases of diphtheria reported in California for the week occurred in one household. The contacts broke quarantine and migrated to at least three other counties in the State. One suspected clinical case has been found in these groups of migratory workers. The first information on the original cases was obtained in a follow-up of a positive laboratory report.

The numbers of cases of malaria among civilians and from military establishments for the current week showed no significant change over the numbers reported during the previous 4 weeks. Of the 43 cases in civilians reported, 27 were in Wisconsin and 7 in Texas.

There was a substantial decrease in the number of poliomyelitis cases reported for the current week (1,405) as compared with the previous week (1,746) and the same week last year (1,990). The cumulative total for the calendar year is 20,505 as compared with 21,528 for the same period last year; and the cumulative total since the seasonal low week is 19,293. For the same period in 1950, there were 20,397 cases.

All geographical regions except two reported decreases for the current week. Only the New England and South Atlantic States reported increases as compared with the previous week, and in each instance the increase was slight.

The largest number of poliomyelitis cases reported in any 1 week, the peak week, in the New England States was for the week ended August 11; the week ended August 18 in the West South Central States; August 25 in the East South Central and Mountain regions; September 1 in the South Atlantic; September 8 in the Middle Atlantic; September 15 in the West North Central; and September 22 in the East North Central and Pacific States. In 1950 only one region had its peak week prior to the week ended September 9, in contrast to five, as noted above, in 1951.

Typhoid Fever

An epidemiological report of 15 cases of typhoid fever which occurred in California in August reveals that there were two instances of multiple cases in the household. Four cases occurred in one family and two in another. Nine of the 15 cases were considered to have been infected out of the State, and in only one instance was a carrier found in the household. The incidence of typhoid fever in California appears to have been higher this year than last.

Dr. W. L. Bierring, Iowa Commissioner of Health, states that typhoid fever incidence was greater in the period from January 1 to September 15, 1951 (19 cases) as compared with the same period last year (9 cases). Two of the 19 cases lived in flooded areas, but proof is lacking that flood conditions were responsible. No carrier sources were found in these cases. However, 5 of the 15 cases had a definite carrier source, and in 2 other cases still under investigation there is a probability of carrier infection.

Dr. B. G. Hamilton, Missouri Director of Health, has reported four cases of typhoid fever in Perry County with onset in late August. A common source of infection has not been found. Only one case was culturally positive. Other cases are under investigation.

Schistosomiasis

Dr. Dean Roberts, Maryland Department of Health, reports that following the diagnosis of *Schistosoma mansoni* infection in a Puerto Rican laborer in Carroll County, laboratory examinations of the stools of 32 other workers were carried out. Thirty-one had *Trichuris trichirua*, 24 had hookworm, 10 had *S. mansoni*, 5 had *Strongyloides stercoralis* (larvae), 3 had *Giardia lamblia*, 3 had *Endolimax nana*, and 1 had *Endomoeba histolytica*.

Gastroenteritis

Dr. J. C. Hart, Connecticut Department of Health, has reported an outbreak of gastroenteritis in a boarding school, following a turkey dinner served to students and faculty members and their families. After an incubation period of 7 to 18 hours, 19 students reported to the infirmary with abdominal pain and diarrhea. In the investigation by Dr. M. E. Rindge, it was found that approximately one-half of those partaking of the dinner were mildy ill. The turkey had been cooked the day before serving, refrigerated overnight, but kept at room temperature several hours after slicing. An organism of the paracolon group was isolated from leftover turkey meat.

Dr. R. F. McAteer, Rhode Island Department of Health, reports a

family outbreak of *Salmonella* infection in three of five members in which ham hash is suspected of being the vehicle of infection. The incubation period was reported to vary from 2 to 5 hours. A group B. *Salmonella* organism has been recovered. *Salmonella schottmulleri* was isolated from an infant, not related to the other cases, at about the same time. A contact carried the same organism.

Dr. W. R. Giedt, Washington State Department of Health, has reported an outbreak of food poisoning following a picnic in Yakima attended by about 300 persons on September 16. About 230 persons became ill, the onset ranging between 1½ and 3 hours after eating the picnic luncheon. The food item found responsible for the illness was baked, tenderized ham, contaminated with *Staphylococcus aureus*. The ham was baked Thursday and remained unrefrigerated until served on Sunday.

