It has been found that marked variation in diagnostic methods and treatment of tuberculosis exists in Japan. In an effort to coordinate these factors, this manual was produced. It will be recommended to the Japanese physician. This is the second step in the program which is already activated.

Together with the two previously discussed steps, the third measure of continued case finding and individual control has been maintained in the health centers. Associated with this part of the program is the establishing of the school lunches which was begun in December 1946. This is a corrective and supplemental feeding and has an educational value in proper dietetics and nutrition. The mass examination of school children by means of X-ray and the Manteau test is already in progress and is being widely encouraged. It is under the supervision of the Ministry of Health and Welfare. It is through these efforts, based upon case finding, that the positive cases are followed into the home and instruction in methods of control is given there. Through the press, through discussion with various medical and lay groups, information has been and will be given emphasizing the control of tuberculosis in the home and the value of hospital care for all active cases.

This same program, begun with the children of Japan, will be expanded as a fifth step to include various groups of workers throughout the country.

3. Epidemiology

Before the onset of World War II, Japan and Finland had a death rate in tuberculosis of 200 per 100,000 per year. This figure was four times the rate found in Denmark, the Netherlands, Australia, New Zealand and the United States of America (less than 50 per 100,000). England and Wales, Italy, Germany and Sweden had between 50 and 100 per 100,000. The Philippines, Puerto Rico and Chile had over 250 per 100,000 per year. There has been a decline in the United States from 202 per 100,000 in 1900 to less than 40 per 100,000 in 1946. Due to the marked shift in population throughout Japan, and the loss of records of vital statistics due to the exigencies of war later figures for Japan have been unavailable. Thus, recent vital statistics for Japan are not to be quoted. However, it is known that the number of deaths from tuberculosis reported have definitely increased up to 1943 in both the first two years of life and in the adolescent period. An estimate of 200,000 deaths from tuberculosis in this present year in Japan is a startling figure.

Therefore, it is necessary to review the predisposing factors which play a role in the development of tuberculosis and of such a death rate. The scientific minds of Japan face many problems as a result of its rapid national growth. The most important of these is to combat the fatalistic viewpoint and superstition concerning tuberculosis, and to create a realistic, hopeful approach to its control. Other nations have done it, and Japan can also do it through education of its people.

Tuberculosis is not--is not--a hereditary disease nor is there any inherent tendency to this infection. It is purely a communicable disease. It is definitely transmitted from one individual to another. It is true that certain factors do predispose to its occurrence. They are social and economic, and not hereditary factors. The state of nutrition, the presence of fatigue, and the occurrence of other acute infections, which break down the defenses of the body and permit invasion by the tubercular infection all play supportive roles. Various other factors such as over crowding in poor housing and the resultant lack of fresh air and sun light all have a part in its development. Ang ignorance of simple rules which prevent its transmission is the greatest offender of all. With these conditions in mind, it is not difficult to understand the marked rise in the number of deaths from tuberculosis in the first three years of life. It is in these years in which the seed of tuberculosis is sown. It lies dormant throughout childhood only to sprout up again in the adolescent period. It produces the second peak of morbidity and mortality records of this disease. One might almost say tuberculosis is a disease of childhood which produces its effect in adolescence or young adulthood.

4. Etiology

Tuberculosis is caused by the mycobacterium tuberculosis, of which there are four types; the human, bovine, gallinaceous and reptilian. Of these, the first two types are the most common invaders, and in Japan it is the human type in the majority of cases.

5. Pathology

The major route of invasion is by inhalation. There are other lines such as ingestion, through wounds, through the faucial tonsils and by transplancental transmission. The infected breath, cough or sputum of the tuberculous mother or members of the family is a continual menance. The common cup and the common chop stick are excellent transmitters of infection. At no time in life is the individual exposed as in infancy. The infant itself has a greater susceptibility to tuberculosis due to the constant exposure. It has a lesser immunity with which to combat the invasion. Since the infection plays so important a role in childhood, it is at this level that the approach to its control must be made. The pathology of the infection must be thoroughly understood, because all plans for treatment are based solidly on that knowledge. The portal of entry is through the epithelial surfaces. The bacilli pass through the epithelium. Some of the bacilli remain at the port of entry and there establish the primary focus which is a small area of bronchopneumonia. Others of the bacilli are picked up by the wandering cells. In them, the bacilli are carried along in the lymph stream to the lymph nodes which drain the particular area involved. The lymph nodal invasion together with the primary focus compose the primary complex. The histological picture of the tuberculous invasion occurs in the following patterns: First, there is a reaction of the tissues to the presence of the organisms. This produces an accumulation of the polymorphonuclear cells at the site of the invasion. They surround the organisms as a first line of

defense. As a second line, certain epithelioid cells surround the tubercle bacilli to form concentric whorls. These create the typical tubercle formation. These tubercles may be individual or develop in masses. A third line of defense is laid down as the lymphocytic cells and giant cells surround the tubercle. After the tubercle is formed, a degenerative stage develops. The center of the tubercles becomes softened (caseated) and liquifies. This liquified material is absorbed into the lymph stream. Deposition of calcium occurs within the mass of the tubercle. Just before calcification occurs is the time of the greatest clinical danger. At this stage, three processes may occur; one, the lesions may be progressive and spread beyond the original point of invasion; second, due to progression, with caseation and liquifaction of the area, an erosion into a bronchus may develop; and third, the organisms may be carried by erosion through the wall of a blood vessel into the blood stream. The lymph nodes may caseate and liquify with resultant ulceration. The tuberculous material may be split into the bronchial tree with a further invasion of other pulmonary areas. A fourth and more remote danger may occur before calcification is established. It is the general infection which is the result of hematogenous and or brochogenic spread. As a result of these processes, generalized or military tuberculosis develops. As the bacilli are swept in the blood stream throughout the entire system, multiple tubercle formation occurs in any or all tissues. It is always a complication of active primary tuberculosis and hence is more frequent in infancy. All organs of the body are invaded, as well as any serous membrane. However, in the primary infection, the lesions may be arrested at the level of the tracheo-bronchial lymph nodes. Retrogressive processes take place, with the deposition of calcium or fibrous residues which remain permanent. This arrest is dependent upon several factors such as resistance of the tissues and the degree of acquired immunity.

In adolescence and early adult life, reactivation of quiescent lesions occurs. These are the result of the pathology which is established at the time of the primary infection. Old apical lesions flare up to form a progressive ulcerative stage, or previously quiescent lymph nodes break down. The pathological changes in the gland results in ulceration and liberation of more tubercle bacilli into the blood stream or brinchii. Consequent further infections develop in new areas. The disease progresses by repeating, over and over, the same process which occurs in the primary lesion; that is, extension of the lesion from the new site of infection by progression, then as a result of central caseation, liquifaction, ulceration, to bronchogenic or hematogenous extension. Lesions may be of varying ages and stages of progression as a result of succeeding ulcerations into hematogenous and bronchial fields. The extent of the general systemic response with the appearance of toxic symptoms is dependent upon the number of tubercle bacilli which are thrown in the circulation at one time, together with the extent of liquifaction which has occurred.

At adolescence or in adult life, a completely new infection may occur due to the inhalation of tubercle bacilli after the primary infection is completely arrested and the above mentioned chain of pathologic procedures occurs.

The infection which develops in adolescences is an exudative process in contrast to the proliferative one which is typical of the primary infection. In adolescence, the infection tends to localize itself, to form cavities, and not to further invade the glands.

Repair is made in the adolescent and adult stages by fibrosis, in contrast to calcification in the primary infection. The lesions are usually apical in location in the older age group of cases while the infection of the primary lesions in infancy are commonly in the lower lobes.

It will be noted that the same process occurs both at the point of invasion through the epithelial surfaces and within the lymph glands. The tendency of the lesions in the primary complex is to heal. It is of paramount importance to keep this in mind in all pulmonary lesions in children.

As the tubercle forms, or as a lymph gland enlarges, it may obstruct a bronchus. This produces an atelectasis distal to the point of the obstruction. A plug of mucus may cause the development of the same condition. With the collapse of a portion of the lung distal to the obstruction, shifting of the mediastinal contents may occur.

Cavities in the parenchyma may develop in a primary lesion; or if a tuberculous pneumonia is present in an atelectatic area, a cavity may be formed as a result of the caseation and absorption.

6. Diagnosis

The approach to any diagnosis, and particularly, that of tuberculosis, still rests firmly upon the recognized basis of thorough history taking, complete physical examination, adequate laboratory studies and Roentgenograms correctly interpreted and associated with the history and clinical findings. It is important to emphasize that the laboratory findings and X-ray reports are to be considered merely as supportive evidence of the two paramount basic steps; a good history and a complete physical examination.

It is always advisable to maintain a regular procedure in developing the history in order to miss no important point.

a. Get the chief complaint (C.C.). It is often a vague one but an effort should be made to discover that one which causes the patient the greatest annoyance. Remember, a patient does not know that the various symptoms are related to each other. The symptoms of which he complains at the time of the visit are the most outstanding in his mind. You must remember that his first symptoms may have been forgotten. It is the examiner's task to arrange these statements in their correct order.

(1) Tuberculosis should be considered as a possible cause in:-

(a) Any patieht with vague symptoms, weight loss, malaise, easy fatigue, persistent cough.

(b) In any patient, especially a young one, with recurrent attacks of grippe.

(c) In any patient with a typical or unresolved pneumonia.

(d) In any patient with cough and expectoration lasting over six weeks.

(e) In any patient who spits blood.

(f) In any patient with pleurisy, especially with effusion.

(g) In any patient with unexplained fever.

(h) In any patient with mild or obscure lesions such as:

1. Persistent lymph adenopathy
2. Fistula in ano
3. Chronic laryngitis and hoarseness.

There is another approach to the diagnosis of tuberculosis.

(2) Tuberculosis case-finding in apparently healthy people.

There is

(a) Routine X-ray examination of chest,
(b) With or without previous tuberculin test.
(c) Positive X-ray findings require as follows:

1. Complete history
2. Complete P. E.
3. Complete tuberculosis laboratory study.

(b) Get the history of the present illness (G.P.I.) Remember, of what does the patient complain? This is the basis for the history of symptoms. Remember that the patient does not know the pathology of tuberculosis; you do. You know the point of primary focus and the routes of invasion along which the infection procedes. It is your task to establish that point of primary focus if possible, and from there move into the history. Since 95% of tuberculosis is usually found in the respiratory system--and if the chief complaint leads into that system--one

begins the history with those questions which involve that system. Discovery of the date of onset of symptoms of tuberculosis is diffiault because it is so atypical; but ask the question, "When did this symptom, the chief complaint, first appear?" Then make a thorough inquiry as to the presence or absence of the following points:

(1) Fatigue and lassitude.

They begin at what time of day? Does the patient awake rested and restored to energy?

(2) Is there noted any loss of staying power?

(3) Has there been any loss of weight or is the weight at a standstill? What was the last weight and when was the patient weighed?

(4) Does any rise in temperature occur? And at what time of day does it develop?

(5) Has the patient noted any nights sweats?

(6) Is there any chilliness?

(7) Does the patient complain of any chest pain or "pleurisy"?

(8) Is there any coudh? Or even any clearing of the throat early in the morning? When does the cough occur? Does exertion increase the extent of the coughing? What is its duration?

(9) Is there any sputum? What are its characteristics? Thick or mucoid? Color? Increased amount at any time of day? Quantity in twenty-four hours?

(10) Has there been any hemorrhage or even any slight streaking of the sputum with blood? At what time of day does it occur? What is the color and quantity of blood lost?

(11) Is there any dyspnoea on exertion?

(12) Is there any wheezing respirations or stridulous breathing?

(13) Has any hoarseness of aphonia developed?

(14) Has the patient's family noted any pallor?

(15) Is there any cardio-vasicular instability?

(16) Has the patient noted any episodes of illness, repeated in character, like grippe?

Since sputum may be coughed up and swallowed, it follows that the G.I. system would become readily involved. Therefore,

a review of the symptomatology of that system would be the next line of inquiry with particular emphasis upon the following points:

(17) Is there any capriciousness or loss of appetite?

(18) Is there any nausea or vomiting, especially following severe coughing in the morning?

(19) Are there any colicy pains throughout the abdomen?

(20) Has there been any alteration in bowel function? Has there been any diarrhea alternating with constipation?

Recalling the close association between the respiratory and cardio-vascular systems, the following questions should be asked:

(21) Has there been noted any cyanosis of the lips or nails?

(22) Has there been any variability in the pulse rate?

Then since the spread of tuberculosis is also by the lymphohematogenous route, review the symptoms of the genito-urinary tract.

(23) Is there any localized pain, tenderness or enlargement in the lumbar regions?

(24) Is there any frequency of urination?

(25) Is there any painful urination?

(26) How long have these symptoms continued to be present?

And upon the same basis, inquiry into any symptoms involving the nervous system should be investigated--even though nervous and psychic reactions are usually absent--asking inquiry concerning:

(27) Headache

(28) Change in disposition

(29) Increased irritability.

c. Past medical history (P.M.H.). Since the foundation of chronic tuberculosis is laid in childhood, particular care should be taken in acquiring the past medical history (P.M.H.). In doing any check up program as in a mass case-finding campaign where there may be no history of any present illness, it is vitally important that the past medical history be thoroughly done. Remember, the death rate is high from tuberculosis in the first two years of life, and that in Japan, contact with the infection in the home is

intimate and constant. Inquire definitely concerning any and all of the following conditions which have an effect upon activating any quiescent lesions and list them in chronological order.

(1) Any bronchopneumonia in the first two years or a prolonged enteritis?

(2) Diphtheria? Was the child immunized against it? When? What dosages? And how many?

(3) Smallpox? Was there any vaccination?

(4) Measles?

(5) Pertussis? Any immunizations?

(6) Scarlet fever?

(7) Diarrheal diseases? Was there any immunizations?

(8) Chickenpox?

(9) Typhoid or Paratyphoid fever?

(10) Grippe or influenza?

(11) Pleurisy?

(12) Special inquiry should be made in Japan concerning the use of B.C.G. The date of the injection and the dose given should be accurately determined.

d. Monstrual history. If the patient is a woman; inquiry should be made as to the age of onset of menstruation, its regularity, its flow as to amount, color, freedom from clotting; the presence of pain and its time of occurrence in relation to the menstrual cycle. With a married woman, the history of her pregnancies and particularly if miscarriages have occurred is of vital importance. It is these women that so often have a pulmonary hemorrhage and reinfection following a delivery. And if she is an older woman, the age and character of her menopause.

c. The family history (F.H.). The family history (F.H.)is of great importance since family life in Japan is so intense. Patients are in very intimate contact with tuberculosis in their own homes. It must be recalled that the family may not, or may not be willing, to recognize the presence of tuberculosis in its midst. They may not know of it even if recognized by a physician. He may have diagnosed it as pleurisy to avoid offending the sensitivities and losing his case, or to assist in their intimate family affairs; such as the marriage of a daughter. Inquiry should be made concerning the tuberculous symptoms among members of the family, particularly concerning the loss of infants in the first two years of life. It is worth recalling that children under five years usually contract

tuberculosis within the home, and over five years, outside of it. Make inquiry concerning other chronic diseases in the family. For example, diabetes mellitus so often predisposes to activation of a quiescent tuberculous lesion.

At this point in the history inquire about conditions in their home or at their work, their mode of life, their social status and their dietetic regime in this present period of national recovery.

Any mixture of racial strains would be interesting from the standpoint of racial susceptibility to the disease. Any familial conditions which may be present would be included here, remembering that in Japan, tuberculosis is considered by many people as a hereditary condition.

It will be remembered that in the outline of a history as cited above, emphasis is laid throughout upon tuberculosis, while other equally important points leading to other diagnoses have not been stressed. However, it is not to be overlooked that other conditions may be of great importance since they are factors which reduce the patient's resistance and increase his susceptibility to tuberculosis.

Acting upon the suggestion of several of the younger medical officers of the Military Government teams, the following discussion of the symptoms was developed and so arranged that the numerical headings of both the questions in the history and discussion of those points were the same.

f. Keep in mind primarily the pathology and the various steps in its development. Study the order of appearance of the symptoms and associate them with the pathology.

(1)-(2) Fatigue, lassitude, loss of staying power may be the first symptom a patient notes. At first it is observed late in the afternoon, but gradually moves earlier and earlier in the day. Increasing the rest hours fails to help. These are the most common symptoms of toxemia.

(3) Weight loss is gradual. None is noted at first and some patients say they have gained a little early in the illness. It may be rapid in the acute fibrile stage. Fat is lost first, then muscle and finally atrophy of the skin occurs.

(4) Temperature. Its presence indicates a toxemia. It may not appear until a few months have passed. It may be subnormal or normal in the morning, but reaches its high point between 1600 and 2000. Its onset is insidious and dependent upon the extent of the pathology causing toxemia. There may be a wide swing if the patient develops an acute tuberculosis pneumonia, or in advanced cases, there may be morning rise instead of an afternoon one.

(5) Night sweats are not an early symptom. They are a constitutional one. They occur often only when the temperature is elevated or there is much exhaustion. Drenching prostrating sweats

are present with marked cavitation and suppurative processes.

(6) There is usually no chilliness except when there is an acute onset as in pulmonary tuberculosis pneumonia. This absence of chilliness is a diagnostic point of value from a pneumonia.

(7) Chest pain, spoken of as pleurisy, and it is so, because it is an indication of an inflamed pleura, so often it is the first symptom of tuberculosis. It also occurs as an early symptom in acute pulmonary tuberculosis pneumonia. There may be a sense of constriction of the chest rather than pain with each respiration. It varies markedly in character from slight to severe pain, from dull to stabbing, from acute to recurrent, and it is increased by respiratory effort. The pleurisy is usually close to the site of the lesion which is a diagnostic point. However, it may be referred to the shoulder or to the belly if it should be diaphragmatic in location. The acute pain does not persist but a sensitiveness may continue to be annoying. If the condition becomes chronic, a constant ache or soreness may continue in the side, aggravated by damp weather or fatigue and noted for many years after the lesion has become quiescent.

(8) The cough is the most common local symptom. However, it may not be a prominent symptom early in the process and does not appear until ulceration of the pulmonary lesion into the bronchi has occurred. However, it is more prominent in the early morning on awakening. It may be merely clearing of the throat. If the lesion should lie close to the pleura, a cough may appear which is completely unproductive due to reflex action. As ulceration develops, the cough becomes more and more productive and may be very annoying in the later stages, even interfering with eating and sleeping. A change occurs in its character with involvement of the larynx. It becomes painful and annoying and the sound assumes a stridulous character.

(9) A study of sputum helps in determination of the activity of the lesion. Early in the disease there may be but a little shiny mucus. Later, as progression occurs, the quantity and the frequency of expectoration increases, but may vary from time to time. There may be a few patches of muco-pus in the morning. Any abrupt onset indicates an ulceration into a bronchus of a pulmonary lesion. There may be a decrease by occlusion of a bronchus followed by a sudden release of a large quantity of sputum. The quantity may be 30 cc with an increase up to 90 cc. Advanced cases may have up to 350 cc daily. The sputum in the acute pulmonary pneumonia is purulent, greenish yellow in color. It is sticky, tenacious, and on standing does not separate in layers. However, as the condition improves the greenish color disappears and the consistency becomes much more like mucus.

(10) Hemorrhage. It is not an early sign. It is due to an ulcerated lesion into a bronchus or to weakening by ulceration of the walls of blood vessels in the wall of a cavity or even release of pressure upon the superficial vessel walls. About 50% of

cases show signs of hemorrhage. Many patients note a sense of congestion in the chest or complain of a bubbling sensation in the side effected before the hemorrhage occurs. The quantity is usually small though it depends on the size of the vessel which is ruptured. Copious bleeding is not rare and may amount to 60-360 cc. It may be merely a pinkness, a streaking or spotting of the morning sputum which is the most common time of its occurrence though it may occur at any time. Massive fatal hemorrhages, however, are rare. It may be associated with the occurrence of the menstrual cycle. The hemorrhage results in a pneumonitis of varying intensity and duration. It may be regressive or progressive, the latter associated with reinfection and so overwhelming that death may occur. Not only may it rupture into a bronchus, but into a pleural cavity, thus masking the extent of the hemorrhage.

(11) As to the occurrence of Dyspnoea, it is not an early symptom. There may be some slight increase of respiratory rate as a manifestation of toxemia in a febrile stage. It also indicates a rapid accumulation of fluid in a pleurisy.

(12) Wheezing and stridulous breathing are symptoms which appear late, usually when cavitation has occurred, or due to changes in the size and shape of the bronchi as the result of cicatricial contractions, secondary to ulcerations.

(13) Hoarseness always develops late as a rule because the laryngeal involvement is usually secondary to infections occurring primarily lower down in the respiratory tree. If it is a persistent symptom, it indicates involvement of the larynx itself and is associated with the complaints of dryness and tickling

(14) The family or the patient himself may state that he seems quite pale. It is a condition which occurs late in the disease. So often it is associated with intestinal tuberculosis or amyloidosis.

(15) A tachycardia is noted in the midst of the disease. Earlier the rate is regular but after exercise, it fails to return as quickly to a normal level. The tension of the vessel is poor and the pulse is often associated with a low systolic figure in blood pressure. The poor vascular tone leads to clamminess and coldness of hands and feet, bluish nails and lips.

(16) There is one type of onset of tuberculosis which resembles grippe. There is mild muscle ache, together with other symptoms of this condition. The attack may last several weeks but tends to be recurrent. This may lead to an error in diagnosis.

(17) Gastro-intestinal symptoms are usually vague.

Variability of the appetite is a constitutional symptom. It indicates a toxemia. Vomiting is unusual but may occur after or during eating should the patient strain while coughing. Since the purulent material coughed up from the lungs

is swallowed, a mild inflammation of the gastric mucous membrane may develop.

(18) A severe coughing paroxysm, especially in the morning may cause vomiting.

(19) When colicy pains are late symptoms, they are associated with alternating diarrhea and constipation. Ulcerations in the bowel is strongly suggested.

(20) Ulceration in the bowel develops late. It is usually in the lower portion of the ileum. It is indicated by alteration in bowel function.

(21) Cyanosis of lips and nails varies in its appearance depending upon the type of onset. They are an indication of any acute congestion through the lung fields. It will be noted in an acute pulmonary tuberculosis.

(22) The pulse rate may remain elevated after the temperature has reached normal. It is an indication of the presence of activity.

(23) Remembering the pathology--that other organs are invaded by hematogenous route--it is necessary to inquire concerning genito urinary symptoms. They may be the first indication of any tuberculosis re-infection. Therefore, pain, tenderness and swelling in the lumbar space should lead one to consider tuberculosis as a possible diagnosis.

(24) The frequency of urination indicates, of course, an irritation of the bladder which is secondary to infection higher in the genito-urinary system.

(25) The same holds true for painful urination.

(26) The above symptoms are prolonged in tuberculosis beyond the usual time of recovery of a simple cystitis.

(27) Prolonged headache may be again the first indication of a hematogenous spread indicating a beginning meningitis. While it is a complication usually appearing in childhood, it can and does develop in the adolescence and adult period. Toxic psychosis are unusual.

(28)-(29) The same holds true concerning these points as of headache.

While menorrhea is unusual, it does develop in tuberculosis. Menstruation may be delayed in a girl with tuberculosis and is often scanty and irregular in older women. While a tuberculous woman can become pregnant, fertility is somewhat impaired, and abortion does occur spontaneously in the more advanced stages. No alteration is libido or potentia coiundi if found in the earlier or middle stages of the disease.

g. In this manual it is hardly more than necessary to list the differential diagnoses.

1. Bronchopneumonia
2. Lung Abscess
3. Bronchiectasis
4. Cancer of Lung
5. Emphyzema and Pulmonary Fibrosis
6. Mycoses
7. Pulmonary Lesions secondary to cardiac disease
8. Suppuration in structures contiguous with the lungs.

7. Physical Examination

a. It is well to remember that physical signs are those which the examiner finds. They do not belong in the history. A planned procedure is absolutely necessary to avoid missing any signs of tuberculosis in structures other than the lungs.

The obvious points of a physical examination hardly need to be discussed; however, there are many points in conducting an examination which help much to complete the picture.

An old adage to remember is "Stop! Look! Listen!"

Stop, to record the findings while doing the examination.

Look, at the patient, and see at what you are looking.

Listen, to the sounds you hear in the patient (and what he says).

b. Good light, a quiet room, and a comfortable patient are paramount for a good physical examination. Physical examinations are being done in Japan without any attempt to obtain any of these necessary prerequisites. It is not necessary to uncover the patient completely, but it is necessary to arrange the clothing that every portion of the body is uncovered at some one time during the examination. Observation in clinics, hospitals and health centers in Japan has made it necessary to emphasize these points. In the examination of children, always leave any annoying or painful procedures to the last.

(1) Start at the top of the head and proceed downward. While the lung fields are of primary interest in most tubercular patients, there may be indications of its spread into every portion of the head and neck. Look for eye changes, variations in mucus membranes of nose, mouth and throat; variations in the skin texture and color. Observe the voice for changes. Inquire concerning any deafness. Learn to use a tongue depressor properly. Gagging is unnecessary. Put the depressor at the base of tonsil on the lateral aspect of the tongue and push the tongue obliquely forward. Check the lymphatic glands of the neck in both anterior and posterior groups.

(2) The familiar four steps of procedure of a physical examination of the lung fields will be observed. These, you recall, are:-Inspection, Palpation, Percussion, and Auscoltation. Do not depend on memory; write down your findings at once.

Do the posterior aspect of the chest first. It avoids the immediate embarrassment which a patient feels, and more important, one does not fail to examine the posterior aspect of the chest. If they don't turn their backs, you don't examine a chest. The use of a diagram of the thorax helps immensely. "A picture is worth a thousand words" so say the Japanese. If there is no printed form, the following suggestions are helpful. (See addenda).

Chest examination -

Place the patient if he is ambulatory with his back to the light, or if a bed patient, the foot of the bed toward the light, and note the following points:-

(a) Inspection -

1. The alignment of the spine.

2. The alignment of the shoulders.

3. The movement of the scapulae. Do they move in unison or is there a lag upon one side with deep inspiration?

4. Are the interspaces equal bilaterally?

5. Are there any retractions of the interspaces?

(b) Palpation -

Place the thumbs together with the fingers spread over the thorax, at the 10th thoracic vertebra. Have the patient take a deep breath and check the basal movements for equality of expansion.

Tactile Fremitus. Many examiners exert too much pressure. Use merely the tips of the fingers or the lateral aspect of the hand and keep the touch extremely light. Don't press, touch.

(c) Percussion -

Use a skin pencil or marker. Keep the percussion light. The hand is not a hammer. Strike the blow with one finger. Work in a quiet room so that the sound of percussion is the outstanding sound. Compare both sides as percussion is done. Remember one can feel a difference in tension of the underlying tissues. At both bases, percuss in the 9th interspace as the diaphragm moves downward with deep inspiration to check diaphragmatic movement.

d. Auscoltation -

Have a quiet room and listen! Conduct the auscoltation in a regular fashion proceding from above downward, and compare both sides, observing vocal resonance, whispering pectoriloquy and breath sounds. It is advisable to make notes as one finishes each phase of the examination.

(3) Then, turn the patient to face the examiner. Do the cardiac examination first, and make the necessary records. The same principles of inspection, palpation, percussion and auscoltation should be followed in regular order. Again carry out the same technique of examination of the lung fields anteriorly as had been followed posteriorly. And again make notes of each stage of the procedure. Follow the same procedures while doing a cardiac examination.

(4) The abdominal examination. The patient should lie down on a covered table. If the examiner's hands are warm (and clean) muscle spasm is less likely to interfere with deep palpation. The patient can be taught to drop the jaw and breathe through the mouth with very shallow respirations, thus avoid abdominal splinting. There is no difference in which quadrant the examination is begun so long as a regular routine is observed. Recall the pathology of abdominal tuberculosis with the resultant peritonitis in its various types and stages. Remember the patient complains of pain; you find tenderness.

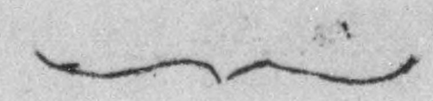
(5) Then check the genitalia and anal regions. A painful hemorrhoid may be an early fistula in ano, or a painful testes an early tuberculous epididymitis.

(6) Any change in the reflexes, sensitivity of skin or cornea; any paralysis or any other neurollogical symptom may indicate an early tuberculosis meningitis.

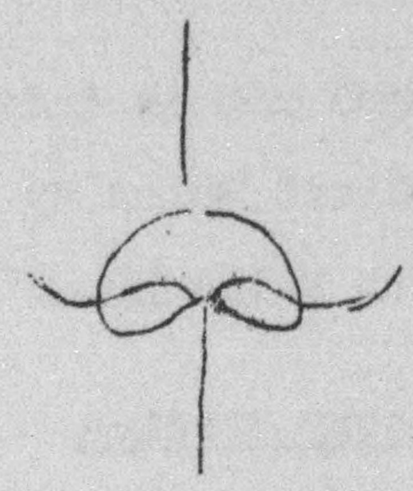
(7) Recalling that by hematogenous spreads any portion of the osseous system may be also involved, a slight blow on the top of the head with the patient in a sitting position jars the spine. This may localize a point of pain within the vertabral column. There may be tenderness or palpation, or pressure over the skelcto or there may be a change in posture or gait.

(a) The discovery of an apical lesion usually occurs in adults, but it may occur in the age group from 7 to 14 years. Cavitation may occur early even in the primary lesion or if caseous material is carried by bronchogenic spread, it may develop in the early years as well as in the adolescent or adult period.

Plan for diagram of the thorax.
Draw a bracket.
<u>This represents the clavicles</u>.

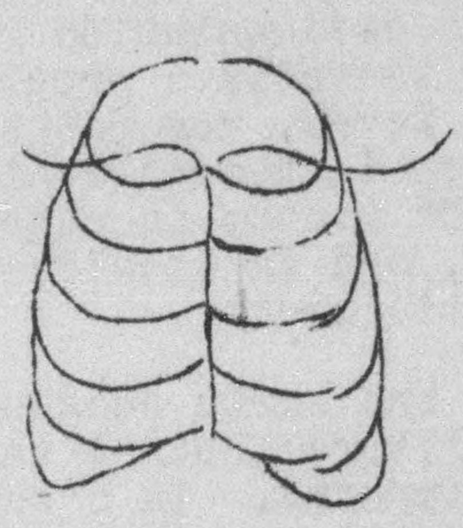


Draw a perpendicular line
from the center of the bracket
<u>to represent the sternum.</u>

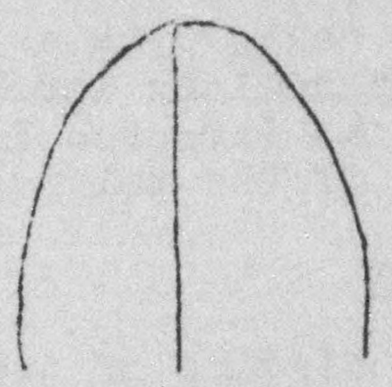


Remember the 1st ribs join
the clavicle and sternum to
<u>draw the half circles.</u>

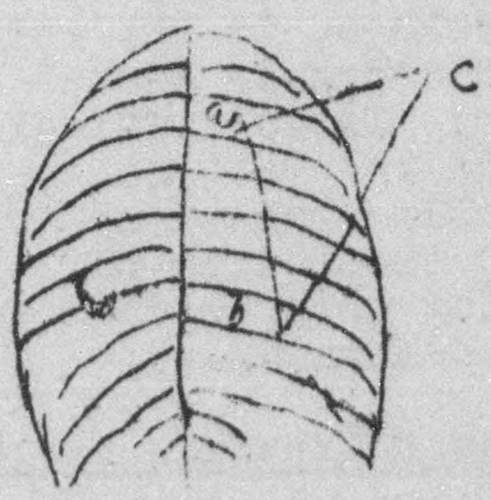
Remember the next 5 ribs
all meet the sternum, so
continue downward.
The nipple lies in the
4th interspace in
<u>mid clavicular line</u>.



Posteriorly, the diagram is
drawn as follows: Draw
a perpendicular line.
Draw two curved lines to
<u>represent the thoracic wall.</u>



Ten ribs extend from spine line
to the thoracic wall line.
The upper inner angle of the
scapula is in the 3rd inter-
space in the mid thoracic line.
(a) The lower angle of the
scapula in the 8th interspace.
(b) The acromuim process of the
scapula is distal to the 2nd inter-
space. (c).



Plan for diagram.

By filling in the interspaces with various densities, the extent of dullness or percussion can be indicated.

D D D

Pleural rub is indicated by

Crepitant Rales by

Coarse Rales by

8 Laboratory Studies

The sedimentation rate of the red blood cells is increased as long as there is a progression of the tuberculosis lesion associated with fever, regardless of the phase of the disease. There also occurs an increased sedimentation rate in pregnancy after the third to fourth month, in cancer corresponding with the degree of malignancy, and in localized infections which show an increase in leukocytic count.

In the early stages of tuberculosis, there is no change in the blood picture; but as the later stages develop, a hypochromic anemia appears. In a tuberculous pneumonia, a leucocytosis up to 15,000 develops with an increase in the polymorphonuclear and mononuclear cells with a decrease in the lymphocytes, but in the usual tuberculous infection, the total count will alter but little. It shows an increase in the lymphocytic and monocytic cells with decrease of the polymorphonuclear cells.

a. Sputum

The finding of tubercle bacilli establishes a positive diagnosis. These appear in the sputum alone or intermixed with hemorrhage, in the spinal fluid, in the discharges from eroded lymph nodes or osseus sinuses, in the pleural fluid, or in the urine. It is difficult to obtain a satisfactory specimen of sputum unless the patient is adequately trained. The sputum must be actually coughed up from the trachea when the bronchial tree is first cleared in the morning. In children and infants, gastric washing must be done before gastric peristalsis has begun, early in the morning.

b. The Tuberculin Reaction

A study was done at the Bellvue Hospital in New York City covering a period of five years (from 1930 to 1936) on 11,000 children. Their ages included the period from birth to 12 years. This study showed a steady increase in the rate of positive tuberculin reactions with each increasing year of age.

The tuberculin reaction is based upon an allergic response of

the tissues to the presence of the tubercle bacilli. The Manteaux which is an intracutaneous test, is preferred in the United States, and is the one which is commonly done in Japan. Old tuberculin is used. In the first test, 0.1 cc of 1 to 10,000 or 1 to 1,000 dilution is used, and 0.1 of a 1 to 100 dilution in the second test. The reaction is read in 48 hours. A positive reaction is an elevated, reddened, indurated area, at least 0.5 cm in diameter, or there may be several papules appear at the city of the injection. A pseudo reaction appears as a reddened area without elevation. There is also a generalized systemic reaction. About any existing tuberculous lesion, a localized reaction may occur and the activity of that lesion may be increased by the tuberculin reaction. One may have false positive reactions, which are most marked in the first 24 hours, due to too large doses of tuberculin.

A positive test indicates that an individual has been infected with tuberculosis and is sensitive to its proteins. It does not indicate the presence or the extent of an activity.

A negative reaction indicates a possibility that there has been no tuberculous infection. However, the reaction may be negative because; first, it may be too early in the period of invasion; second, in the terminal stages of the disease; third, if there is a marked dehydration or severe wasting or severe febrile stage; four, the existence of a tuberculous lesion which is thoroughly calcified and healed; five, the dose of tuberculin being too small.

There are other laboratory studies of interest but not of diagnostic importance.

9. Roentgenographic Diagnosis

The greatest value of roentgenographic studies lies in the ability to observe the progress of the pulmonary lesions. To review the roentgenograms of pulmonary lesions in the various age groups, the appearance of the primary lesion shall be briefly considered first. Recalling the pathological changes as formerly described, one must remember that the primary lesion is usually small; less than 3 mm. in diameter and may be too small to show upon the X-ray film, or it may not be calcified at all. The primary lesion lies usually in the periphery of the lower lobes though it may develop anywhere in the lung fields. However, there may be an extensive involvement of much of a lobe, and the density upon the film may vary. When this lesion is healed, the X-ray findings may show merely bands of fibrous tissue through the lung field and calcified area, the Ghon's tubercle. It must also be recalled that the pathology indicates a spread from the primary lesion to the trachio-bronchial lymph nodes. It may require lateral or oblique films to show these nodes which have become enlarged.

If the primary lesion is not demonstrable, due to its small size or lack of calcification, the hilar nodes may show no

calcification. The primary lesion may be demonstrable, but the lesion be too early for calcification in the lymph nodes to occur. But if the Ghon's tubercle, the calcified primary lesion, is seen, calcification in the lymph nodes is usually found also. This is the primary complex of the disease.

Should a lesion be seen in the parenchyma of the lungs and no involvement of the lymph nodes be found, the lesion is probably tuberculous. A positive tuberculin reaction increases the possibility of the lesion being tuberculous.

The primary lesion may produce a wide-spread reaction in a lung, but no calcification in the lymph nodes may be seen. A bronchus may be obstructed by a tubercle or by an enlarged lymph node. An atelectasis distal to the point of obstruction may result and other thoracic structures may be seen to be displaced. Yet, the hilar nodes may or may not show any calcification. The density of an atelectasis is the same throughout the involved area.

With a miliary tuberculosis, with or without a demonstrable primary lesion, the hilar nodes show no calcification because the condition develops too swiftly. With a caseous bronchopneumonia, the nodes show calcification since the progress of the lesion is developed more slowly. The disposition of this lesion is over a wide area, often involving the entire area of the lung.

The contour of calcified lesions are more irregular. Because of the irregular deposition of the calcium in them, they vary in their density. Coccidiosdosis and histoplasmoris also cause calcification in the lung fields.

As to enlargement of the lymph glands, Hodgkin's Disease or lymphoblastoma may be the cause. If the tuberculin reaction is also positive, a biopsy is required to clear the diagnosis.

The great advantage of roentgen studies is that serial studies of the lung fields in pulmonary tuberculosis can be conducted over a period of months. If there is but little change in the appearance, tuberculosis is apt to be the cause. In a low grade bronchopneumonia, however, a serial study will show definite change from time to time.

It is worth noting that laboratory findings are combined with the roentgenographic studies in arriving at a diagnosis.

10 Treatment

The treatment of tuberculosis requires the "long look ahead". It is not the immediate condition which is alone important, but it is the potential dangers which must not be forgotten. Planning for that treatment is based upon a thorough knowledge of the underlying pathology. The patient's physical condition is of primary importance, but the social, economic and personal phases must also be kept in mind.

a. After a case study is complete, the first question which arises is "Does the patient require treatment?" There is a group of these patients who do not. These are the patients in whose X-ray studies, calcification of the primary complex is seen, but they have had no signs of activity for years. There is a second group whose X-ray studies show old fibrotic changes at the apices but who are perfectly well. There is a third group whose X-ray findings show the scars in the lung fields of former infections. With extra pulmonary lesions as well; but both areas are completely healed. However, the opinion of complete healing must be a guarded one, since the center of the calcified mass may still be composed of caseous material in which virulent bacilli may be found. A yearly check-up of these cases is advisable.

In Japan as well as in the United States, there are two groups which may be considered border--line groups; (a) those over 20 and those under 20. (In the United States over or under 25 years).. In the first group, the X-ray may show changes from one examination to another. There may be individuals who have a slight fever, malaise, easy fatigue or weight loss whose lesions are apparently calcified. The fibrosis about the lesion may or may not have thoroughly encapsulated the infection in this older ago group. Whether or not this group requires treatment depends upon their laboratory and X-ray findings. A check once a month for several months, gathers evidence upon which to plan their treatment. Any patient should be treated whose X-ray film shows lack of calcification (a poorly outlined soft shadow) in its outline because the lesion is unstable and always potentially dangerous.

In the second group, those under 20 years, the X-ray findings alone are enough to decide upon treatment. These studies should be done at two week intervals. Any instability of the lesions demands bed rest and, in the younger individual, stricter study. The older group of patients can be kept at work and follow a daily routine. Records should be kept of the temperature, pulse and respiration every fourth hour, and the laboratory work done every one to three weeks. Any instability, either progressive or regressive, means treatment. If it is found in a youth or a young adult, it is a definite indication that study and treatment should be done <u>in bed</u>, even if there are no symptoms. These require very careful laboratory studies for the presence of tubercle bacilli, and negative findings do not--do not --mean that treatment is not required. The laboratory work is observed in many places throughout Tokyo area is not thorough enough to rule out the presence of the tubercle bacilli in the sputum.

There is a group who definitely should be under treatment. These show the five important clinical symptoms and signs, - fever, malnutrition, fatigue, cough and hemorrhage. These constitute all patients of whatever age group with clinical symptoms of activity, patients with new lesions, or whose lesions have not yet been stabilized, and patients whose lesions have been reactivated. This classification is based upon that of Dr. J. Burns Amberson.

In the treatment of the primary lesion, remember many of these patients show no symptoms at all in relation to the lung fields. However, it is in this age group that one must continually recall the rapidity of spread through the hematogenous route with the appearance of symptoms and signs in other systems--gastro-intestinal, nervous, osseous, renal--unrelated directly to the lung fields. Do not fail to recall the most important cause of meningitis in the first three years of life is tuberculosis, nor that gastro-intestinal symptoms may be tuberculous in origin. Keep in mind the close family relationship in the young individual in the presence of infection. All active or potentially active cases who have a chance to recover should be kept in bed. A delay of a week or months in beginning treatment means loss of irrecoverable ground. Begin treatment as soon as the lesion is discovered. Rather treat a quiescent lesion until it is proved otherwise than lose a patient. Don't wait for a cavity and the potential hemorrhage from its walls. Avoid the cavity formation if possible by insisting on complete rest. The same situation exists in young adolescents who have a reinfection superimposed upon a healed primary lesion, or an activation of a primary lesion which was previously arrested. Remember the "long look ahead" which the pathology demands--the look to see possible caseation, liquification, erosion, hemorrhage and further spread.

Tuberculosis is a disease with which a patient must learn to live. He must realize that recovery is a slow process and that it will take time. While it is a difficult task to explain the healing of tuberculosis simply, it can and must be done and the patient must understand it. He must accept the diagnosis and make the necessary adjustments in his work and habits of life. He must understand his symptoms and know what to do when and as they appear. He must realize that delay of treatment for weeks or months means danger, and the earlier the lesion and younger the patient, the greater is the necessity that treatment be instituted at once. The treatment must be planned according to the stage of the tuberculosis and the condition of the patient.