Dr. H. M. Erickson, Oregon State Health Officer, has reported an outbreak of food poisoning among children eating in an elementary school cafeteria. There were 55 cases among 131 persons who ate butterscotch pudding which had been kept at room temperature for nearly 24 hours prior to serving. *Staphylococcus aureus* was isolated from a specimen of the pudding.

Dr. M. H. Merrill, California Department of Public Health, has reported an outbreak of food poisoning in a rural penal camp. Nausea and vomiting occurred in 49 persons 1 to 3 hours after eating fried liver. Five cases were ill for several days. The liver was reported

Comparative Data For Cases of Specified Reportable Diseases: United States

[Numbers after diseases are International List numbers, 1948 revision]

Disease	Total for week ended—		5-year median 1946–50	Seasonal low week	Cumulative total since seasonal low week		5-year median 1945–46 through 1949–50	Cumulative total for calendar year—		5-year median 1946–50
	Sept. 29, 1951	Sept. 30, 1950			1950–51	1949–50		1951	1950	
Anthrax (062)	1	1	1	(1)	(1)	(1)	(1)	47	33	41
Diphtheria (055)	100	131	252	27th	713	1,021	1,792	2,721	4,149	6,402
Encephalitis, acute infectious (082)	30	28	32	(1)	(1)	(1)	(1)	796	707	497
Influenza (480–483)	360	463	463	30th	2,649	3,402	3,402	118,704	142,166	131,394
Measles (085)	863	667	667	35th	[2] 3,423	2,225	2,225	[2] 473,334	290,396	554,446
Meningitis, meningococcal (057.0)	56	62	54	37th	106	113	102	3,167	2,912	2,727
Pneumonia (490–493)	434	689	(3)	(1)	(1)	(1)	(1)	48,695	64,856	(3)
Poliomyelitis, acute (080)	1,405	1,990	1,528	11th	[4] 19,293	20,397	18,824	[4] 20,505	21,528	19,174
Rocky Mountain spotted fever (104)	8	1	10	(1)	(1)	(1)	(1)	297	422	505
Scarlet fever (050) [5]	491	474	586	32d	2,185	2,331	3,032	55,571	42,501	60,032
Smallpox (084)				35th	11		2	11	26	51
Tularemia (059)	7	13	13	(1)	(1)	(1)	(1)	[6] 512	734	763
Typhoid and paratyphoid fever (040, 041) [7]	96	90	109	11th	1,922	2,168	2,478	2,357	2,678	2,963
Whooping cough (056)	987	1,630	1,630	39th	75,377	118,731	101,893	53,775	97,195	75,875

[1] Not computed. [2] Deduction: North Carolina, week ended June 16, 1 case. [3] Data not available. [4] Deduction: Arkansas, week ended September 8, 1 case. [5] Including cases reported as streptococcal sore throat. [6] Deduction: Arkansas, week ended Aug. 18, 1 case. [7] Including cases reported as salmonellosis.

to be green in color, bitter, and friable. Refrigeration was found to be inadequate at the camp.

Anthrax in Animals

Dr. L. R. Davenport, Illinois Department of Public Health, reports that four outbreaks of anthrax have occurred in Illinois over the past few weeks. Two outbreaks occurred in cattle and two in swine. The most recent outbreak disclosed the loss of 35 swine on a farm in the southwestern part of the State. The source of the outbreaks is unknown, but mention is made of the occurrence of the disease in Kentucky, Tennessee, and Missouri prior to that in Illinois. No human cases have been reported in the latter State.