When an adult patient has a chronic tuberculosis, immediate treatment may be often postponed, and the hopeless and elderly patients with long standing lesions may have more delay than a young and active patient.

b. There is still but one chief principle in the treatment of tuberculosis and that is <u>rest</u>. And one must understand why rest is so important from a pathological angle. Rest decreases the motion of the lungs and aids in healing of the lesion. Rest decreases respiratory rate and amplitude. Rest decreases the circulatory rate and amount of blood passing through the lungs. Rest decreases toxemia. Rest reduces the amount of infected air inhaled into health lung areas. Rest maintains a good circulatory tone thus the danger of hemorrhages through increased permeability of

capillaries and friability of vessels. Rest maintains a good intestinal tone with adequate absorption. And rest is rest in bed, day and night, not one step to be permitted, avoiding restlessness or unnecessary movement, and local rest of the thorax may be obtained by splinting the affected side eigher by physical means or surgical intervention. Rest must also be mental as well as physical. A man or woman can scarcely rest when he must lie in bed and worry about his family's food or lodging.

The duration of the bed rest is based on the X-ray studies and bacteriological examination. Its duration is from two to twelve months. To get up too early means relapse.

A systematic check-up should be established to include the following guides:

(1) A collection of a twenty-four specimen of sputum twice a week to determine the quantity, and check for tubercle bacilli.

(2) X-ray studies from once a week to once a month for six months.

(3) Leucocyte count and sedimentation rate every second week.

(4) Weight is to be taken every second week unless the patient is too ill.

(5) Temperature, taken rectally, every second hour, day and night until the high point is determined; then every fourth hour.

(6) Pulse record should be made every fourth hour because its instability is an indication of toxemia long after the temperature becomes stable.

(7) Record the appearance, general condition, reaction to fatigue, eliminative functions and any appearance of the symptoms and signs already discussed.

Prolongation of the rest period of treatment until the lesion is securely walled off within a fibrotic capsule is definitely better than permitting the lesions to progress to the requirement of pneumothorax or potential hemorrhage. Activity must be assumed very gradually, only after the check-up indicates that stability has been reached. One should begin with fifteen minutes a day out of bed on a chair for two weeks, and then gradually increasing the time and the extent of activity.

c. The dietetic goal toward which Japan must work in the feeding of her adult tuberculosis patients is a 2000 calorie diet with protein of 65 gm.

Recommended Daily Allowances for Specific Food Nutrients for Tuberculosis Patients

Calories	2,000
Protein	65 g.
Calcium	0.65 g.
Iron	12.0 mg.
Vitamin A	5,000 International Units
Thiamine	1.5 mg.
Riboflavin	2.2 mg.
Niacin	15.0 mg.
Ascorbic acid	100 to 125 mg.

While it is at present impossible to supply the Japanese with the above diet, one should know what is acceptable for this condition. Sun baths and helio therapy are contraindicated in pulmonary tuberculosis. However, they have their place in tuberculosis of bones and joints and the Rollier sun treatment and air baths can be given with excellent healing and tonic effects in this type of tuberculosis.

a. Drugs find their best use in their control symptoms. Expectorants do not help and disturb the appetite and interfere with nutrition. It is well known that in Japan, certain drugs are considered to be specific in the treatment of tuberculosis but opinions of their value varies markedly among the Japanese physicians. Streptomycin is being studied for its effect in the United States as well as Promin and Diazone, which are sulfa compounds, but reports are incomplete.

e. There is always the important question, when is the tubercular process arrested? The National Tuberculosis Association in America has established the following criteria. "The process is arrested when, for at least six months, the lesions have remained apparently healed, no tubercle bacilli have been demonstrable, and the patient has been symptom free under conditions of moderate physical activity". These patients should be checked once a month for four months, then every three to six months for two years, and then once a year, and then gradually assume his occupation. This regime covers a period of two years, and if he remains "arrested" for that period, the occurrence of relapse is greatly minimized.

f. Rest alone may be ineffective in the patient with cavitation. Collapse therapy is a distinct aid in these cases. With the collapse of the lung, the walls of the cavity are brought in contact with each other, the respiratory movement of the lung is limited and the rate of flow of the blood and lymph through the infected area is decreased. Pleural adhesions may interfere with adequate collapse. This therapy is of the greatest advantage in a chest in which there is cavitation in one lung with no adhesions and with little or no activity on the opposite side. With hemorrhage from the wall of a cavity, collapse therapy will help control it. And even in far advanced cases, it can be used to advantage for the same purpose.

It is necessary here only to mention that pneumoperitoneum, paralysis of the hemidiaphragm and thoracoplasty have been done to put the lung field at rest.

g. Children and adolescents should be hospitalized because they require close study and control to maintain their rest treatment. They can receive the proper training in self-care in association with other companions facing the same problem. They profit by the object lessons about them when patients have failed to maintain their rest treatment. They are happier among their own age groups and their education can be continued as a group.

The moderately advanced or cases with cavities should be hospitalized because of the danger of complications.

The far advanced elderly patient could remain at home for his own comfort as long as he is not a source of infection to the family or too great a drain upon the family economy.

n. Climate itself is not nearly as important as it was formerly considered to be. With the present crisis in Japan, it is almost impossible to transport patients to climates said to be suitable for their particular cases. One makes the effort to keep them as comfortable as possible in the locality in which they are living.

l. The cough usually responds to rest. It may require codiene 0.015 every four hours to control it at the beginning, and perhaps even a hypnotic at night. Steam inhalations are of use, and a hot drink in the morning is helpful. Postural drainage will clear the bronchial tree. Patients can be trained to control the cough and to avoid straining.

j. With the onset of hemorrhage there should be absolute rest in bed, lying upon the affected side. The hemorrhage decreases over a period of several days. Reassurance means much to the patient and codiene decreases the irritation from the cough.

11. Mass Examinations

a. In Japan, entire schools are given mass examinations in the health centers. The children are brought by their teachers, they are arranged in order according to a list, stripped to the waist, and X-ray films are taken on 35 mm. film. These films are developed, read, and any suspicious cases of tuberculosis are furthe studied by doing a sedimentation rate and a Manteau test. Should the laboratory studies increase the suspicion of tuberculosis, the patient is followed in the clinic and in his own home.

b. Based upon these case findings, the public health nurses from that clinic in which the examination is done, should make repeated home visits. At her first one, she should discuss the contagiousness of the disease. She must begin to fight the fatalism and superstition with which Japan has accepted this disease. She must insist that every member of that household report to the health center for examination. She should explain that the Government is prepared to carry out these examinations free of charge if the family is unable to pay for them. (It has come to the attention of the Public Health and Welfare Section of SCAP that because of a patient's inability to pay, these individuals are ignored or neglected in the health centers. Their visits are repeatedly postponed and cursorily done. Necessary supervisory action will be taken to correct this practice.) The nurse should be able to instruct the family concerning home care of the patient until such time as he can be hospitalized. She must also instruct them on how to protect the members from the tuberculous infection during this period of pre-hospitalization. She must instruct the patient so that he (or she) realizes that he is the source of infection. He must be helped to see how he can check its spread in the family. He must assume that responsibility. He must realize that the greatest sign of affection he can express toward the family is by refraining from intimate contact. The nurse should advise the family to follow certain simple rules for the protection and care of its members.

(1) The patient should be trained to cover his face every time he coughs and sneezes with a paper tissue or cloth.

(2) He should be taught to collect all sputum in paper or cloth which can be burned after it is placed in a paper bag. These paper bags can be made from newspapers and folded according to the diagram at the end of this section. The nurse should know how to fold such a bag. If paper is not available, two covered cups can be used. When a cup becomes filled, the cup and its contents can be dropped into a pail containing 5% Lysol solution (25 cc of Lysol to 500 cc of water) and soaked for four hours and then washed out with warm water and thoroughly rinsed. The Lysol can be obtained through the prefectural office.

(3) The patient should have his own cup, bowl, plate and chop sticks. His food should be served to him in his individual dishes, and under no circumstances should he eat from the common dish with his own chop sticks or drink from a common cup. The patient's dishes and utensils should be washed separately from those of the family with soap and hot water.

(4) The patient should have his own individual clothes, towels, toilet articles, tooth brush and toys and sources of amusement. These must be kept separate from the family articles. He should be trained to acquire a possessiveness for these articles as a matter of protection for the rest of the family.

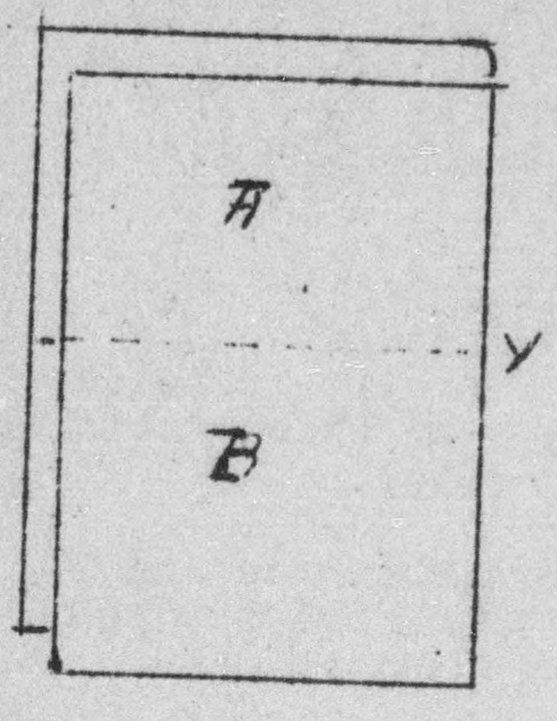
(5) Because the hands are constantly before the face and soiled with saliva, the patient should be trained always to wash his hands before eating and after coughing and sneezing.

(6) The patient should have his own room if possible. At least he should have his own bed and the bed covering should be so designed that they can be removed, soaked in 5% Lysol solution and washed at least twice a week. They should not be shared with any other member of the family. A suspended curtain across a portion of the room may give him at least separate space and act as a reminder to the family that special care is required. His room should be sunny if possible. Moist cleaning of the room should always be done so that the dust infected with tubercle bacilli is not carried throughout the house.

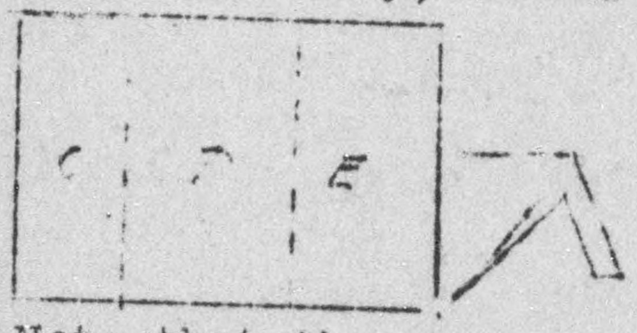
(7) Especially must both patient and the older members of the family be trained to protect infants, children and the adolescents from intimate contact with the patient.

It must be kept in mind that home treatment is far from ideal and that hospitalization should be insisted on as quickly as transportation to the hospital can be obtained. Home care is merely an emergency measure and should be considered so at all times. It is through segregation of the tuberculosis patient in a hospital adequately equipped to care for the patient lies the hope of control of tuberculosis in Japan.

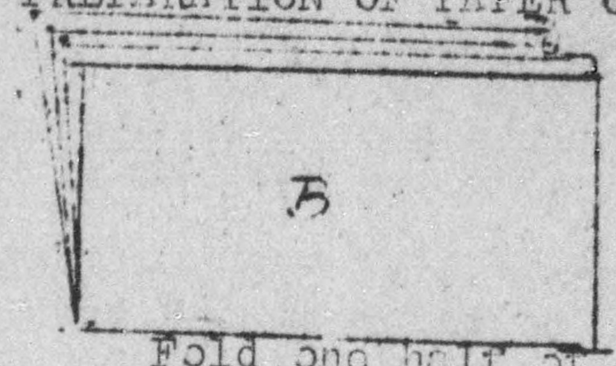
PREPARATION OF PAPER CUPS



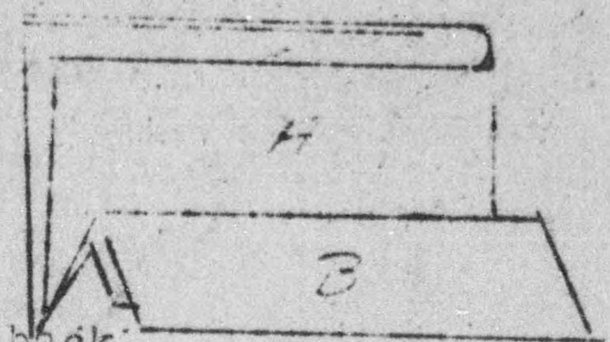
Note that the folded edge of the newspaper is toward the right. Fold at x to y, B over A.



Note that the paper is turned so that the back of part A shows. Fold along the dotted lines to form C, D and E.



Fold one half of B back as in the third diagram.



Note that E is tucked into C. Open to form the cup or bag.

A second such cup can be constructed and used as a cover.

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TB - PH - PREV MED 3.

RICKETTSIAL DISEASES IN JAPAN AND KOREA

PUBLIC HEALTH AND WELFARE TECHNICAL BULLETIN

PH & W GHQ SCAP APO 500 FEBRUARY 1947

Introduction

The two rickettsial diseases that are well recognized and established are the typhus fever group and the Tsutsugamushi fever group. These diseases can be differentiated by specific serological reactions, using highly purified antigens.

GROUP I - TYPHUS FEVER

1. LOUSE-BORNE TYPHUS: -- "epidemic typhus," "European typhus," "shirami typhus" (shirami--"louse" in Japanese), "hashin chibusu," (eruptive typhus-Japanese) are synonyms in this area.

Louse-borne typhus is an acute infectious disease caused by Rickettsia prowazeki and usually characterized by sudden onset of headache, continuous fever of 12-14 days duration which ends by rapid lysis, and the appearance of a macular exanthematous rash on the 4th to 6th day.

All the prefectures in Japan and all of the provinces of southern Korea reported cases during the 1945-46 season. The majority of cases in Japan were located in and about the Tokyo-Yokohama area, the Osaka-Kobe area, and the prefectures of Aomori and Hokkaido.

a. Clinical Course--Incubation period is 8 to 12 days after the Rickettsia prowazeki has gained entrance into the body by way of breaks in the skin or inhalation. Onset is usually sudden with a severe headache and fever. However, it may be preceeded by general malaise, weakness, mild headache and elevated temperature. During the period of invasion, there are chills or rigor followed by fever, loss of appetite, severe headache, neuro-muscular pains, and back ache. The temperature rises rapidly as high as 102°F to 105°F (38.9° to 40.6°C). At first there is a relative bradycardia which becomes proportional to the fever as illness continues. The face is flushed. The patient is apathetic. There may be a slight dryness of the throat and tongue. The spleen is often palpable and tender.

The skin eruption usually appears by the fifth day as round or oval,

pink erythematous macules first in the axillary areas and the base of the neck. The chest, back, and abdomen become involved and the eruption may spread to the extremities. In severe cases, it may become hemorrhagic. At this time there is usually a cough which is loose. Rales that are sibilant and sonorous are often present over both lungs. The conjuctive are injected. The tongue is dry, coated, and fissured. Deafness is a frequent complaint.

During the second week the fever remains high but irregular. In the seriously ill the pulse rate rises in proportion. The pulse is poor in quality. The blood pressure may drop sharply. Incoherence, delerium, or coma may develop. (In fatal cases such conditions may become worse with muscular twitching, dehydration, and incontinence of urine and feces).

After 10-12 days there is a marked remission of the temperature. It returns rapidly to normal during the end of the second week and in the third week. The signs of mental confusion, deafness, etc., clear rapidly. The general weakness may persist for weeks.

In fatal cases death probably occurs from neurological involvement although azotemia and pneumonia may be the important factors.

b. Complications:--Secondary bacterial bronchopneumonia, parotitis, otitis media, gangrene of the extremities (toes), and pressure sores are the chief complications.

c. Diagnosis:--

(1) Differentiation-- A tentative diagnosis (suspect case) is based on the clinical picture. Louse-borne typhus must be differentiated from murine typhus, scrub typhus, typhoid fever, relapsing fever, malaria and small pox.

(2) Serological Differentiation:

	Weil-Felix			Complement Fixation	
	OX-19	OX-2	OX-K	Louse	Murine
Louse-borne typhus	xxx	x	-	xxx	-
Murine Typhus	xxx	x	-	-	xxx
Scrub Typhus	-	-	xxx	-	-

(a) Weil-Felix reaction is used to show the presence of agglutinins in rising titer for proteus OX-19 in serum taken from the patient as soon as the disease is suspected and at 2 to 5 day intervals until the diagnosis is established.

(b) Complement fixing anti-bodies usually appear after the second week. A highly purified specific antigen makes the test very specific. This test is necessary to differentiate between cases of epidemic typhus and murine typhus and in previously vaccinated individuals.

(3) Animal Inoculation: 30 cc of whole blood is withdrawn in early febrile period. Separate the serum and grind the clot. Suspend the material in 10 cc of normal saline and inoculate 2 male guinea pigs with 5 cc each of the suspension intraperitoneally. The temperature of the animals should rise on 12th day. Pass 10% brain suspension on 3rd febrile day to two male guinea pigs using 1 cc suspension intraperitoneally. The temperature should rise in 6-7 days. In rats typically there is no febrile reaction to louse-borne strains of typhus. In contrast to murine typhus, louse-borne typhus seldom produces a scrotal reaction in guinea pigs or rats.

Whether there is a febrile or scrotal reaction or not, the animals blood should be checked for specific antibodies by the complement fixation test.

d. Prognosis:— The case fatality ranges from 10% to 60%. Some factors are age, sex, state of nutrition, and presence of partial immunity. The fatality rate is high above the age of 40 and low in children. Neurological symptoms of increasing severity, spreading eruption, elevated pulse rate, hypotesion, oliguria, and development of bacterial penumonia indicate poor prognosis. Death rarely occurs before 10th day; usually between 14th and 18th days.

e. Treatment: --

(1) Symptomatic and supportive

(a) Good nursing care and appropriate supportive therapy.

(b) Maintenance of adequate fluid intake (2,000-3,000 daily)

(c) High caloric diet with high protein intake.

(d) Preferable to use penicillin instead of sulfa drugs for treatment of bacterial complications.

(2) Para-amino benzoic acid is given in initial doses of 4 to 8 gm. and maintenance doses every 2 hours (usually 2 gms.) are given to keep the concentration in the blood between 10 and 20 mg. per 100 cc. The drug is given until the patient's temperature returns to normal or below.

When given early this medication tends to shorten the course, ameliorate the symptoms, and decrease the fatality rate.

The drug is not standardized and is not available for general clinical use at present.

f. Immunity:-- Infection confers substantial immunity against the disease, but instances of second and even third attacks have been reported.

g. Vaccination:-- The chances of infection are greatly reduced by vaccination. No proven deaths have occurred in individuals completely vaccinated prior to their infection. The clinical course is much less severe and the duration shortened to such a degree that many cases are erroneously diagnosed as murine typhus.

h. Pathology:-- Gross pathological changes are not distinctive. The rash is usually evident because of its petechial character. Skin necroses or gangrene are occasionally found. There may be symmetrical gangrene of the skin covering the extremities, i.e., blood is usually dark in color. The spleen is slightly enlarged before the second week but tends toward normal size later.

Microscopically there are perivascular infiltrations about arteroioles, small arteries, venules, and small veins. Focal infiltrations, when they are sharply demarcated and are proliferative, form Fraenkel's "typhus nodules" in the skin and brain (cortex, pons, medulla, and basal ganglia). Thrombosis in small vessels and subsequent hemmorhagic manifestations cause the petechiae. Thrombi are rare in large blood vessels. Myocarditis in the acute phase of the disease is indicated by infiltration of the myocardium. There is atrophy of testicular tubules and interstitial orchitis is usually present.

i. Etiology and Transmission

(1) Causal agent is Rickettsia prowazeki, an intracellular parasite found in the circulating blood during the active stage of the disease. At autopsy they may be found in the brain, spleen, bone marrow, etc. Staining with Giemsa gives the organism purplish tint; Machiavello (basic fuchsin) stains reddish. The organisms may be cultivated in the yolk sac of fertile hens eggs or the lungs of mice. Male guinea pigs are suitable laboratory animals.

(2) Transmission is accomplished through infective excrement from human lice (possibly fleas and bed bugs) rubbed into skin abrasions or inhaled particles of this material. The species of lice involved in the order of importance are: Pediculus humanus var. corporis (body louse);

Pediculus humanus var. capitis (head louse): and
Pthirius pubis (crab louse).

(a) Life History of the body louse. Lice normally inhabit the under surfaces of clothing next to the skin. In heavy infestations they may be found in the outer layers. The female deposits 3 to 5 eggs daily for 2 to 24 days. Eggs hatch in 7 to 10 days. Nymphs pass through three stages reaching maturity in 14 to 16 days. Mating occurs in 2 to 4 days and egg deposition 2 to 4 days later. The average life of a normal louse is 30 days. Life of infected lice may be shortened. The louse becomes infected only by feeding on infectious blood and becomes infective in 8 to 10 days following an infectious blood meal. Lack of blood meals is fatal to adult lice in about nine days. Newly hatched lice die in 2 days without feedings. A similar history is true for head lice and crab lice.

j. Epidemiology

Occurrence is chiefly between the months of October and late June with the peak in May or June although occasional cases may occur the year round. In 1946 the peak was reached in late March in Japan. The reservoir is still unknown for the interepidemic period; occasional cases, mild, unreported cases or unrecognized cases may be responsible.

Predisposing factors are those which tend toward an increase in lousiness and an accelerated distribution of lice from person to person. Colder weather causes close crowding of the population and the wearing of more and heavier clothing. Often the individual wears all of his clothes all the time because they are all he possesses. Lowered standards of sanitation and personal hygiene, the mass movement of troops, refugees, repatriates, and the general populace during post-war periods, particularly play major roles in creating ideal conditions for the appearance of an epidemic.

k. Prophylaxis and Control

The ground work which is laid prior to the typhus season is of the greatest importance and when carefully planned and executed, will result in effective control and eventual eradication of the disease.

(1) Procedures prior to the typhus season

(a) American typhus control officers are from the U. S. Military Government Teams and are in overall supervision of typhus control operations.

on epidemic threatens, they can be used as instructors and cadres for other teams. Sufficient transportation for each team should be available and a surplus maintained if the need becomes evident.

2. Training of civilian physicians and nurses.

A training program should be designed to acquaint physicians and nurses with typhus fever and its control. The need for early case reporting and isolation should be stressed. The meetings should be conducted by local medical associations or nurses associations.

3. Training of Block and Neighborhood Association Chiefs (Japan); Voluntary Service Group Heads (Korea)

Such persons should receive training in typhus control procedures and they in turn should inform the inhabitants under their surveillance.

(d) Publicity and Educational Programs

Publicity and educational programs on louse-borne typhus and its control should be instituted in October and continued through May of the following year as part of a well planned public health education program. Each Prefecture (Japan) and province (Korea) should institute continuous programs designed to carry typhus information into every school and every home through the agency of information meetings of teachers (parent-teacher associations), radio, newspapers, magazines, posters, leaflets, kami-shibai, motion pictures, (i.e., an animated cartoon or typhus control), slide films, contests in schools, and circulating exhibits. The danger of typhus should be stressed and people should be told what they as individuals can do to rid themselves of lice without relying on the use of DDT alone. Block and Neighborhood Association Chief (Japan), Voluntary Service Group Heads (Korea) and Red Cross Associations should be utilized to the fullest extent in the educational and publicity programs.

(e) Distribution of Supplies

Early distribution and maintenance of adequate stocks of typhus control supplies to the eight key points in Japan and to the six points in Korea is essential.

1. Available supplies

a. Insecticide, powder, louse (10% DDT in pyrophyllite or talcum)

b. Larvicide, DDT, powder, dusting (10% DDT in talcum)

c. Larvicide, DDT, powder, dissolving (100% DDT)

d. Insecticide, spray, residual effect DDT (5% DDT in kerosene)

e. Pyrethrum emulsion (30X) or 10X)

f. Cresolis compound (Liquor cresolis)

g. Duster, powder insecticide, plunger type, hand operated.

h. Outfit delousing, gasoline engine driven

i. Sprayer, insect, knapsack type, plunger type, cylindrical shape.

j. Sprayer, liquid, insect, continuous spray.

(f) Mass Vaccination

Ideally all persons should receive an initial two doses of 1 cc each, typhus vaccine 7 - 10 days apart, and a booster dose once every six months. If there is insufficient vaccine for this plan, alternate plans are suggested, dependent on supplies:

1. Vaccination with 1 cc of all persons living in the large centers of population where typhus was epidemic in 1945 - 1946.

2. Vaccination with 1 cc of all persons living in a city "ku" where secondary cases are occurring.

3. Vaccination with 1cc of all persons living in a prescribed area ("zone") where secondary cases are occurring.

4. Vaccination with 1 cc of all commuters holding season tickets. (In cities, as Tokyo, Osaka, etc.)

(g) Vaccination of key personnel

All new persons actively engaged in typhus control operations should receive the full course of the vaccine. Former workers to receive a booster dose of 1 cc vaccine. Special groups of people, i.e., nurses, doctors, hospital and institution personnel, control team members, railway trainmen, street car motormen and conductors, policemen, etc. should receive the full prescribed course of vaccine and a booster dose once every six months.

(h) Disinfesting of possible typhus foci

Routine disinfestation of all persons entering and leaving jails, prisons, vagrant homes, orphanages, homes for poor and aged, infectious disease hospitals and similar institutions should be continued on a year round basis. In addition all persons in those institutions should be deloused once each month (more often if lice continue to be found).

Hand dusters, spray equipment, DDT insecticide powder, residual DDT spray and pyrethrum emulsion should be distributed to each institution.

Steam sterilizers or dry heat chambers should be installed and used in infectious disease hospitals, jails, public baths, etc. for the disinfection of clothing and bedding.

Cells of jails and prisons, isolation rooms of hospitals, public baths (rooms, baskets, etc.,) should be sprayed with DDT residual effect spray to which is added 2% (content) cresolis solution.

Use of a rickettsicidal spray will kill rickettsiae in louse or flea feces in addition to its insecticidal power. If fire hazard is great, Pyrethrum emulsion (30X or 10X) plus 2% cresolis content, using water as the diluent, may be substituted.

(See Rickettsicidal spray program, Addenda 6)

(i) Disinfesting of zones

Although it would be hazardous in the year following an epidemic to establish zones for routine monthly dusting on the basis of concentration of cases during the previous typhus season, such a plan has advantages. Such zones were established at Inchon and at Seoul, Korea in 1944 - 1945.

(j) Permanent disinfesting stations

Disinfesting stations should be established at health centers and operated on a year round basis. A few stations established near crowded railway stations should be established to care for migratory people. Persons would be free to come to such stations for delousing. On entering a disinfesting station, each person should be examined for presence of lice (head or body lice) and if found infested, receive a thorough dusting with DDT powder.

(k) Distribution of Insecticide powder to individuals

In an effort to encourage personal cleanliness ("freedom from lice", the "5th freedom") insecticide dusting powders (DDT or pyrethrum) could be distributed through the health centers to each individual or family living in a ku, particularly those kus where great numbers of typhus cases have occurred.

(l) Typhus Control Teams -(Organization and general duties)

1. Case Finding Teams - ("Checking" and "Roving" teams) Working from--Ku (ward) office, Kenku (school district) office, city health office, town health office, village health office, Health Centers, etc.

a. Organization

Doctor	1	In charge
Nurses	2	Assistant to doctor, vaccination work, take temperatures.
Workers	2	Disinfestation work

b. Duties

Intensive and extensive case finding (hunting) by "roving" teams.

Investigate all reported suspect typhus cases by "checking" teams.

Visit all persons in the neighborhood in an attempt to locate new suspects who may have been contacts of reported cases.

Vaccinate all family or household contacts

of cases with 1 cc typhus vaccine. Take temperatures of all contacts.

Disinfest all family or household contacts as well as patient or corpse. (Clothing, extra clothing, beds, bedding, floors included in dusting procedures.)

Mark house or building to indicate that it is disinfested and quarantined.

Direct that quarantine of house or building must be done within 6 - 8 hours following discovery of case.

Responsible for expeditious removal of all suspect typhus cases to an isolation hospital within 6 - 8 hours after discovery of case.

Reporting of suspect cases, cases or corpses within 2 hours after discovery.

Instruct members of household as to early symptoms and not to bathe or wash clothing for three days.

2. Sanitary (disinfesting) teams

a. Organization

Leader	1	In charge, inspects work, in charge of supplies
Clerk and Inspector	1	Keeps records, inspects work, assists in work.
Workers	4	Performs dusting and spraying.

b. Duties

Arrange itinerary of work based on reported cases.

Responsible for performance of focal dusting, zonal dusting, focal spraying, and zonal spraying and marking of homes processed.

Reporting of any new suspects or new cases found by team members and execution of disinfesting procedures in such instances.

Give disinfesting instructions for family absentees to report for dusting and vaccinations at ku (ward) or Ronku office by noon of following day.

Instruct persons not to bathe or wash clothing for three days.

3. Vaccination teams

a. Organization

Doctor	1	In charge
Nurses	2 - 4	Perform vaccination techniques.

b. Duties

Obtain addresses of reported suspect typhus cases.

Responsible for focal and/or zonal vaccination.

Responsible for vaccination of special groups; prisoners, policemen, nurses, doctors, inmates of institutions (orphanages, vagrant homes, old people's homes), railway employees, street (tram) car employees, bus drivers, etc.

Responsible for prompt reporting of any new suspect cases of typhus discovered by or reported to team members.

4. Suggested Additional Sanitary (disinfesting) teams

a. Central Health Office Sanitary (disinfesting) Team.

Organization

Doctor or Nurse	- 1 in charge of team
Inspector	- 1 inspects work, keeps records, etc.
Workers	- 4 perform disinfesting techniques.

Duties

Assist in focal and zonal operations if necessary

Perform disinfesting operations for special groups, i.e., routine disinfesting of migrants in railway stations, (work to be done at night) etc.

b. Disinfesting Station Teams

Organization

Doctor or Nurse	1 in charge (examines clients for lice)
Inspector	1 inspects work, keeps records, and helps examine clients for lice, etc.)
Workers	2 to 10 (dependent upon the size of the station) perform dusting techniques.

Duties

Perform disinfesting operations in special disinfesting stations.

Doctor or nurse responsible for operation of station and work done. Also responsible for screening out of suspect typhus cases.

Inspectors examine persons reporting for treatment for presence of lice.

Disinfesting technicians responsible for application of dust to clothing and heads of persons sent to them by inspectors.

Instruct persons DDT'd not to bathe or wash clothes for three days.

c. Special Disinfesting teams or small groups of trained personnel.

Organization

Nurses or trained personnel from staff of:

Ku-office, Renku, Village town, etc., health office.	Poor Farms
Jails and prisons	Vagrant Homes
Hospitals	Dormitories
Orphanages	Other institutions of various sorts.

Duty

To perform disinfesting procedures within their particular offices or institutions.

Disinfesting the absentees from the focal or zonal dusting procedures.

Routine disinfesting of the inmates (if any)

Routine disinfesting of incoming and outgoing patients, prisoners, orphans, etc.

(2) Procedures when outbreaks of typhus occur

(a) General

When cases of typhus occur, the following control measures should be instituted. Such measures should be modified in accordance with the needs of the local situation.

Control measures should be directed towards two general methods - 1) louse control and eradication of infected lice, 2) the development of active immunity by the use of typhus vaccine. The use of either or both of these methods requires judgement and adaptation of the measures outlined below to suit the problem at hand. In general disinfestation with insecticide powder and spray is a simple procedure but a relatively temporary measure. The chief asset of immunization is its "holding" power. Inoculation with typhus vaccine should therefore be practiced to the fullest extent possible under existing local conditions and availability of vaccine supply.

(b) Definition of Terms

1. Suspect case of typhus fever; any person with elevated temperature and headache of sudden or gradual onset. If the case is known to be suffering from some other cause (boils, severe cold, pneumonia, broken leg or arm, or other definitely recognizable disease) such a case need not be considered a suspect.

2. Confirmed case of typhus fever; a case in whom the Weil-Felix tests, complement-fixation tests, rickettsial agglutination tests, or autopsy findings support the clinical diagnosis. Confirmation is done after the patient has been isolated in the hospital (not in the home)

3. Focal Disinfesting; the application of 10% DDT dust to persons living in the homes of the suspect case and not over 500 persons in an area of 100 meters radius. These 500 will be those persons living next to and around the case. Where 500 or less persons live within 100 meters of the case, then all persons will be dusted in their homes. Do not dust outside 100 meter radius of the case for focal disinfesting.

4. Zonal Disinfesting; the application of 10% DDT dust to persons living in designated areas where several cases have occurred in close proximity to each other in location and time. The size of a zone may vary from one block to an area with a population of 30,000 - 50,000 or more persons. (A 6 man sanitary disinfesting team should be able to thoroughly dust 2000 - 3000 persons in a 5 day period). Disinfesting work is done in the homes and should be carried out simultaneously in all zones.

5. Focal Vaccination; the administration of 1 cc of cox-type tyohus vaccine to persons living in the home of the suspect case and to the 500 persons dusted in the 100 meter radius. Available amounts of vaccine will be a limiting factor.

6. Zonal Vaccination; the administration of 1 cc of cox-type typhus vaccine to all persons living in the designated "zone".

7. Spot maps; large maps on which reported suspect cases can be accurately located. Maps of each ku (ward), city, and village should be utilized where typhus occurs. The maps help in judging the concentration of cases, and help to more correctly evaluate where more intensive and effective work must be done.

(c) Operation of typhus control plan.

1. When case is reported personally:

a. A person with elevated temperature and headache:

Reports to: (any one of the following)

Doctor	Chief of block or neighborhood association
Nearest Policeman	
Chief of his dormitory, shop, factory	Red Cross Representative, Health
Family head	Center (nearest)
Local Health Office Ku (ward) Village, Town.	

2. When case is discovered by: (any one of the following)

Family head	Red Cross Representative
Doctor	Chief of his dormitory,
Chief of block or	shop or factory
Policeman	

(When discovered by any of the above, the information is transmitted directly to the proper health office, or is sent through a doctor, policeman, messenger or phone at once.)

3. When the case is reported to the local health office by any person, neighborhood or block association chiefs, policeman, doctor, visiting nurse or Red Cross representative:

a. Local Health Office: (Procedure)

Immediately dispatches the local office case-finding team (s) to the address or addresses of "suspect" cases. Case-finding team (s) institutes measures as listed in 4.

Spots case on large scale map of area

Reports Case(s) to city health office

Decides if Zonal disinfesting is necessary

Dispatches Sanitary (disinfesting) teams(s) to the addresses of suspect typhus cases. They perform the following duties:

Complete any disinfesting operations in the home of the patient not done by the case finding team.

Performs Focal disinfesting procedures in the neighborhood of the case.

House to House work

Head, body and clothing of all persons living in each house to be thoroughly dusted with 10% DDT powder (1½ - 2 oz/ person)

Extra clothing, and bedding dusted with 10% DDT powder.

Focal disinfesting to be done same day as the case is reported.

Repeat disinfesting in 7 and 14 days.

Performs Zonal disinfesting procedures if concentration of cases (secondary cases) appear (for size of zone see definition of Zone in Zonal Disinfesting)

House to House work

Head, body and clothing of all persons living in each house to be thoroughly dusted with 10% DDT powder.

Extra clothing and bedding to be dusted with 10% DDT powder.

Disinfestation of Zone to be completed in 5 days.

Repeat disinfesting in 7 and 14 days.

Dispatches vaccination team(s) to the address of the suspect typhus case.

b. Vaccination team(s) perform the following duties:

Vaccinate any person not vaccinated in the home of the patient by the case-finding team.

Perform Focal Vaccination procedures on all persons living in the neighborhood of the case with 1 cc typhus vaccine (500

persons depending on the concentration of population and the availability of the vaccine)

Performs Zonal vaccination procedures if a concentration of cases develops. Zonal vaccination with 1 cc typhus vaccine to be done only on direction. Size of zone to be as in definition of Zone for Zonal delousing.

4. When a case is reported into any health office by the roving case-team (team in the field), this team initiates the following action at the home of the patient.

a. Doctor

Examines the patient, and classifies the patient as a typhus suspect or not. He does not diagnose the case as typhus.

Orders isolation of the patient (if suspect).

Orders quarantine of the family of the suspect for 14 days.

Reports suspect case within 2 hours after discovery to the nearest local health office by messenger or phone.

b. Nurses

Lists family names. Requires family to have any absentees report to the local health office by noon of the following day for processing.

Questions patient, and household members, and neighbors as to possible source of infection. Secures names of possible contacts (relatives, visitors, etc.)

Takes temperatures of the family members.

Organizes and performs vaccination with 1 cc typhus vaccine of all members of the family and/or household.

c. Workers

Apply dust (DDT 10% powder) to:

Patient: head, clothing, bedding, and his extra clothing, (patient should be transferred to clean clothing and bedding where possible).

Family members: head, clothing, extra clothing (especially that clothing which is worn at odd times), extra bedding.

Floors of house, particularly around the bed of the patient.

Apply spray (pyrethrum emulsion in water plus 2 to 3% cresolis content) to:

Floors, bedding of patient, clothes of patient. Apply the spray to inside of garments, along the seams of bedding. (DDT spray, residual effect may be used if the fire hazard is not considered to be too great.)

Note: In some localities there are disinfection teams for the disinfection and isolation of contagious disease cases. These can be utilized in the above program by changing the solution used in spraying from their present 3% lysol or cresolis content in water to a 3% lysol or cresolis content in either pyrethrum emulsion in water or DDT spray, residual effect. This will relieve the case finding team of additional equipment and avoid duplication of work.

(d) Typhus Control in Rural Areas, smaller towns, labor camps, etc.

1. General principles

a. When one or more cases of typhus fever occur in a civilian community of less than 1000 (and not more than 5000) population:

Isolate patient(s)

Quarantine household 14 days.

Disinfect every individual.

If possible, vaccinate everyone living in the community using one dose technique of 1 cc. (Full Prescribed course of vaccine if possible).

Disinfest all patients and known contacts with 10% DDT insecticide powder and treat the homes with either DDT residual effect spray plus 2 to 3% cresolis content, or pyrethrum emulsion plus 2 to 3% cresolis in the final dilution where the fire hazard is great. Repeat disinfesting operations in 7 and 14 days.

Vaccinate all family or household contacts (two 1 cc doses one week apart)

Apply "focal" disinfesting and vaccination procedures.

Disinfesting work is to be done house to house.

b. When typhus appears in towns above 5000 population and in cities, a complete typhus control program should be established as outlined, but modified to fit the existing local situation.

c. If typhus fever cases appear in labor camps, camps of displaced persons and refugees, dormitories, barracks, etc., the following applies:

Disinfest all inmates, staff personnel and attendants, their extra clothing, bedding.

Vaccinate all inmates, staff personnel and attendants with full course of typhus vaccine.

Use residual effect spray and cresolis 2% content and/or pyrethrum emulsion spray and

cresolis 2% content on the floors, halls, store-rooms, kitchens, etc., as outlined in RICKETTSICIDAL SPRAY PROGRAM (see addenda 6)

Quarantine of such camps and institutions should be imposed for 14 days after appearance of the last case.

Necessary regulations should be issued preventing unnecessary civilian travel into or out of such areas until typhus has been controlled.

(e) Port Quarantine Procedures

(See Memorandum For: Imperial Japanese Government, AG 014.33 (5 Nov 46)GC, (SCAPIN 927/10) APO 500, dated 5 November 1946, Subject: Repatriation.

(f) Proper care of Disinfesting Equipment

Responsible men with mechanical skill should be trained in the proper use of the gasoline driven outfit and charged with responsibility of proper maintenance of the machine and dusting heads. On Sanitary (disinfesting) teams, some one person should be responsible for conditioning of the hand dusters and spray equipment.

1. Outfit, Delousing, gasoline engine driven.

   a. Clean equipment after each day's operation.

   b. Clean all air filters after each day's operation.

   c. Operate engine in open away from dust if possible.

   d. When available, use accessory outfits alternately to relieve the load on any one outfit.

   e. Use proper grade lubricating oil (S.A.E. - 20)

   f. Clean and oil control valve on dusting heads.

2. Hand dusters

a. Clean the inside of the pump each day.

b. Clean and oil the leather plunger after each day's operation.

c. Exercise care so as not to dent the cylinder pump walls.

3. Spray equipment

a. Clean spray nozzle.

b. Tighten hose clamps.

c. Clean screen filters.

d. General maintenance.

2. MURINE (FLEA-BORNE) TYPHUS: Manchurian Fever.

a. General

Murine typhus is an acute infectious febrile disease caused by Rickettsia prowazeki, var. mooseri, usually characterized by sudden onset of severe headache, chills, and fever that is continuous for 12 to 14 days. A roseate, macular, exanthematous rash appears about the 5th day. The disease is relatively mild and has a low mortality as compared to louse-borne typhus and scrub typhus.

Unfortunately, in Japan, statistics prior to 1945-1946 do not distinguish between epidemic and murine typhus. The general belief is that most of the sporadic cases reported from 1923 to 1945 were cases of murine typhus. These cases occurred in the prefectures of Akita, Aomori, Hyogo, Iwate, Tokyo-To, Yamagata, Osaka, and Yamaguchi. Undoubtedly this disease could be found in nearly all prefectures of Japan. The disease is also present in southern Korea.

b. Clinical Course.

The disease may start gradually after an incubation period of 4 to 14 days with irregular development of symptoms, the temperature rising step by step. Usually the onset is abrupt. In general, the clinical course is similar to that of louse-borne typhus, but the disease pursues a comparatively mild course. Complications are rare and the mortality low. During invasion the temperature rises to 38.5° C to 40.0° C (101.2° F to 104.0° F) in 3 to 6 days, and terminates in rapid lysis about the 14th day. The mental condition is much less altered than in louse-borne typhus. Delirium is almost wholly lacking. The

most characteristic finding is the rash which appears about the 5th day. This rash characteristically consists of rose or dark red macules which fade into the surrounding areas and do not disappear on pressure. The eruption is less extensive and petechiae are less common than in louse-borne typhus. The exanthem may last from 2 to 10 days disappearing rapidly.