Reported Cases of Selected Communicable Diseases: United States, Week Ended Sept. 29, 1951

[Numbers under diseases are International List numbers, 1948 revision]

Area	Diphtheria (055)	Encephalitis, infectious (082)	Influenza (480–483)	Measles (085)	Meningitis, meningococcal (057.0)	Pneumonia (490–493)	Poliomyelitis (080)
United States	**100**	**30**	**360**	**863**	**56**	**434**	**1,405**
New England	**1**		**2**	**126**	**2**	**21**	**40**
Maine			1	18		5	2
New Hampshire				7	1		1
Vermont				22			5
Massachusetts	1			55			12
Rhode Island				17		1	
Connecticut			1	7	1	15	20
Middle Atlantic	**8**	**9**	**1**	**242**	**18**	**57**	**177**
New York	5	7	(1)	112	6		97
New Jersey		2	1	56	5	25	20
Pennsylvania	3			74	7	32	60
East North Central	**4**	**2**	**1**	**167**	**5**	**58**	**367**
Ohio	1			32			64
Indiana	2	1		2		2	34
Illinois				48	1	36	111
Michigan			1	25	3	20	64
Wisconsin	1	1		60	1		94
West North Central	**3**	**3**		**34**	**5**	**38**	**160**
Minnesota	1			3	4	4	28
Iowa		1		6		10	23
Missouri				2	1	1	42
North Dakota		1		11		19	
South Dakota				6			7
Nebraska	1	1		1			20
Kansas	1			5		4	40
South Atlantic	**34**	**2**	**148**	**71**	**6**	**67**	**90**
Delaware							
Maryland	1			27		19	7
District of Columbia				3		13	3
Virginia	2		133	15		27	14
West Virginia					1		16
North Carolina	16	2		9	4		16
South Carolina	11		5	2		6	1
Georgia	4		10	13		2	29
Florida				2	1		4
East South Central	**32**	**4**		**24**	**9**	**20**	**114**
Kentucky	9			1	2	8	10
Tennessee	7			9	5		40
Alabama	9	3		5	1	4	27
Mississippi	7	1		9	1	8	37
West South Central	**12**	**2**	**79**	**32**	**3**	**99**	**141**
Arkansas	3		48			14	19
Louisiana	1		1			8	37
Oklahoma	1	1	30	2		4	19
Texas	7	1		30	3	73	66
Mountain	**3**		**99**	**62**	**2**	**28**	**103**
Montana	2		5	6			15
Idaho				5			2
Wyoming							14
Colorado			3	11	2	7	34
New Mexico				2		2	6
Arizona			91	30		19	3
Utah	1			8			27
Nevada							2
Pacific	**3**	**8**	**30**	**105**	**6**	**46**	**213**
Washington			6	11	2		32
Oregon			21	35	1	12	19
California	3	8	3	59	3	34	162
Alaska					1		2
Hawaii				44		1	

[1] New York City only.
Anthrax: Arkansas, 1 case.

Reported Cases of Selected Communicable Diseases: United States, Week Ended Sept. 29, 1951—Continued

[Numbers under diseases are International List numbers, 1948 revision]

Area	Rocky Mountain spotted fever (104)	Scarlet fever [1] (050)	Smallpox (084)	Tularemia (059)	Typhoid and paratyphoid fever [2] (040, 041)	Whooping cough (056)	Rabies in animals
United States	8	491		7	96	987	123
New England		28			3	76	
Maine		1			1	9	
New Hampshire		1				7	
Vermont						1	
Massachusetts		22			2	53	
Rhode Island		3				1	
Connecticut		1				5	
Middle Atlantic	2	71			4	182	11
New York		27			2	77	10
New Jersey	1	17			1	39	
Pennsylvania	1	27			1	66	1
East North Central		125		1	11	223	8
Ohio		28			6	36	6
Indiana		11			1	13	2
Illinois		33		1	4	53	
Michigan		37				60	
Wisconsin		16				61	
West North Central		32			6	29	7
Minnesota		8					4
Iowa		4			3	2	
Missouri		4			2	16	3
North Dakota		3					
South Dakota					1	3	
Nebraska		7				3	
Kansas		6				5	
South Atlantic	4	91			15	75	11
Delaware							
Maryland		6			3	4	
District of Columbia		4				4	
Virginia	2	9			1	12	2
West Virginia		20			1	5	
North Carolina	2	39			1	37	
South Carolina		2			1	5	7
Georgia		4			8		2
Florida		7				8	
East South Central	1	53		1	18	52	29
Kentucky		14			3	20	13
Tennessee		24			4	17	6
Alabama		12			2	10	3
Mississippi	1	3		1	9	5	7
West South Central		10			21	224	57
Arkansas		3			2	35	4
Louisiana					6	1	26
Oklahoma		2			3	18	1
Texas		5			10	170	26
Mountain	1	4		5	9	45	
Montana					1	3	
Idaho		4				4	
Wyoming				4		1	
Colorado					3	13	
New Mexico					2	2	
Arizona					3	22	
Utah	1			1			
Nevada							
Pacific		77			9	81	
Washington		9			2	9	
Oregon		13				2	
California		55			7	70	
Alaska						21	
Hawaii							