Recovery is usually by the 16th day when the temperature has returned to normal. Convalescence to complete recovery varies from 2 to 4 weeks after normal temperature has been reached.

c. Complications are usually few. A bacterial pneumonia is most common.

d. Prognosis is usually good.

e. Diagnosis:

(1) Differentiation: requires differentiation from louse-borne typhus, scrub typhus, relapsing fever, typhoid fever, malaria, and Weil's disease.

(2) Serological Differentiation:

	Weil-Felix			Complement Fixation	
	OX-19	OX-2	OX-K	Louse	Murine
Louse-borne Typhus	xxx	x	-	xxx	-
Murine Typhus	xxx	x	-	-	xxx
Scrub Typhus	-	-	xxx	-	-

(a) The Weil-Felix agglutination reaction using Proteus OX-19 is positive after the 6th day of the disease.

(b) Complement-fixation and specific rickettsial agglutination using highly purified murine antigens are the most reliable procedures. These antibodies begin to appear after the second week of the disease.

(3) Animal Inoculation: Inoculation of guinea pigs with infectious material from suspected murine typhus cases produces an obvious scrotal reaction. However, such a reaction has been noted in guinea pigs inoculated with material from known louse-borne cases. Murine typhus produces a febrile disease in laboratory rats

female deposits from 3 to 18 eggs at one laying, on the host animal or in the nests of their hosts. Under optimum conditions of 18.3° C to 26.7° C (65° F to 80° F) and 70% humidity) the eggs hatch in from 2 to 12 days. The larvae are very active, slender, 13 segmented, yellowish, white with segmentally arranged bristles with biting mouth parts. They feed on faeces of adult fleas and dried blood chiefly. The larvae as a rule pass through 3 developmental stages, and the entire larval period ranges from 9 to 15 days under natural conditions. The larvae then become quiescent, spins a cocoon, and pupate. The pupal stage varies from 18 days to many months before the adult emerges. Longevity of the adult fleas is quite remarkable. Under natural conditions adults may live as long as 376 days (X. cheopis). The average length of life ranges from 30-60 days. The rat fleas show no evidence of disease due to R. prowazeki infection.

k. Epidemiology:

Cases of murine typhus are typically sporadic and are known to occur during the louse-borne typhus season and probably all through the year. In many parts of the world the disease is more prevalent in the summer and fall months. This corresponds to the peak of density of the flea population. Murine typhus is most commonly found among workers on docks, grain elevators, etc. The incidence is the highest among males. The rat is the common reservoir host, but other rodents may play a role.

l. Prophylaxis and Control

(1) Prophylaxis

Control of murine typhus fever in a civilian population is based upon the premise that the typhus infected fleas are the primary agent in the transmission of the disease to man with rodents as reservoir animals of the infection.

Recent experiments indicate that the use of DDT dusts and sprays are effective in the control of fleas and when used as auxiliary measures with the fundamentals of rat control, an effective control of murine typhus should be accomplished.

(2) Control Methods

(a) The general procedures as outlined for the control of louse-borne typhus will apply to a great extent, since each suspect typhus case must be considered as possible louse-borne typhus and must be dealt with accordingly.

1. Case Finding Teams.

No change should be made in the general duties and operation of case finding teams.

2. Vaccination teams.

No change should be made in the general duties and operation of the vaccination teams. (Vaccination against louse-borne typhus. No murine typhus vaccine is available in this theater.)

3. Sanitary (disinfesting) teams

a. Organization

Leader	1
Inspector and clerk	1
Workers	4

b. Duties

Flea control

Sanitary teams should perform their regular duties as outlined for louse typhus control. Additional sanitary teams should be used to carry out a detailed rodent control program (see Insect and Rodent Control).

Consider all suspect cases of typhus as possible cases of louse-borne typhus.

Focal disinfestation (see definition of "focal disinfestation")

In addition to regular disinfestation duties:

Application of 10% DDT dust to:

Rat burrows

Area in front of openings to rat burrows

Rat harborages

(Work to be done in and around all buildings in focal area. Dust may be applied with hand or power dusters).

Cats and dogs. (Dust fur lightly)

Infested areas and grassy lawns may be successfully treated with DDT dust.

Application of 5% DDT spray, residual effect to:

Floors of buildings.

Wall surfaces to a heighth of one meter above the floor. Use at rate of 1 liter per 25 sq. meters of surface. Earthen floors and underneath buildings dosage should be increased to 2 liters per 25 sq. meters of surface.

Beds (if any), mattresses "futon", etc. Apply spray directly to surfaces and into cracks and crevices in beds and along seams of bedding and seams and tufts of mattresses. Use at the rate of 1 liter for each 5 beds and mattresses or equivalent.

Flea breeding and flea harboring areas, sleeping quarters of animals, (cats, dogs) infested barracks, warehouses, theaters, recreation halls, restaurants, railway stations, basements, houses, dormitories, vagrant homes, dog kennels, ground under buildings, railway cars, street cars, buses, public bath houses, etc.

Zonal disinfestation (if necessary)

(see definition of "zonal" delousing)

Disinfestation procedures at Japanese and Korean ports of entry and debarkation.

(see Memorandum For: Imperial Japanese Government, AG 014.33 (5 Nov 46)GC, (SCAPIN 927/10) APO 500, dated 5 November 1946, subject, Repatriation.

Rodent Control

(See section on Insect and Rodent Control)

GROUP II - TSUTSUGAMUSHI FEVER GROUP

1. General

Scrub Typhus (larval mite borne)
Japanese Flood (River) Fever
Rural Typhus (S. E. Asia)
Island Fever (South Pacific)
Tsutsugamushi fever (disease mite fever)
Kodani Fever (Hairy Mite fever)
Akumushi Fever (Red mite fever)
Shimamushi fever (striped mite fever)
Yochubio (mite disease or fever)
Shashitsu (sand mite ache or fever)

Scrub typhus is an acute infectious disease caused by Rickettsia orientalis, usually characterized by the appearance of a "primary" eschar at the site of the mite's bite, sudden onset of headache, sudden fever which is continuous for 12 to 14 days and ends by rapid lysis, and the appearance of a macular exanthematous rash on the 5th to 7th day.

Akita and Niigata prefectures are the only areas involved in Japan as far as is known. Korea also has affected areas in the southern half.

2. Clinical Course

The bite of the mite may occur anywhere on the body but is most common on the neck, in the axillae and groins, and in other locations where the course of the mite is impeded by constrictions of clothing, such as collar line, belt line, top of shoes or boots, etc. Following the bite, incubation takes place in 4 to 16 days.

During the period of incubation a small papule develops which becomes encrusted. By the time of onset of symptoms the "primary lesion" is usually a black eschar 2 to 10 mm. in diameter. Onset is usually sudden and lacks prodromal symptoms. Occasional cases have malaise, anorexia, headache, dizziness, nausea and photopsia. (However, persons bitten by

an uninfected mite may complain of similar symptoms, but these subside in 2 - 3 days).

Sudden fever is the usual onset. It rises step-wise for the first four to six days, until it reaches 38.9° C - 40.6° C (102° F - 105° F) and then may be remittant for 10 to 14 days. General malaise, headache of increasing severity and sudden chills are characteristic. Conjunctivae are injected. Often restlessness, cough and delerium develop rapidly. General lymphadenopathy with tenderness appears early, especially of the regional lymph nodes draining the "primary" lesion. Less commonly slight xanthopsia, tinnitis, slight deafness, dizziness, joint pains and epistaxis are present. The pulse rate is slow and regular as a rule.

From the third to seventh day discrete a raspberry-red macular exanthem appears. Often the rash is not marked and may escape notice altogether. When the rash is apparent, it may spread from the trunk to the upper parts of the extremities. Seldom does it involve the hands, feet or face. Enanthem may appear on the soft palate and is not petechial. The rash may be of short duration.

Signs of pneumonitis are almost always found. Congestion of the nasal, mucosa may be present. Spleen is enlarged and tender during the first week.

Toward the end of the second week and during the third week after the onset of headache and fever, the temperature begins to fall remittently and intermittently to normal. Mild cases are able to resume normal activities in four to six weeks after their temperature returns to normal.

3. Complications

Pneumonia (secondary), gangrenous stomatitis, suppurative lymphadenitis, and cystitis are more frequent complications.

4. Diagnosis

a. Differentiation

In the early stage scrub typhus must be differentiated from plague, louse-borne and murine typhus, dengue, malaria and infectious hepatitis which may be in the same areas. The limited geographical distribution should reduce the error in making a tentative diagnosis. Of great help is the presence of the characteristic necrotic ulcer (eschar) with its regional lymphadenopathy.

b. Serological Differentiation

	Weil-Felix			Complement Fixation	
	OX-19	OX-2	OX-K	Louse	Murine
Louse-borne typhus	-	x	-	xxx	-
Murine typhus	xxx	x	-	-	xxx
Scrub typhus	-	-	xxx	-	-

(1) Weil Felix reaction is used to show agglutinins in rising titre for proteus OX-K in serum taken from scrub typhus patient as soon as the disease is suspected and at 2 to 5 day intervals until the diagnosis is demonstrated by a rising titre. The peak titre is usually reached during the third week and is followed by a rapid decline to negative within several weeks. A titre of 1/160 is significant if only one result is available.

(2) No satisfactory complement fixation test has been devised as yet.

c. Animal inoculation: The blood clot from a specimen taken from a patient is ground with saline, centrifuged at low speed and 0.3 cc of the supernatent fluid injected via I.P. route into white mice. Infected mice die in 10-16 days. Smears of scrapings from the serous membrane of the peritoneal cavity and of the spleen will show the causative Rickettsia when fixed with methyl alcohol and stained with Geimsa.

5. Prognosis

Signs which in combination may indicate a poor prognosis are:

a. Increase in pulse rate out of proportion to the temperature rise;

b. Onset of muscular twitchings, convulsions and coma;

c. Increasing leukocytosis with a relative and absolute decrease in lymphocytes.

Case fatality rate in Japan varies from 15 to 60%. The higher rate occurs in persons beyond 30 years of age. Age, physical condition, stage of disease on institution of hospital care, and coexistence of other diseases are factors to be considered. Other areas of the Pacific report a lower fatality rate. This may be due to a milder strain or confusion of murine and scrub typhus in areas where both diseases occur.

6. Treatment

a. Symptomatic and supportive

(1) Good nursing care and appropriate supportive therapy.

(2) Maintenance of adequate fluid intake (2000 to 3000 cc daily.)

(3) High caloric diet with high protein diet.

(4) Preferable to use penicillin instead of sulfa drugs for treatment of bacterial complications.

b. The results of experiments in the laboratory with susceptible animals indicates that the sodium salt of para-amino-benzoic acid may have beneficial therapeutic action in scrub typhus. Results of field trials conducted in Burma with this compound in patients are promising.

7. Immunity

Some immunity is conferred by one attack, but second attacks are not uncommon and are relatively mild.

8. Vaccination

No suitable vaccine has been available. Intensive research on the preparation of a scrub typhus vaccine is being carried out in the U. S. A. Laboratory results are promising.

9. Pathology

The gross anatomic changes are not striking. The lymph nodes are enlarged and, in the drainage area of the "primary" lesion, may show great enlargement as well as irregular areas of necrosis. The heart is often pale and flabby. Focal hemorrhagic mottling due to extravasation of blood is seen in the lungs, often with interstitial pneumonitis. The liver is always congested and the spleen enlarged. The brain may show multiple punctate hemorrhages.

Microscopically the section of the primary lesion consists of a necrotic cutaneous lesion with thrombosis of vessels limited to the narcotic zone. Basically the disease is characterized by a disseminated, focal vasculitis and perivasculitis of the smaller blood vessels of the skin, lungs, heart and brain. The predominating cell is a large basophilic macrophage.

The most striking lesion is found in the heart. It is a diffuse, interstitial myocarditis characterized by many large basophilic mononuclear cells. In the lungs a rickettsial pneumonia (interstitial) is found.

Sections of lymph nodes from drainage areas show large foci of necrosis. Kidney sections show changes of early acute glomerulo-nephritis. Brain lesions vary from perivascular collections of histiocytes to a typical "typhus nodule". A diffuse interstitial orchitis is occasionally seen. The arteritis is not as frequently seen in scrub typhus in any of the organs as in louse-borne typhus.

10. Etiology and Transmission

a. Causal agent is Rickettsia orientalis, an intracellular parasite found in lymphocytes and endothelial phagocytes of the tissues in the "primary" lesion, lymph nodes and spleen. It is also recovered in the blood in the incubation period. The organism shows a bluish tint with Giemsa staining and a reddish tint with Machiavello staining. It may be cultivated in the yolk of fertile hen's eggs.

b. Transmission is accomplished through the bite of certain larval mites. The "Kodani mite", Trombicula akamushi, is an orange-red color with hairy body and legs. The infection is inherited from adult mites (the larval mite feeds but once). T. deliensis is also incriminated.

(1) Life History of the Mite Vector

This group of mites of the acrine family, Trombidiidae, are commonly known as "harvest mites" and locally in Japan as "Kodani mites" (hairy mites). Adult female deposits the eggs on the ground during the summer and autumn. Newly hatched larvae usually are found attached to the inside of the ears of field mice and receive their initial infection from these reservoir animals. The engorged larvae drop to the ground, and pass through the nymphal form following which they reach maturity. The following spring adults deposit their eggs and the infection is passed through the egg to the resultant larval offspring. If man accidentally is exposed to the attack of the mites, infection results.

11. Epidemiology and Distribution

In Japan, Formosa, and Korea, the disease occurs most frequently during July and August; less so in June and September. Occasional cases are found in other months. The field mouse (vole) Microtus montebelli is the chief reservoir in Japan although other small rodents may play a role. Persons handling hemp, vegetables, grains and hay during the harvest season in endemic regions are particularly in danger of infection. Conditions that produce a moist, damp soil favorable to the development of the mite are found in fields along the course of rivers subject to frequent inundation.

12. Prophylaxis and Control

In mite infested localities certain precautions should be followed:

a. Avoid sleeping on the ground.

b. Bathe as soon as possible after exposure with strong soap.

c. Anit-mite solutions. Repellent, insect spray, clothing (dimethyl phtalate or dibutyl phthalate).

Impregnation of socks and clothing is a satisfactory method of individual protection. Good results are obtained by spraying with a "wet" or large droplet type sprayer. Two to three ounces are required to impregnant a coverall or shirt and trousers, or uniform. Repelling or killing effect on mites will last one week or longer provided clothing is not washed out.

The larval form of T. Akamushi may be destroyed by spraying infested ground with petroleum emulsion. Clean cultivation of infested areas, burning of grass and debris, flood control in frequently flooded areas and reclamation of flood lands also tend to irradicate the infestation.

OUTLINE OF SUBJECTS TO BE
COVERED IN LECTURES ON
TYPHUS CONTROL TO
PREFECTURAL AND PROVINCIAL HEALTH OFFICERS

I. Introduction: (to include)

A. General History
B. History of typhus in Japan and Korea

II. Entomology and Epidemiology:

A. Entomology of the louse and the course of the infection in the louse (intestinal tract infection which is fatal to the louse in 11 days)
B. Mechanism of infection
C. Incidence effects and mortality as influenced by:
1. Age
2. Sex
3. Season
4. Occupation
5. Resistance and acquired immunity.

(Largely a reflection of infected louse-to-man opportunity of contact)

D. Miscellaneous factors:
1. General hygiene
2. Travel and Crowds (contact chance)

III. Etiological agent and its pertinent bacteriology and immunology:

A. Definition and classification with morphology and viability.
B. Animal reactions in guinea pig, rat, mouse, and monkey.
C. Immunology in Humans: Common and specific antibodies (murine and louse borne) resulting from:
1. Infection
2. Vaccination
D. Bacteriological relationship of murine and "louse-borne" typhus (close).

IV. Pathology and Diagnosis:

A. Pathology
B. Diagnosis:
1. Symptoms
2. Signs
3. Laboratory aids:
(a) Bacteriological
(b) Immunological
(1) Weil-Felix
(2) Complement Fixation
(3) Rickettsial Agglutination test.
(c) Animal inoculation and immunity tests.

ADDENDA 1

V. Clinical Course
   A. Prognosis
      1. Without vaccine
      2. With vaccine
         (a) Full course
         (b) One dose
   B. Treatment -- symptomatic

VI. Control Measure (directed at elimination of <u>infected lice</u> and active immunization of potential patients)
   A. Non-specific measures:
   B. Delousing procedures:
   C. Vaccination
   D. Isolation and quarantine

VII. Control Techniques:
   A. Early, rapid reporting of any headache and fever
   B. Checking of reported illness and instituting of control measures:

VIII. Organization
   A. National
   B. Prefectural
   C. Local
      1. City health officers
      2. Ku or machi health officers
      3. Case-finding teams
      4. Disinfecting teams
      5. Immunizing
      6. Special groups:
         (a) Hospitals
         (b) Jails and detention cells
         (c) Vagrant camps, dose-houses, etc.

IX. Supplies - source and amounts

X. Transportation: mobility for increased effectiveness of personnel

XI. Publicity
   A. Schools
   B. Posters
   C. Newspapers and pamphlets
   D. Radio and Movies
   E. Organized groups such as railroad workers, teachers, volunteer firemen etc.

XII. Insect and Rodent Control (emphasis on relation to murine typhus)

XIII. Discussion period.

XIV. Demonstrations - actual field demonstrations of typhus control methods, supplies, and equipment.

ADDENDA 1

TYPHUS SURVEY CARD
(sample)

CASE HISTORY

1. Number _____ 2. Name of Patient _____

3. Age _____ 4. Sex _____

5. Residence _____ Gun _____ Village
Ku _____ Cho _____

6. Place of onset of Illness _____

7. Date of onset 8. Date of first visit of doctor ____

9. Date of reporting 10. Date of hospitalization _____

11. Lice or Not? 12. Dusted or not before onset with DDT ___
Date Dusted _____

13. Vaccinated before onset? 14. Name of Hospital _____
Date vaccinated
Name of Doctor in charge _____

CLINICAL HISTORY

15. Prodromal symptoms:

a. Back pain? _____ i. Muscle pain? _____
b. Anorexia? _____ j. Diarrhea? _____
c. Nosebleed? _____ k. Insomnia? _____
d. Tired? _____ l. Chilly sensation? _____
e. Headache? _____ m. High fever? _____
f. Vomiting? _____ n. Cough? _____
g. Impaired Hearing? ____ o. Lightheaded? _____
h. Chills? _____

16. Observation:

a. Facial expression:
(1) Flushed _____
(2) Conjuctivitis ___

b. Rash: Date of Appearance
(1) Face _____
(2) Chest _____
(3) Arms and legs _____

c. Impaired Hearing _____ d. Stupor _____ e. Delirium _____
f. Excitable _____ g. Coma _____ h. Pneumonia _____
i. Heart: (1) Weak Pulse _____ j. Enlarged: liver _____
(2) Blood pressure _____ spleen _____
k. Gangrene _____ l. Pregnancy _____ (1) month _____
(2) abortion _____

BLOOD EXAMINATION

a. (Weil-Felix) Date of examinations _____ Titre _____

b. (Complement Fixation) Results
Date of examinations
_____ _____

ADDENDA 2

DISINFESTATION TECHNIQUES

1. Disinfestation, as applied to the extermination of lice and fleas in clothing, or bedding, may be readily accomplished by dusting with DDT insecticide powder. This procedure is simple and is particularly adaptable to field use.

2. Lice begin to die within six (6) hours after exposure to DDT powder. All are dead within twenty (20) hours after exposure. Louse eggs are not killed by DDT powder and will hatch in 7 - 10 days. Properly treated clothing and bedding remains lousicidal for 21-30 days and if not washed, will kill newly introduced lice and newly hatched nymphs during that period. It is necessary to redust the individual if the dusted clothing is changed or washed before the expiration of the hatching period of the eggs. Fleas begin to die in about four hours.

3. Procedure for Disinfestation

a. It is advantageous to set up sanitary (disinfesting) teams of 6 persons including one well-trained supervisor to direct the operation when hand dusters are used. (12 persons when power dusters are used). Individuals learning the dusting technique should remove the clothing of the first few persons after dusting to note whether the proper amount has been applied.

b. The chamber of each gun is filled to about 3/4's of its total capacity. The procedure as outlined below will deliver approximately 1½ ounces of powder per person. Less than this amount is ineffective.

c. The individual to be dusted is directed to remove hat, loosen collar and belt and to stand or sit with hat in hand.

d. Dust the hair until whited, separating the hair to insure even distribution. Dust inside of hat with band, if any, turned up.

e. Insert nozzle of powder gun in right sleeve at the wrist next to the skin with the arm held straight out to the side and at shoulder height. Direct two full plunger strokes of powder toward the arm-pit. Repeat for the left sleeve.

f. Insert nozzle in front of shirt at collar next to the skin and direct two full plunger strokes each toward the right armpit, toward the belly, and toward the left arm-pit. (3 positions).

g. Insert nozzle in back of shirt at collar next to the skin and direct two full plunger strokes each on top of the right shoulder, toward the right axilla, the middle of the back, the left axilla and on top of the left shoulder. (5 positions). Deposit additional powder on the neck band and under the collar itself where lice frequently abound.

h. Insert nozzle in front of trousers at the waist band next to the skin, with the person standing, and direct two full plunger strokes each toward the right leg, the crotch and the left leg. (3 positions).

i. Insert nozzle in back of trousers, next to the skin and direct two full plunger strokes each toward the right leg, the buttocks crease and the left leg. (3 positions).

j. Insert nozzle at belt line of trousers and deposit powder around the waist.

k. In dusting women an extra quantity of dust can be blown in at the collar, thus dispensing with dusting at the waist. It is much more satisfactory to use women teams for dusting women and infants.

l. Where multiple layers of clothing are worn, it is desirable to dust each layer of clothing.

m. With hand dusters, two full even strokes in each position are required. With the power duster, a momentary pressure on the trigger to release a like amount of powder is all that is necessary; the exact timing is learned by experience.

n. Instruct persons <u>not</u> to <u>shake</u> powder from clothing nor to <u>wash</u> clothing for at least 3 days.

o. Instruct persons <u>not</u> to bathe for 3 days.