[1] Including cases reported as streptococcal sore throat.
[2] Including cases reported as salmonellosis.

FOREIGN REPORTS

CANADA

Reported Cases of Certain Diseases—Week Ended Sept. 15, 1951

Disease	Total	New found-land	Prince Ed-ward Island	Nova Scotia	New Brun-swick	Que-bec	On-tario	Mani-toba	Sas-katch-ewan	Al-berta	Brit-ish Co-lum-bia
Brucellosis	1						1				
Chickenpox	192			7		28	62	18	11	39	27
Diphtheria	1					1					
Dysentery:											
Amebic	1				1						
Bacillary	9					5					4
German measles	84			10		20	12		8	14	20
Influenza	14			7			5	1			1
Measles	247	4		23	2	83	29	10	12	49	35
Meningitis, meningo-coccal	5	1				1		1	1	1	
Mumps	132			2		12	68	9	2	16	23
Poliomyelitis	165			16	5	18	110	3	8	2	3
Scarlet fever	139			1		38	13	21	13	23	30
Tuberculosis (all forms)	251	7		1	4	150	6	25	6	15	37
Typhoid and para-typhoid fever	6	1			2	1	1			1	
Venereal diseases:											
Gonorrhea	341	4		3	10	84	60	29	35	41	75
Syphilis	71	2		4	3	38	9	1	6	5	3
Primary	3			1		2					
Secondary	6					2	1		2	1	
Other	62	2		3	3	34	8	1	4	4	3
Whooping cough	187			4		26	70	18	13	21	35

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

The following reports include only items of unusual incidence or of special interest and the occurrence of these diseases, except yellow fever, in localities which had not recently reported cases. All reports of yellow fever are published currently.

Cholera

Burma. The flare-up of cholera in Tavoy seems to be under control since only three cases were reported for the week ended September 22, 1951, as compared with 10 for the previous week.

India. The outbreak of cholera in Madras which began about the first of September has now reached 436 cases for the first 3 weeks of the month. This is more than the total number (420) reported for the year up to September 1. For the week ended September 22, cholera was reported in India as follows: Madras, 181 cases; Calcutta, 33; and Cawnpore, 1.

Indochina. One case of cholera occurred in the rural area near Soc Trang, Viet Nam, during the week ended September 22. Three other cases were reported earlier in the port of Soc Trang, the last previous case being for the week ended June 16.

Plague

Belgian Congo. One case of pneumonic plague was reported north of Lubero in Ndekoluoku, District of Kivu, Costermansville Province, on September 25, 1951. Another case was reported in this province for the week ended September 1.

Burma. The first cases (2) of plague during 1951 were reported in Moulmein for the week ended September 8.

Smallpox

India. During the week ended September 22, 1951, smallpox was reported in ports as follows: Madras, 18 cases; Calcutta, 4; Negapatam, 3; and Vizagapatam, 2.

India (French). The incidence of smallpox decreased from 40 cases for the period August 21–31 to 11 for the following 10-day period. In Karikal the decrease was from 21 cases to 3 for the same periods.

Typhus Fever

France. For the week ended September 8, 1951, one case of typhus fever was reported in Paris.

Germany. During the week ended September 1, 13 cases of typhus fever were reported in the French Sector of Berlin. Only one other case has been reported for the year in this area.

Turkey. Three cases of typhus fever were reported in Turkey, one in Istanbul and two in Izmir.