4. <u>Disinfesting by Individuals</u>

a. This is readily achieved by disciplined workers who instruct each individual to shake half of the contents of a 2 ounce can of louse powder onto the head, axillary, and pubic hair; the inner surfaces and seams of underwear, shirt and crotch of trousers. Instructions should be given to take special care to rub the powder well about the inner surfaces of the collar and armpits of the underwear and shirt, particularly the seams, since lice are ordinarily found in these locations.

5. <u>Disinfestation of Clothing and Bedding.</u>

a. Clothing not on the person of the individual may be disinfected by dusting with louse powder. (Bedding may be treated similarly). All surfaces, including the seams and inner folds of clothing and bedding, should be treated. It is desirable to fold and arrange extra bedding in piles. Dust is applied to surfaces by inserting the nozzle between layers. Two persons should work together--one to operate the dust gun and one to manipulate the bedding. A minimum of 20 hours after exposure is required to insure death of all lice. Eggs are not destroyed by this method and louse powder must remain in the clothing and bedding

for about 10 days, or until all eggs have hatched in order to kill all newly-hatched nymphs.

b. Exposure of infested clothing and bedding to a temperature of minus (-) 23.3°C (-10°F) or colder for at least 2 hours and storage at ordinary temperatures for 3 - 4 weeks thereafter will destroy lice and their eggs. Laundering of clothing with hot water and soap will serve to disinfest such garments, but provision should be made to prevent infestation of the laundry and operators and the reinfestation of clothing subsequent to laundering or cleaning.

c. Heat. Clothing and bedding exposed to high temperatures will kill lice.

(1) Dry Heat -- a temperature of 60° C. for 30 - 45 minutes in a dry heat chamber is effective. Temperatures effective against lice will also kill the eggs and rickettsia.

(2) Steam Sterilization -- 15 lbs. pressure 15 - 20 minutes.

(3) Boiling water - 5 minutes.

6. Disinfection of Clothing and Bedding

a. Delousing with DDT louse powder does not kill Rickettsia prowazeki, the causative agent of typhus fever. Therefore, hospitals admitting patients with typhus fever must take proper precautions to disinfect the clothing of such patients. This is readily accomplished with steam sterilization or boiling in the case of articles of clothing or bedding not injured by heat. In case of woolens, leather and other such articles, disinfection should be achieved by application of cresol solution or use of dry heat.

b. Use of rickettsicidal spray (residual DDT and cresol (2% content); or pyrethrum emulsion with 2% cresol content) - (see Rickettsicidal Spray Program).

7. Disinfection and disinfestation of buildings, etc. (See Rickettsicidal Spray Program and under Murine typhus, flea control).

ADDENDA 3

"ASSEMBLY LINE" DUSTING TECHNIQUE

The "assembly line" method of dust application is designed for use in mass disinfesting operations where large groups of repatriates or other persons are to be treated. This method serves to:

1. Speed up the processing operations
2. Insure a more complete application of dust
3. Distribute duties so each person employed as a worker is responsible for only one or two steps of the dusting procedure.
4. Simplify training of workers.
5. Simplify ease in supervision of work.

PROCEDURE

A. Application of insecticidal dusts to clothing of individuals should follow the recommended steps of procedure, using either power dusting equipment or hand operated dusters.

B. The Sanitary (Disinfesting) team is composed of 14 to 16 persons (7-8 men; 7-8 women) as follows:

1 - General Supervisor
1 - Assistant Supervisor (man) 1 Assistant Supervisor (woman)

Worker #1 (man)	Worker #1 (woman)
" #2 (man)	" #2 (woman)
" #3 (man)	" #3 (woman)
" #4 (man)	" #4 (woman)
" #5 (man)	" #5 (woman)

1 - baggage duster (if needed)
1 - supply man
1 - mechanic

C. Duties of team members

Worker #1 (man & woman) - dusts hat and hair
Worker #2 (man & woman) - dusts up both sleeves and under collar
Worker #3 (man & woman) - dusts down front and around neck band
Worker #4 (man & woman) - dusts down back and over shoulders.
Worker #5 (man & woman) - pants (front & rear), around waist.

D. Duties of Supervisors:

Chief - In charge of dusting operations
Assistant - (man) - Supervises work of men dusters
Assistant - (woman) - Supervises work of women dusters

E. Duties of additional personnel:

Baggage duster - applies dust to baggage
Supply man - tends to powder supply, keeps extra guns filled.
Mechanic - responsible for care of dusting equipment.

F. Operation

1. Individuals to be dusted are divided into 2 lines - one line for men and a second line for women and children.

2. Individuals leave baggage (if any) on platform where a person employed as a worker applies DDT to extra clothing, blankets, etc.

3. Individuals file by workers in proper line, where each "worker" executes the step in the procedure for which he or she is responsible.

4. Individuals, when dusted, claim their baggage and are guided to another area, or placed on board boat or train (in case of repatriates).

5. Supervisors walk between line of dusters and can easily watch the progress of the work and make corrections.

"ASSEMBLY LINE" DUSTING PLAN

MEN DUSTERS — Supply Table — Outfit Delousing — WOMEN DUSTERS

Men

WORKER #1

Hat
and
Head

WORKER #2

Both sleeves
& under collar

WORKER #3

Down front &
around neck
band

Supervisor's Walk

WORKER #4

Down back &
over shoulders

WORKER 35

Pants
Front
& Rear
Around
Waist

Women

WORKER #1

Hat
and
Head

WORKER #2

Both sleeves
& under collar

WORKER #3

Down front &
around neck
band

WORKER #4

Down back &
over shoulders

WORKER #5

Around
Waist
Front
& Rear

ADDENDA 4

RICKETTSICIDAL SPRAY PROGRAM

1. Circumstantial evidence has gradually been building up as regards the role that infective fecal material from lice and fleas may play in the spread of typhus fever. Experiments have shown that a spray containing a 2% cresolis content is effective in killing the causative organism of typhus fever, Rickettsia prowazoki. Based on the above information, a spray schedule, coordinated with the regular control program appears advisable.

2. Materials Available.

Sprays

Insecticide spray, DDT residual effect.

Emulsions

Pyrethrum emulsion (30X)
Pyrethrum emulsion (10X)

Cresolis

Cresolis compound - or local preparations containing cresol

Apparatus

Knapsack type sprayer
Hand, continuous operation, sprayer

3. Method of Preparation of Sprays

a. Stock materials obtained should be mixed in quantities desired, immediately preceding actual use, in areas where work is to be undertaken or at a central point and sent out with the proper typhus control teams.

b. The sprays should have a 2% cresolis compound content in the finished product. Mixing may be done in any convenient barrel, drum or tub.

c. Formulae of Sprays

Spray #1

Insecticide spray, DDT residual effect - - - 30 Liters
Cresolis compound - - - - - - - - - - - - - - - 600 cc
Add cresolis compound slowly to spray material stirring continuously with wooden paddle until thoroughly mixed. This spray to be used for residual effect DDT and for rickettsicidal effect.

ADDENDA 5

Spray #2

Pyrethrum emulsion (30X) - - - - - - - - - - 1 Liter
Water - 30 Liters
Cresolis Compound - - - - - - - - - - - - - - 600 cc
Add pyrethrum slowly to volume of water desired. Stir continuously until mixed. Add cresolis in same manner to mixture of emulsion and water.

This spray to be used for quick killing of fleas and for rickettsicidal effect.

Spray #3

Pyrethrum emulsion (10X) - - - - - - - - - - - - 3 Liters
Water - 30 Liters
Cresolis compound - - - - - - - - - - - - - - -600 cc.

This spray is prepared and used for the same purpose as spray #2 if the pyrethrum (10X) emulsion is furnished instead of the pyrethrum (30X) emulsion.

4. Spray #1 - residual effect DDT - cresolis spray

Schedule of use

Twice monthly

Railway Stations and large transfer points.
Corridors - floors and walls, seats or benches
Staircases - steps, walls, hand rails
"Rest" rooms (if any) - floors walls, stools, etc.
Offices and miscellaneous rooms.

Railway cars and coaches used for passenger transportation.
Floors, walls, ceiling, seats or benches.
Based on a III Class coach of approximately 16 x $2\frac{1}{2}$ x $2\frac{1}{2}$ meters, about 5 - 6 liters of spray would be required for one car.

Streetcars - Floors, walls, ceiling, seats or benches.

Buses - Floors, walls, seats or benches.

Jails and prisons - Floors and walls of cells, corridors, latrines, offices.

Infectious Disease Hospitals - Typhus wards

Vagrant houses - Floors and walls of all rooms, corridors, bath houses.

Orphanages - Floors and walls of rooms, toilets, bath houses.

Dormitories, poor farms, similar institutions, if lice are detected or cases occur.

Railway cars, street cars and buses should be marked in a prominent place with a date on which work was done.

Method of Application

Dosage rate for interior application for DDT residual effect should be approximately 1 Liter per 25 sq. meters of space.

Application

A rather coarse, wet spray should be used. Hold nozzle of sprayer close to surface to be treated, (10 - 20 cm.).
Surface should be moistened but with no run-off.
Liquid may also be applied with a large paint brush if no other equipment is available.

Precautions

Use competent trained personnel.
Open fires, electric motors, light bulbs, heating equipment, etc., should be kept out of direct contact with the spray.
Do not "fog" the spray with high pressure atomizers.
Leave doors and windows open during processing and for several hours after, until drying and ventilation is complete.
Workers should avoid prolonged contact of spray with the skin as the solvent, kerosene, will cause a mild dermatitis.

5. Spray #2 or Spray #3 - Pyrethrum - cresolis spray

Schedule of use.

These sprays are to be used in places where fire hazard is great in addition to general use.

Twice Monthly - on alternate weeks with spray #1

Railway Stations and large transfer points
Corridors, staircases, waiting rooms, "rest" rooms, offices.
Railway cars and coaches

ADDENDA 5

Streetcars
Buses
Jails and Prisons
Vagrant houses
Infectious disease hospital wards

Once each week

Theaters - floors, seats, rest rooms, lounging rooms, store rooms, kitchens, sleeping quarters.

Immediately

Typhus houses - floors, beds (if any), extra clothing, bedding, mattresses. Care should be taken to treat the cracks and crevices in floors, between mats, etc. Also seams of clothing, bedding, mattresses.

This work should be done immediately following dusting operations in the home of a suspect typhus case. This work should be repeated at weekly intervals over a three week period.

6. The spray program should be coordinated with the general typhus control procedures, and should be vigorously executed during the months of December, January and February. If the typhus situation during the spring warrants a change in tactics, this spray program may be modified to meet the changing conditions.

7. The larger centers of population should receive strict attention: in particular:

Sapporo) Hokkaido
Hakodate)
Aomori
Sendai
* Tokyo-Yokohama area
Nagoya
Kyoto
* Osaka-Kobe area

* Important areas.

INFORMATION CONCERNING DDT

DDT ("dichloro-diphenyl-trichloroethene") was first prepared in 1874 by Zeidler. The reaction of anhydrous chloral and chlorobenzene in the presence of concentrated sulfuric acid produced a material which in chemically pure form is a white crystalline solid, practically odorless, with low volatility, rather stable, and insoluble in water, but soluble in many organic solvents. It has the following chemical name:

1-trichloro-2.2-bis(p-chlorophenyl)ethane.

Preparation: "The compound is prepared from 1 molecule of chloral or chloral hydrate and 2 molecules of monochlorobenzene in the presence of sulfurnic acid (oleum is used commercially)."

"The DDT crystalizes from the reaction mass, and the sulfurnic acid is then removed by washing. The compound contains many isomers, in which the chlorine atoms on the benzene rings are attached in other positions, and other impurities. If pure p.p'-DDT is desired, it may be obtained by recrystallization of the technical material from ethyl alcohol. Several recrystallizations are necessary to obtain a pure product."

Technical DDT is a fine white powder which varies from yellowish white to white in color. Storage at high temperatures or exposure to sunlight does not cause deterioration. Under conditions of high humidity it tends to cake. Some producers offer a product so treated as to prevent hard clumping.

DDT insecticide is covered by patents assigned to J. R. Geigy, Basel, Switzerland, the first application for a patent being filed in Switzerland on 7 March 1940.

Toxicity: DDT acts both as a contact poison and a stomach poison for insects. The toxic effect is exerted principally on the nervous system and results in characteristic "DDT tremors", progressive paralysis and death. DDT when applied in the form of a spray or powder will continue to kill insects which come in contact with treated areas for several weeks or months.

DDT is a toxic substance to humans and care should be exercised in handling. All persons working with this material should be well trained in methods of application. Poisoning may occur from ingestion of DDT or by absorption of solutions of DDT through the skin. Therefore care should be taken to prevent contamination of foods (particularly butter, milk, etc.) by DDT. Contact with oil and organic solvent DDT spray solutions should be avoided. Inhalation of dusts containing DDT is not particularly dangerous, but when the dust cloud is dense, use of respirators is advisable.

ADDENDA 6

Emulsions for impregnation of garments containing 1% DDT are safe for this use but during processing tongs should be used to handle the clothing in solution.

DDT Insecticide Preparations: DDT may be incorporated in the preparation of various insecticidal and miticidal formulae.

1. Dusts

a. Insecticide powder, louse

DDT (concentrate) 10%
Pyrophyllite 90%
To form a 10% DDT content dust

b. Larvicide DDT, powder, dusting:

DDT (concentrate) 10%
Talcum 90%
To form a 10% DDT content dust

Manufacture of 10% DDT Insecticide Dusts

"Either pyrophyllite or talc can be mixed with DDT to produce louse powder. While 10% is used in the standard Army product, the concentration is not critical and from 5% to 10% will be effective. The pyrophyllite or talc should be neutral or very slightly acid. Alkaline dusts will cause the DDT to decompose.

A hammer mill should be used for this operation. Do not attempt to use a stone mill, ball mill, paint mill or edgerunner, since the frictional heat developed will cause the DDT to soften and cake-up. A hammer mill of the blade type is to be preferred to the saddle type.

If either the pyrophyllite or the DDT is lumpy, break up the larger lumps by hand and mix 25 lbs. of DDT with 25 lbs. of pyrophyllite. This mixing can be done in any type of mechanical agitator or in a tumbler drum. Put this mixture through the hammer mill once, then add 200 lbs. of additional pyrophyllite. Mix and put through the hammer mill a second time. Do not try to put unmixed DDT through the hammer mill.

Mixing and milling equipment should be avilable in Japan and Korea. Blade type hammer mills should be available in plants which formerly ground pyrethrum flours for export."

In the specifications for DDT louse powder as used by the Army, the following is stated:

90% should pass U.S. Standard mesh #325
99% should pass U.S. Standard mesh #100
99% of the finished material should go through the U. S. Standard mesh #80.

The approximate particle size corresponding to these meshes are as follows:

Mesh #325: 44 micra
Mesh #100: 149 micra
Mesh # 80: 177 micra

2. Solutions: Several types of solutions for use as sprays may be prepared.

a. Insecticide spray, residual effect

DDT (concentrate) 5%
Methylated naphthalene 15%
Kerosene 80%

For use in the control of roaches, bedbugs, mosquitoes, houseflies, phlebotomus flies, fleas, ants, etc. A solution, giving residual effect, may be prepared by dissolving 7 pounds DDT concentrate in one gallon of kerosene. Use at rate of one quart per 250 sq. ft.

b. Insecticide, liquid, finished spray

DDT (concentrate) 1.0%
Thanite 2.5%
Kerosene 96.5%

For use as a general insecticide where the spray is applied directly on the insect by means of an ordinary hand spray gun. This spray should not be used to give a residual effect as the DDT content is too low.

c. Insecticide spray, delousing (stock solution)

DDT (concentrate) 6%
Benzyl benzoate 68%
Benzocaine 12%
(ethyl p-amino benzoate)
Tween 80 (wetting agent) 14%
Prior to use dilute with 5 parts (by volume) of water to form 1% DDT content.

Designed for use on individuals against louse infestation of the hairy parts of the body. This spray is lousicidal and ovicidal. 2/3 oz. required per individual.

Solution may also be used in the treatment of Scabies, by applicatinn to effected parts.

ADDENDA 6

d. Insecticide DDT emulsion concentrate

DDT	25%
Xylene	65%
Triton x-100 (emulsifier)	10%

To be used as a 2% water dilution for louse proofing of clothing. May also be used in emulsions for preparation of larvicides, residual spraying against mosquitoes, flies, bedbugs, etc.

For impregnantion of clothing, mosquito bar, etc., dilute 1:11 by weight to form 2% aqueous emulsion. 30 gallons is sufficient for 125 suits of winter (50% wool) underwear (or garments of similar weight). One quart of solution per suit of underwear is required. 2% of dry weight of garment should be DDT.

e. Rickettsicidal Sprays (See Rickettsicidal Spray Program)

List of component ingredients of DDT insecticide products:

DDT - Technical (concentrate)

Dusts

DDT - technical
Pyrophyllite
Talcum

Solutions and sprays

DDT - technical
Methylated naphthalene
Thanite
Benzyl benzoate
Benzocaine (ethyl p-amino benzoate)
Xylene
Kerosene - Diesel oil - Fuel oil
Tween - 80 (wetting agent)
Triton x-100 (emulsifier)
Cresolis compound

ADDENDA 6

RICKETTSIAL DISEASES IN JAPAN AND KOREA

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THE PRINCIPLES OF VENEREAL DISEASE CONTROL

PUBLIC HEALTH AND WELFARE TECHNICAL BULLETIN

PH&W GHQ SCAP APO 500 June 1947

1. Organization of the Program in Cooperation with Medical and Allied Professions and Lay Organizations.

In the organization of a national venereal disease control program for Japan, careful attention should be given to the part to be played by the medical and allied professions and lay organizations. Although the Ministry, with the direction and supervision of the Public Health and Welfare Section, SCAP, must determine the scope and define the content of the program and administer many of the details, the private practitioner, the local and prefectural medical societies, the hospital, nursing, welfare and voluntary public health agencies, the public schools, medical schools, and a variety of other agencies, will have specific duties to perform in the actual application of many of the control procedures. Unless they are informed as to the Ministry's plan and are in general sympathy with its principles, they will either fail to assist to the full extent of their capacities or, in ignorance of the aims of the control program, may work at cross purposes to the eventual detriment of the public welfare.

Interested, active, and well-informed voluntary organizations can be of invaluable assistance in securing public support for the program, and in extending the health department's channels of the public information and education. It is doubtless to the disadvantage of many prefectural programs that not enough attention is paid to this matter of public relations.

Organizations of the general public, that is, non-professional groups, are very important in the last analysis. The greatest stimulus to the reluctant or uninspired public health worker is the persistent demand and continuous interest of the people he is paid to serve.

2. Administration of the Program

a. A Division of Venereal Disease Control. Venereal disease control should be a function of a separate section in the prefectural health department. In Japan venereal diseases are too outstanding a problem to be grouped with other infectious diseases. Where it is impracticable to make venereal diseases control a separate section, it should be the function of a subsection, with a high degree of autonomy, in the section of communicable disease control or its equivalent.

b. Direction by a Venereal Disease Control Officer. Whether there is a section or a sub-section of venereal disease control, the program should be directed by a venereal diseases control officer who gives his entire time to the duties

of his office. This officer should be the best trained clinically, should be amenable to further training, and should have the best knowledge of modern venereal disease control methods.

c. The duties of the venereal disease control officer should include as a minimum the following:

(1) The definition of the aims, purposes, and policies of the venereal disease control program. Since it will be his responsibility to carry out the program, under the direction and supervision of the Military Government Health Officer, he should administer that part of it with which the section of venereal disease control is directly involved; that is, he should have administrative supervision over all of the work of the section and over all of its personnel.

(2) The collection and analysis of morbidity data. Future planning, the need for more personnel, supplies, equipment and financial aid are all dependent upon the gathering and presentation of accurate statistics. As the extent and prevalence of venereal disease become recognized, additional facilities will be easier to acquire. It is important that the venereal disease control officer keep himself informed, through the study of statistics, as to the results of the program and as to any progress which is being made toward the control of the venereal diseases. The actual collection and analysis of all morbidity data are the function of a section of vital statistics in the health departments. In such cases, however, the venereal disease control officer should be permitted to prescribe the data to be collected for his purposes, and the scope of their analyses. He should have the fullest cooperation of the section of vital statistics in the planning and conduct of special studies, particularly as they pertain to analyses of treatment, case-finding and case-holding performance of clinics and other treatment sources. Certain statistical data must be available to the prefectural V.D.C.O. each month, so that he can submit his monthly report of Venereal Disease Control Activities to the V.D.C.O. in the Ministry.

(3) The establishment of effective cooperation with physicians in private practice, through conferences with local medical societies, provision of consultation services, by the health bureau clinics distribution of effective and helpful medical literature, provision of prefectural laboratory services and such other assistance as will lead to the willing participation of physicians in the health bureau's program.

(4) The development of cordial relations not only with the public but with special scientific groups. He should conduct a continuous campaign of sound public education in venereal disease control. He should be the liaison officer between the health bureau and the several agencies which will share in the development of the program.

(5) Administrative consultation to other units within the health bureau, such as the sections of laboratories, maternal and child health, anti-tuberculosis. He should have considerable voice in the determination of what emphasis is to be placed upon those parts of the program which may be administered by these sections in order that one service may not overbalance the other, and in order that one section may not work at cross-purposes with another to the embarrassment of both and to the confusion of the public.

(6) The organization and supervision of venereal disease clinics. The health bureau should conduct sufficient in-patient and out-patient facilities to adequately serve the population of the prefecture. The prefectural V.D.C.O. must either conduct these clinics personally, or supervise the work of the clinicians who are operating the clinics. Methods used should be as approved by the Military Government Health Officer and the Public Health & Welfare Section of SCAP.

(7) The organization and supervision of epidemiologic and followup services for clinics and private physicians.

(8) Study and control of the efficiency of venereal disease clinics in terms of contact tracing, efficacious treatment, and case holding.

d. Auxiliary Personnel in the Section of Venereal Disease Control. The venereal disease control officer should be supported by such administrative assistants, professional consultants, case-holding and case-finding personnel, and clerical staff as the execution of the program may demand. To whatever extent the program can be expanded from time to time, more nearly to approach the ideal, the staff of the section should be increased to permit the effective execution of the expanded program.

3. Treatment Services

a. General Principles

(1) The provision of adequate public treatment services is a basic necessity for venereal disease control in Japan. As has been demonstrated in other countries, the level of venereal disease control work is raised in direct proportion to the number of public facilities available. It is a matter of readily verified fact that most of the infected who seek treatment at public clinics are either on relief or are managing a precarious independent existence. Many are young people with small earning capacities, if they work at all. It is not likely that many patients in Japan at this time are seeking free care at public agencies in spite of being able to pay for private care. The treatment of the venereal diseases, and especially of syphilis, is time consuming and, at private practitioners' rates, is expensive. Those of the infected who can afford long continued medical care at the hands of private physicians will not often be found in public clinics where the danger of recognition is great, where long periods of waiting are the rule, where mass methods may leave little room for close patient-physician relationships, and where a multitude of other embarrassments and inconveniences must too often be tolerated. The more talk that is heard as to who will pay for the patients care, the poorer the medical care will be.

(2) The venereal diseases are communicable diseases. The right of the community to protect itself against exposure to communicable disease is recognized wherever there is civilization. In providing public treatment for the indigent infected with venereal disease, the community exercises a prerogative consistent with this right to protect itself. It is only in the public clinic that the large mass of the economically handicapped can be given efficient service at a price which the community can afford to pay. The provision of adequate treatment is vastly more than the simple introduction of medication into the patient. Consultation, case-holding and case-finding services are important functions of venereal disease control which could hardly be provided for the great number of the medically indigent in any other way than through organized clinic services.

4. Definition of Beneficiary of Public Clinic Service.

Diagnostic and treatment facilities should be provided for:

a. The diagnosis and emergency treatment of all persons who apply. All contagious patients must be considered a community hazard and treated until non-communicable.

b. All patients referred by private physicians either for continued treatment or for consultation.

c. All patients unable to pay for private medical care.

5. Definition of Physical Quality of Clinic Service.

Clinics should be so located as to be easy of access and of maximum convenienc to the population of the areas which they are to serve. The number of clinic sessions should be such as to meet the needs of the area without overcrowding or unreasonable delay. Night sessions should be held if necessary and at such hours as to prevent loss of time from work to employed patients. Special attention should be paid to special conditions, such as advanced pregnancy, the need of a patient to catch a bus, to return to work, or to return to children left at home.

Health Bureau Clinics should be held in clean, well-lighted, well-ventilated rooms, so located and arranged as to offer adequate privacy but not to imply isolation (as of a communicable disease), nor segregation (as of undesirable people). The physical arrangements should be such as to insure privacy in history-taking, physical examination and treatment, to provide adequate waiting-room and toilet facilities, and to contribute to the self-respect of the patient. In other words, the accessibility and the physical character of the clinic should be such as to invite and encourage regularity of attendance; not to discourage it or to imply that any treatment at all, no matter how disreputable the environment in which it is administered, is good enough for the venerally infected.

Children are preferably handled in a family clinic with the late afternoon or Saturday morning hours. Their mothers should be treated for their venereal infections during these same sessions, and prenatal and pediatric care when necessary should also be available in these family clinics.

6. Conduct of Clinics

a. Clinic sessions and hours should be well publicized. Patients should be examined in the order in which they appear at the clinic, although exceptions may be made for a very sick patient, mothers with several small children, or a working person with only a short time off from his job. The other patients who were not taken in turn should understand why another patient was seen ahead of them.

b. The general atmosphere of the clinic is of major importance and should be felt the moment the patient enters. All patients should be treated with courtesy; professional dignity must never be violated, and a friendly, business-like attitude should prevail in which the patient feels a respect toward the physician and nurse in their professional capacities.

c. A sincere interest in each patient and a kindly manner should be maintained regardless of the patient's economic, social position, educational level, or personal appearance. Public health venereal disease clinics treat patients in such a way that the majority of patients are very desirou of carrying out every medical or epidemiologic directive given to them by the clinician or the nurse.

d. Good manners are a first requirement in a professional service dealing with the public. A display of haste, loud voices, and impersonal handling of patients such as is common in prostitute hospitals should not be tolerated for the general public. Remarks should be directed to the person concerned and not to the entire clinic. Irrelevant conversation should never be indulged in during clinic hours. Food should never be prepared or eaten in the clinic.

e. Modern venereal disease clinics in health centers are noted for their cleanliness, quietness, efficiency and gentle handling of patients. In a public health venereal disease clinic patients should be made to feel welcome. In these respects the clinic nurse has the main responsibility. By her deportment, bearing, and kind reception of each patient, the nurse sets the tone of the entire clinic.

f. The most important public health teaching is done while the patient is in the clinic. Every patient will respond to a clear explanation of his particular case with more enthusiastic cooperation. The tactful handling of each patient and careful instruction while in the clinic are most effective in case control and eliminate the necessity for much correspondence and home visits.

7. Clinic Personnel

a. All clinic personnel should be technically qualified for the particular functions which they must perform.

b. Minimal clinic personnel should consist of (1) a qualified physician who is a graduate of a recognized medical school, who has had at least 6 months of special training under supervision, in the management of the venereal diseases, and who has a tactful and sympathetic personality and a particular interest in the venereal diseases and their relation to the public health; (2) a qualified technical nurse who should assist the physician in the technical aspects of clinic operation, the routing of patients through the clinic, the entry of clinical notes of a routine nature, etc; and (3) a clerk, (female), who should keep clinic records and statistics, attend to the clerical aspects of the follow-up system, and attend to the clinic correspondence. To this fixed minimum of intramural personnel there should be added such assistants in all of the categories as may be necessary to the efficient, and effective operation of the clinic without undue waste of the patients' time and case-holding and case-finding personnel as may be adequate to the problem with which the clinic is confronted.

8. Clinic Equipment

a. Clinic equipment should be adequate to the proper and efficient handling of the patient, his adequate physical examination, and his competent treatment. Adequate facilities should be available for the collection of specimens for examination in the laboratory and in the clinic for the immediate examination of smears, chancre serum (by dark-field), urine, unless adequate laboratory service is available close at hand. Lack of dark-field substages in many prefectures will necessitate sending capillary tube specimens of serum from suspected chancres to the nearest laboratory having a dark-field microscope.

b. History, physical examination and treatment record. Clinic records should provide for recording the patient's medical history, the results of an adequate physical examination, treatments given, reactions to treatment, tests for cure, and the condition of the patient at the time of any interruption of his connection with the clinic whether because of cure, the further need for treatment, transfer to treatment elsewhere, or unauthorized discontinuance of treatment. The record should provide, further, for recording the identity of all of the patient's contacts and the result of their follow-up.

9. Hospital Services

a. Hospitalization should be provided, at the discretion of the clinic chief, for patients with open lesions of early syphilis under certain circumstances, particularly in case of infectious relapse or for the recalcitrant or promiscuous patient, or when there are unusual home or social conditions. It should also be provided for lumbar puncture if this service cannot properly be provided in the clinic, or when there are circumstances which make it advisable to have the patient under hospital control.

b. Only those hospitals should be used that belong to the national, prefectural, or municipal governments. Hospitals that are partially or totally controlled by private or special interests should not be used by the health bureaus.

10. Gonorrhea

a. Diagnosis

(1) In the Male:

(a) Cultural evidence of the presence of the gonococcus is adequate, in itself, for the diagnosis of a gonococcal infection. Cultural evidence is defined as including those fermentation tests which differentiate between the gonococcus and other members of the groups of gram-negative diplococci which resemble the gonococcus.

(b) A diagnosis of gonorrhea may also be made in the male, under the following three conditions:

1 If intracellular, gram-negative diplococci which resemble the gonococcus are found in smears from the male genito-urinary tract, and if the history of the infection or the clinical evidence is presumptive of gonococcal infection.

2 If extracellular organisms are found in typical clusters during the earliest hours of an acute infection, and the history or clinical findings are presumptive of gonorrhea, clinical diagnosis of gonorrhea may be made and the case treated as such. Smears should be made at frequent intervals thereafter as intracellular organisms may be found at a later date (especially in a case which does not respond to sulfonamide therapy).

3 A clinical diagnosis should be made in the presence of a suggestive history and suspicious clinical findings, confirmatory laboratory findings being lacking, and the patient treated as if he had gonorrhea. Repeated search should be made for the gonococcus thereafter, however.

(c) If the diagnosis of gonorrhea has been made elsewhere, on the basis of evidence which would have been acceptable to the clinc if the patient had first been seen in the clinic, that diagnosis may be accepted and the patient treated for gonorrhea, if necessary, even though gonococci can no longer be found.

(2) In the Female:

(a) Laboratory confirmation of diagnosis, whether by smear or culture, is relatively easy in acute infections in either male or female. In chronic infections in women, however, even repeated cultures may be negative, and, if the patient is to have the advantage of prompt treatment, the diagnosis will have to be made clinically if a history of exposure or of promiscuous sexual intercourse is obtained.

(b) Specimens for either smear or culture should be taken from the urethra after thorough massage of the para-urethral (Skene's) glands, and from the cervix after thorough cleasing of the vagina with dry gauze or cotton swabs and manipulation of the cervix between the blades of a bivalve speculum. Specimens collected from the urethra without prior massage of the para-urethral glands, or from the cervix without first cleansing the vagina and removing any cervical plug, will usually be highly contaminated with overgrowing organisms or contain no gonococci.

(c) The patient's history should include an account of the symptoms which she has or has had, such as dysuria (not common), vaginal discharge vulvar pruritis, pelvic inflammation (including abdominal surgery), Bartholin abscess or cyst, acute arthritis, and menstrual disturbances not otherwise adequately accounted for. It should further include any history of exposure to a known gonococcal infection, of sexual promiscuity, or of having infected another person with gonorrhea. The mother of an infant with gonococcal opthalmia neonatorum, for instance, may usually be assumed to be the source of the infant's infection.

b. Treatment of Gonorrhea:

(1) Penicillin, when it is available, is the treatment of choice. When Penicillin sodium is given in normal saline or distilled water, it may be given as follows:

First dose - 0 hours --- 100,000 units intramuscularly in buttock
Second dose - 2 hours -- 100,000 units intramuscularly in buttock
Third dose - 4 hours --- 100,000 units intramuscularly in buttock

The above treatment should cure about 94% of the patients. Those who are not cured should be given another course doubling the dosage of the drug. Use a different lot of penicillin if possible.

(2) Where penicillin is not available, sulfathiazole or sulfadiazin should be used as follows: 1 gram (2 tablets) four or five times a day for five days. The drug is given every four hours. The patient should drink a glass of water each time the drug is taken, and should consume at least three quarts of fluids daily.

(3) The patient may improve clinically under this regime and laboratory reports may appear to be negative, but unless the clinician is satisfied that the patient is cured, it is better to wait three days and then repeat the course of the drug.

(4) Sulfonamides should not be given intravenously. Vaccines should not be used. Douches, washing, and irrigation apparatus should be removed from the clinics and not used in the future. They are of no value in the treatment of gonorrhea. They may do harm. Topical applications are useless. Modern treatment is systemic and by chemo-therapy. The clinicians time is too valuable to waste in useless procedures which do not "keep the patient clean", and which have no medical value.

c. Tests of Cure:

(1) Three negative cultures obtained at 48 hour (or weekly) intervals plus a negative culture obtained after a menstrual period are satisfactory evidences of cure in the female. The longer the observation period, the better. The patient is examined several times during a three-month period. If all tests are negative during this period, the patient may be considered cured.

(2) If cultures are not available, reliance must be placed on smears. The clinician should remember that in the diagnosis of chronic gonorrhea, especially in women, smears are notoriously unreliable. Laboratory samples must be obtained carefully from secretion expressed from Skene's, Bartholin's, and the endocervical glands. The gonococcus will not be found on the surface of the mucous membranes.

(3) Patients treated for gonorrhea, especially those treated with penicillin, should receive a serologic test for syphilis once a week for a month, and once a month for the next three months. The possibility of masking primary syphilis with penicillin used in the treatment of gonorrhea should be kept in mind

11. Syphilis

a. Diagnosis

(1) Primary Syphilis

(a) Any genital sore in male or female is possible primary syphilis until proved to be otherwise.

(b) Any indolent lesion anywhere on the body (especially lips, tonsils, fingers) which fails to heal in two weeks may be primary syphilis.

(c) The diagnosis of primary syphilis is a laboratory, not a clinical procedure.

(d) Suspected primary syphilis should not be treated locally until repeated dark-fields are negative.

(e) Antisyphilitic treatment must not be given on suspicion alone. The diagnosis must be proven. Once treatment is begun, it must be carrie through until 40 arsenicals and at least 30 heavy metals have been given.

(f) There is reason for urgent hast in diagnosis; hours count!

(g) The diagnostic procedures are as follows:

1 Dark-field of surface serum; if negative, repeat at least three times on consecutive days before local treatment.

2 If surface dark-field is negative, do dark-field of aspirated serum from lesion's base, or, dark-field of aspirated material from the regional lymph node.

3 If you have no dark-field microscope, send the patient at once to someone who has; or send a capillary tube specimen to the neares laboratory that has a dark-field substage.

4 Do serologic test on all patients with open lesion at first visit. If any of these tests are positive, treat at once. If all are negative --

5 Do serologic test follow-up for 3 months, weekly for first month, every 2 weeks thereafter.

(h) No physician who has not actually had training and experience in the recognition of Spirochaeta pallida should attempt the diagnosis of syphilis by the dark-field; too many serious errors are likely to be made. This is especially true of lesions in the mouth where organisms resembling Spirochaeta pallida are frequently found. A diagnosis of syphilis made by dark-field from preparations taken from the mouth, should never be made.

(2) Secondary Syphilis:

(a) Do blood serologic follow-up (3 months) on any lesion which was possibly primary syphilis.

(b) For any generalized skin eruption - DO A SEROLOGIC TEST.

(c) For any sore mouth or throat which does not heal in 10 days - DO A SEROLOGIC TEST.

(d) For any unexplained patchy loss of hair - DO A SEROLOGIC TEST.

(e) For any iritis or neuroretinitis - DO A SEROLOGIC TEST.

(f) For any vague bone pains or polyarticular arthralgia -- "acute, subacute, or chronic infectious arthritis" - DO A SEROLOGIC TEST.

(g) Lift the top from a papular lesion and examine the serum by dark-field. It is highly desirable to recognize the approach of the open, infectious stage of secondary syphilis before it develops--hence, the serologic follow-up advised is maxim #1. The next five maxims call attention to the five common manifestations of secondary syphilis--generalized skin eruptions, mucosal lesions, alopecia, iritis and arthralgia, although others, much less common, do occur. Ninety-five percent of all patients with secondary syphilis will present

one or a combination of these five manifestations. Unfortunately, the lesions of secondary syphilis may either be completely lacking or so trivial and evanescent as to be overlooked by patient and physician alike. Further, unless blood tests are made, the fact that the lesions are due to syphilis may be entirely missed, and some other diagnosis made.

(h) Fortunately, the properly performed serologic test has its highest negative value during the secondary stage of syphilis. It is always positive (100 percent). If it is negative, there is practical assurance that the patient has some other disease. On the other hand, it must be remembered that a patient may have a positive blood test as the result of an old infection with syphilis, and at the same time have any one of the above signs or symptoms as the result of concurrent condition, not syphilis. The history of exposure or the history of a primary lesion may help to settle the question.

(3) Latent Syphilis: All syphilitic infections are latent at some time, and most of the time until ultimate break-down occurs. There is no way to recognize latent syphilis except by serologic tests.

(4) Syphilis and Pregnancy:

(a) Few syphilitic pregnant women have lesions, and history and physical examination are nearly worthless as aids in making the diagnosis in this group. The diagnosis can be made in most cases only by serologic tests. Every pregnant woman should have at least one and preferably two serologic tests for syphilis during pregnancy. One test should be taken during the early months of pregnancy and another about the seventh or eighth month.

(b) If proper treatment is begun before the 16th week of pregnancy, the infected mother can be assured of a baby free from syphilis in almost every case. Treatment must be adequate and continuous throughout pregnancy, and should be continued to completion. A careful history for any reactions to the previous treatment must be elicited before each succeeding treatment. Urine specimens should be checked frequently for signs of renal damage.

(c) Pregnancy usually causes the signs and symptoms of syphilis to become less obvious. Most pregnant women with syphilis are unaware of the disease and have no signs or symptoms. Treatment is almost always well tolerated and the clinician will not encounter any special trouble if the reaction to each previous treatment is carefully noted.

(5) Congenital Syphilis:

(a) Syphilis should be suspected in every baby of a known syphilitic mother, whether or not she was treated before or during pregnancy.

(b) Syphilis should be suspected in puny, ill-nourished, wizened infants who "won't gain", in infants with skin rashes of any type, in those with snuffles or those with "pseudoparalysis".

(c) In older children, syphilis should be suspected if there is "pink eye" (it may be interstitial keratitis), deafness unless clearly middle ear, hydrarthrosis of the knees (Clutton's joints), osteomyelitis, and peculiar second dentition. Check suspicion by serologic test of both child and other members of its family.

(d) If the facilities are available, make a dark-field examination of scrapings from the wall of the unbilical vein. The finding of Spirochaeta pallida establishes the diagnosis at the earliest possible moment.

(e) If quantitative serologic tests can be made, do quantitative serologic tests on the cord blood and on the infant's blood at 1, 2, 4, 6, 8, and 12 weeks of life and at intervals thereafter for at least the first 2 years. If the child does not have syphilis, the titer will decrease and usually become negative before the end of 8 or 12 weeks. If the child has syphilis, the titer may rise, or it may fall at first and then rise.

(f) If titration cannot be done, it may be assumed that a positive serologic test of the infant's blood after 8 weeks to 3 months means syphilis. If the test is negative at 3 months, it should be repeated at 6 months, 1 year, and 2 years. If all these tests remain negative, the child certainly has escaped infection with syphilis.

(g) Roentgenograms of the infant's long bones at the age of 2 weeks may establish the diagnosis if there is characteristic evidence of syphilitic osteochondritis at the epiepyseal lines. Negative findings do not exclude the possibility of syphilis. Interpretation of the roentgenograms must be made by an experienced roentgenologist, since deposits of bismuth (if the mother has been treated with bismuth) may make differential diagnosis difficult.

(6) Late Syphilis:

(a) Late syphilis may attack any part of the body. Its manifestations are so numerous and its differential diagnosis so difficult, clinically, that it has well earned the name of "Great Imitator". It is impossible, outside of a voluminous textbook, to discuss the diagnosis of late syphilis adequately.

b. Management of Syphilis

(1) General Principles: In general, no treatment should be given until the diagnosis is made either by dark-field or confirmed by serologic tests. No therapeutic tests should be used. If, under the pressure of a most unusual and extreme emergency, treatment for a lesion suspected of being a chancre must be begun before laboratory confirmation of the diagnosis can be obtained, (or if treatment has been begun elsewhere without adequate diagnosis), such treatment should conform fully to the scheme for early syphilis and must be carried through to completion as if a positive diagnosis of syphilis had been made.

(2) Where adequate supplies of penicillin are available, syphilis is now treated in Rapid Treatment Centers. For a period of less than two weeks the patient is hospitalized and given combined treatment with mapharsen, bismuth and penicillin. Various amounts of these drugs are used but at least 5 injections of mapharsen, 3 injections of bismuth and 2,000,000 units of penicillin are given during the patients period of hospitalization. The penicillin is given in divided doses, every 3 hours night and day until the entire amount has been given. As can be seen, this regime necessitates adequate supplies of penicillin, sufficient inpatient facilities, and trained nursing and medical personnel. Where this treatment regime can be instituted the follow-up problem on lapsed cases is nil. In Japan, at this time, it is obvious that Rapid Treatment Centers are not feasible.

In some instances, such as patients who are pregnant and too near term to institute the usual treatment regime, it may be possible to hospitalize the expectant mother and institute treatment with penicillin, mapharsen, and bismuth. However, most patients at the present time will have to be treated with mapharsen and bismuth according to the schedule given in this manual.

(3) Treatment should be begun with an arsenical in early and latent syphilis but with bismuth in cardiovascular syphilis and certain forms of central nervous syphilis. The preferred arsenical, outside of clinics with well-trained medical personnel, is arsenoxide (mapharsen). Under expert direction, arsphenamine or other arsenicals may be employed. The preferred bismuth preparation is bismuth subsalicylate in oil.

(4) Each treatment should be recorded upon the patient's clinic record, including the date, form of drug, dose given, and any reaction noted.

(5) It cannot be too strongly emphasized that clocklike calendar regularity of treatment without long or short variation or lapses, is critically important both to control of infectiousness and cure. Every effort should be made to impress this fact upon all of the clinic personnel on every occasion.

(6) Emphasis should be placed upon the need for the completion, by each patient, of the full treatment schedule in the time called for by the type of infection which he presents. The results of serologic tests should not be permitte to interfere with this schedule of treatment. "Treatment to noninfectiousness" only, should never be accepted as the objective of any clinic in any case.

(7) The infectiousness of syphilis is not to be predicted upon the results of blood tests but upon the total time, course, laboratory tests, physical inspection, and treatment summation of the case.

c. Treatment of Primary, Secondary or Latent Syphilis

(1) All patients started on treatment will receive the full course of 40 arsenicals and at least ~~30~~ 20 bismuth injections.

(2) A negative serologic test for syphilis (STS) will not be used as a reason for stopping treatment before 40 arsenicals and ~~30~~ 20 heavy metals have been given.

(3) Any patient who becomes delinquent before receiving 20 arsenical and 20 bismuth injections must be considered infectious and must be returned to treatment according to the directive SCAPIN 153 which classifies venereal diseases with other communicable diseases.

(4) If old arsphenamine is used, the dosage will be 0.3 grams and will be given only <u>once</u> a week.

(5) If neoarsphenamine is used, the dosage will be 0.45 grams, and will be given only <u>once</u> a week.

(6) Mapharsen is an arsenical drug that has been used in place of Arsphenamine (Salvarsan) and Neoarsphenamine (Neosalvarsan). It is less toxic than the other arsenicals and is just as effective even when given in one-tenth the amount of Neoarsphenamine.

Correction 12 Feb 48

(7) It must be thoroughly aerated when it is mixed, and it should be injected into the vein quickly in twenty seconds or less.

(8) If Mapharsen and Bismuth Subsalicylate are used, the following schedule will be adhered to:

Week	Mapharsen 0.04 gms to 0.06 gms. TWICE a week.	Bismuth Subsalicylate 0.2 gms ($1\frac{1}{2}$cc) intramuscularly once a week
1	" "	" "
2	" "	" "
3	" "	" "
4	" "	" "
5	" "	" "
6	" "	" "
7	" "	Omit Bismuth
8	" "	" "
9	" "	" "
10	" "	" "
11	Omit Mapharsen	Bismuth Subsalicylate 0.2 gms. ONCE a week
12	" "	" "
13	" "	" "
14	" "	" "
15	" "	" "
16	Mapharsen 0.04 gms to 0.06 gms. Twice a week.	Omit Bismuth
17	" "	" "
18	" "	" "
19	" "	" "
20	" "	" "
21	Mapharsen 0.04 gms to 0.06 gms. Twice a week.	Bismuth Subsalicylate 0.2 gms. intramuscularly once a week.
22	" "	" "
23	" "	" "
24	" "	" "
25	" "	" "
26		" "
27		" "
28		" "
29		" "
30		" "
31		" "
32		" "
33		" "
34		" "
35		" "
36		" "
37		" "
38		" "
39		" "
40		" "

Weeks	Mapharsen IV 2x WK 0.04 OR 0.06 mgs.	Bismuth IM 1x WK. 0.2 Gms.
1-5	Give	Give
6-10	Give	Give
11-15	Omit	Give
16-20	Give	Omit
21-25	Give	Give
Total Injects	40	20

Total Treatment: 40 Arsenicals, ~~30~~ 20 heavy metals.

Recheck the blood test every 3 months for the first year after treatment, every six months the second year and at yearly intervals thereafter.

An examination of the spinal fluid should be made within the first 6 months following treatment.

If the blood test, after having been negative becomes positive and stays positive, (in the absences of other causes such as acute infectious diseases, vaccinations, immunizations), the patient should be retreated.

(9) Treatment in late latent syphilis should begin with a series of injections of bismuth subsalicylate. Thereafter, arsenicals and bismuth are given in alternate courses at weekly intervals. Example: Bismuth for 10 weeks, arsenicals for 10 weeks and repeat until 30 arsenicals and 40 injections of bismuth have been given.

(10) The treatment of LATE Syphilis must be individualized according to the existing type of organic pathology.

12. Chancroid

a. Definition

(1) Chancroid (soft chancre) is a localized venereal disease caused by the Hemophilus ducreyi, transmitted only by direct contact, and characterized by painful single or multiple genital ulcers, often complicated by suppurating inguinal bubo. The incubation period is usually 2 to 5 days, but may be longer.

b. Epidemiology

(1) The disease occurs primarily among peoples that live on a low hygienic level. There are undoubtedly symptomless carriers, usually female.

c. Course

(1) The disease begins as a vesicopustule which breaks down rapidly. The pustule soon ruptures, leaving a sharply circumscribed, shallow ulceration. The edges may become ragged and undermined. The base is moist and covered with necrotic, grayish exudate. When this is removed, an uneven base of purulent granulation tissue is revealed. The lesion is surrounded by erythema and is usually very painful. Multiple lesions may develop rapidly by auto-inoculation. Induration is usually absent in untreated lesions, but boggy induration may be present if local treatment has been applied.

(2) The lesions occur in the following sites in order of frequency; in the male-prepuce, frenum, shaft, anus; in the female-labia, clitoris, fourchette vestibule, anus, and cervix. Spread by auto-inoculation may take place anywhere ir the perigenital zone.

(3) Regional adenitis frequently develops within a few days to 2 weeks. The bubo is usually large, unilateral, soft, fluctuant, acutely inflamed, and tender. Untreated, it has a tendency to rupture at a single point. However, it may subside without suppuration when the patient is treated with sulfonamides.

(4) Phimosis and paraphimosis may occur. There is a tendency to spontaneous healing, both of genital lesions and of bubo, with scar formation. Systemic reactions are mild or absent.

d. Diagnosis

(1) All patients with penile ulcers of any description should be admitted to a hospital for diagnosis and treatment. If this is not practicable the physician must be sure that the patient understands and will observe isolation technique.

(2) Since primary syphilis may clinically resemble chancroid, and since mixed infections of these two diseases may occur (thechancre appearing in the chancroid), the diagnosis of syphilis must be confirmed or ruled out by laboratory tests.

(3) A blood serologic test for syphilis should be made on admission, repeated once a week for the first month, and at monthly intervals for 3 months, unless a diagnosis of syphilis is established earlier.

(4) The diagnosis of chancroid may be aided by the laboratory examination of stained smears from the lesion, or by culture of pus from the lesion or the bubo.

e. Treatment

(1) Chemotherapy

(a) Systemic. Sulfadiazine or sulfathiazole should be administered in all cases. One gram four times a day until the lesion is healed is recommended. Where adequate hospital service is available, the drug is given every four hours, night and day for one week.

(b) Local. Nothing but cleanliness (soap and water) is necessary. Keep the ulcers clean and dry.

(2) Surgical Treatment

(a) The bubo should never be incised. If fluctuation is present, aseptic aspiration with a 16-gauge needle is recommended; this may be repeated if necessary. Sulfadiazine ointment should be applied to the puncture wound.

(b) Marked phimosis or paraphimosis may be treated by immersion and soaking in hot magnesium sulfate or saline solutions during systemic sulfonamid therapy. Circumcision or dorsal slit is undesirable and is rarely necessary.

f. Prophylaxis

(1) Personal cleanliness is important.

(2) Caution: All patients receiving sulfonamides should consume at least 3000cc of fluid daily.

13. Lymphogranuloma Venereum

a. Definition

(1) Lymphogranuloma venereum (also known as lymphogranuloma inguinale, 4th venereal disease, Nicholas-Favres Disease, lymphopathia venereum, and by numerous other names) is a systemic virus disease, acquired venereally, and characterized by a small evanescent herpetiform initial lesion frequently followed by regional lymphangitis and adenitis.

b. Epidemiology

(1) The disease is generally acquired through sex contact. The existence of asymptomatic carriers is suggested by the numerous individuals with positive Frei tests without clinical signs or symptoms of the disease.

c. Course

(1) The disease usually begins as a trivial and transitory, painless small erosion, papule, or herpetiform vesicle or ulcer, of the penis, vulva, vagina, peri-anal area, or anal or rectal canal which frequently escapes the patient's notice.

(2) The invasion of the lymph nodes usually occurs from 10 to 30 days after infection. Inguinal adenitis is often bilateral and occasionally subsides without suppuration. During this stage, constitutional symptoms (prostration, malaise, fever, meningitis, meningo-encephalitis, or other bizarre manifestations) may be observed. The lymph nodes may fuse to the skin. Multiple areas of softening occur in the matted nodes followed by break-down and the development of numerous sinuses. Extensive scarring accompanies healing. The anorectal syndrome is more frequently found in the female and is characterized by rectal pain, discharge of blood and pus from the anus, a tendency toward extreme chronicity, and the production of rectal strictures.

d. Diagnosis

(1) A positive Frei reaction cannot be relied upon absolutely to establish the lymphogranulomatous nature of any clinical condition, since it is known that, in untreated infections with lymphogranuloma venereum, skin sensitivity persists for many years, probably for a lifetime. A positive test, therefore, may only mean that the patient has had lymphogranuloma venereum at some time in the past, rather than his present symptoms being caused by this disease. False positive Frei reactions may occur in other related virus infections.

(2) A diagnosis of lymphogranuloma venereum should not be made on the basis of a positive Frei reaction in the absence of clinical signs.

(3) A negative Frei reaction in the presence of a clinically suspicious lesion of at least three weeks' duration is of value in excluding the diagnosis of lymphogranuloma venereum.

(4) The complement fixation test for lymphogranuloma venereum is no longer in the experimental stage, but is still not available for general use.

e. Differential Diagnosis

(1) Lymphogranuloma venereum must be differentiated from malignant tumors, Hodgkin's disease, tularemia, amebic proctitis, tuberculosis, meningoencephalitis, pyogenic infections, plague, chancroidal bubo, granuloma inguinale, and syphilis. Syphilis should be ruled out by dark field examinations of material from genital lesions or regional lymph nodes and by serologic examination which should be repeated monthly for at least three months. Low titre positive serologic tests for syphilis may occur in this disease.

f. Treatment

(1) Local. The fluctuant nodes may be aspirated; but incision and drainage should not be used. Radical excision is inadvisable because of the risk of lymphatic obstruction and chronic swelling of the penis, scrotum, or vulva.

(2) Chemotherapy. Sulfadiazine should be administered in a dose of 1 gram three times daily for 21 days.

(3) Surgical. Patients with late complications who do not respond to sulfonamide therapy, should be handled in the following manner:

(a) Rectal Stricture. Prolonged gentle dilatation, preferably manual. Colostomy should not be performed unless dilation is impossible, because of location of the stricture, or has failed.

(b) Peri-rectal abscess. Surgical incision and drainage.

(c) Fistula-in-ano. Should be excised where possible.

14. Granuloma Inguinale

a. Definition

(1) Granuloma inguinale is a chronic disease due to infection with a Donovan body, which is possibly of bacterial nature. It is a mildly contagious, progressive disease, characterized by a sharply defined, granulomatous, usually painless, initial lesion, involving the skin of the genital or inguinal region, and spreading gradually by continuity or contiguity. Rarely, it is a systemic disease involving bones, joints, and viscera. Granuloma inguinale is a distinct disease entity and should not be confused with lymphogranuloma venereum.

b. Epidemiology

(1) Some doubt exists concerning the manner of spread of granuloma inguinale. The consensus is that it is venereally acquired and that its communicability is low. There appears to be marked differences in racial and individual susceptibility.

c. Course

(1) The disease starts as a vesicle, papule or nodule. The surface epithelium becomes excoriated or eroded, leaving an ulcer with a beefy red granular base. An early lesion may be a clean, raised, velvety, smooth tuft of granulation

tissue, situated at the mucocutaneous border of the vaginal orifice, at the preputial orifice, or on the glans or inner surface of the prepuce. The margin of the lesion is sharply defined, The granulation tissue. if traumatized, bleeds easily. The lesions are not painful unless grossly secondarily infected. There is very little tendency to spontaneous healing. The lesions spread by continuity or contiguity. Extension is often slow. There is a predilection for moist contact surfaces, particularly in the cruroscrotal folds, the groins, and the cleft and folds of the buttocks. The advancing border of the lesion has characteristic rolled edges, the granulation tissue piling over onto the bordering epithelial surface.

(2) The ulcerative process may remain more or less stationary for many years. Secondary elephantoid enlargement of penis, scrotum, or labia may occur. The lesions may heal with scar formation at one margin and progress at another. There are three types of lesions: exuberant, ulcerative and cicatricial.

(3) Ultimately, marked impairment of general health may occur, ending in extreme cachexia and death.

d. Diagnosis

(1) The clinical appearance of a chronic ulcerative process involving the skin of the groin and genital areas, without involvement of the lymph nodes, is characteristic of the disease. The demonstration of Donovan bodies confirms the diagnosis.

(2) For this demonstration spreads should be made from scrapings or punch biopsy of clean granulation tissue, and stained by Wright or Giemsa stain. Histologic study of tissue sections taken by biopsy from a peripheral area of diseased tissue may demonstrate the pathognomonic large cells with cystic spaces containing Donovan bodies.

(3) Lymphogranuloma venereum, chancroid, carcinoma and syphilis should be considered in the differential diagnosis, and appropriate diagnostic tests should be performed. A blood serologic test for syphilis should be made weekly the first month and at monthly intervals for 3 months unless a diagnosis of syphilis is established earlier.

e. Treatment

(1) Fuadin (a complex antimony compound). This drug is also known as neoantimosan and stibophen. It is supplied in ampules containing 6.4 percent solution (0.064 gm fuadin, 1 grain, in 1cc). Fuadin solution is given intramuscularly. The first three doses of 1.5 cc, 3.5 cc, and 5 cc are given on successive days, followed by 5 cc two or three times weekly until complete healing has taken place; and, in order to prevent relapse, continued at weekly intervals for 6 months after complete healing. The most commonly reported toxic symptom is vomiting. Rarely, joint and muscle pains may appear. If any toxic symptom occurs, the dose should be reduced.

(2) Antimony and potassium tartrate (tartar emetic). If there is no response to fuadin therapy after 6 weeks of treatment, antimony and potassium tartrate should be administered. This preparation contains about 36 percent antimony. One percent solution should be freshly prepared using supplies of sterile

distilled water or physiological saline. The solution should be perfectly clear and free from sediment. It is sterilized by gentle boiling for 5 minutes. Solution should not be autoclaved. The drug is best tolerated 2 to 3 hours after a light meal. It is administered intravenously and should be given slowly. Since the solution is very irritating, the needle should be wiped off with a sterile sponge and there should be no extravasation. The patient should remain recumbent for at least an hour after treatment. The first dose is 3 cc (0.03 gm tartrate). Provided no untoward reaction occurs, subsequent doses are given on alternate days and are increased on each occasion by 3 cc (0.03 gm tartrate), until the maximum individual dose of 12 cc (0.12 gm tartrate) is reached. If no toxic reaction appears the maximum tolerated dose may be given 3 times weekly for 15 doses. The toxic effects of antimony and potassium tartrate include coughing immediately upon injection, which is not important; nausea, vomiting, dizziness, and collapse. Transient electrocardiographic changes without corresponding clinical manifestations have been reported. If a toxic reaction other than coughing occurs during administration, the injection should be stopped at once. Following any toxic effect, the subsequent dose or doses should be reduced or omitted according to the circumstances.

(3) Healing under antimony is enhanced by adequate concomitant treatment of gross secondary infection. This may be accomplished by local application of daily wet dressings with weak solutions of potassium permanganate or sodium perborate. Penicillin given intramuscularly every 3 hours, in injections of 10,000 units each, in a total dosage of 400,000 units, is also recommended for the treatment of secondary infection.

(4) X-ray therapy combined with chemotherapy has yielded promising results.

(5) Surgical excision of the entire diseased area may be necessary as a last resort. If used, it must be followed by chemotherapy.

15. Case-Holding and Case-Finding

a. General Considerations

(1) Gonorrhea and syphilis are communicable diseases, and every new patient admitted to a treatment service offers to the personnel a double challenge in case-holding and case-finding. These diseases are communicable, however, under very limited conditions, and their communicability may vary or disappear with the passage of time or with treatment. Both diseases may be clinically asymptomatic and still be communicable or potentially so. Communicable relapse of syphilis and reinfection with gonorrhea are common. An otherwise non-communicable infection with syphilis in a female may become communicable to the infant in pregnancy. Congenital infections are ordinarily communicable only in infancy. Incubation periods are variable and histories of sexual exposure are often indefinite or unreliable. Infectiousness is not easily established by ordinary physical examination; it is likely to be ephemeral, and it is never to be taken lightly since the unexpected may always happen.

(2) Competent medical evaluation of every case is essential to intelligent case-holding and case-finding. It should be obvious, therefore, that those who are to render these services must understand the diseases with which they are to work and must be frequently in consultation with the chief of the treating agency. Reasonably adequate training should be given to all those who are to do this work.

(3) Sympathy, tact, ability to work with patients, and a real interest in venereal disease control are essential in those who are to do case-holding and case-finding. It is important, therefore, that this personnel should be selected with these qualities foremost in mind.

b. Case-Holding

(1) Case-holding is essential if the patient's infection is to be kept under control until it is cured. It is useless, however, to employ a case-holding staff if the fundamental causes of neglect of treatment are ignored. Some of these are failure to explain the disease, its treatment and its communicability to the patient; failure to take the patient's economic problems and job into account; transportation difficulties; rough or discourteous handling of the patient in the clinic; lack of privacy in the clinic; dirty, crowded, unattractive clinic quarters; poor technics which cause pain, reactions and resentment; inadequate cooperation between related clinic services, the hospital proper, and the venereal disease clinic, so that infections discovered in one service fail to reach the attention of the venereal disease clinic.

(2) An effective case-holding service will be constantly on the watch for neglect on the part of the clinic or other treating agency to cooperate with the patient. It should be the ultimate objective of every case-holding service so completely to solve all of those problems which lead to premature interruption of treatment that only those patients who are mentally unable to cooperate or who are obviously antisocial in their behavior need be referred to the health department for control. Except for the truly noncooperative, every patient which the treating agency finds it necessary to report to the health department for control should be looked upon as a clinic failure in case-holding

c. Case-Finding

(1) Case-finding is not an objective in itself. If it is to be of any benefit to the community it must lead to one or more of three conclusions; (1) Better information as to the prevalance or incidence of infection in the community, either for the purpose of stimulating support for an improved control program, or as a measure of the effectiveness of a program; (2) The protection of the public health and the promotion of the public safety, as in the discovery of communicable infection or of cardiovascular or neurosyphilis in those who hold lives in their hands and (3) the treatment of the infected.

(2) Mass blood-testing, in some industries for example, is too often used for the purpose of weeding out infected employees who promptly become candidates for discharge from employment. Food-handlers and domestics, in particular, are singled out for blood tests on the completely false premise that infected food-handlers, because of their occupation, are more dangerous than other persons to the public health. These are abuses of a case-finding procedure which protect nobody and which are almost certain, eventually, to bring this case-finding procedure into disrepute.

(3) It is of the utmost importance, therefore, that the health department do all that it can to see to it that any case-finding procedure is used with an intelligent and legitimate objective in mind.

(4) Case-finding procedures may be divided into three main groups: (a) Mass blood testing; (b) direct opideniologic investigation, starting with a

known infection; and (c) public education, through which those who may have been exposed are encouraged to seek medical advice.

(5) Direct epidemiologic investigation -- Direct epidemiologic investigation, starting with a known infection, is probably the most productive method of case-finding, at least so far as the discovery of communicable infections is concerned. It is when case-finding is initiated by the discovery of a patient with a recently acquired infection that the greatest promise is offered for communicable disease control.

(6) For these reasons, direct epidemiologic investigation is best carried out by representatives of the treating agency, in the name of the treating agency. Only the patient can supply the information by which his contacts may be identified. The clinic follow-up worker has the confidence of the patient and will often be able to obtain the patient's active assistance in bringing the contacts to medical attention. In many cases more than one contact must be investigated although not all of them will be found to be infected. It is much less disturbing to those who must be approached that the approach is made by a representative of a medical agency. There is then an implication of the confidential relationship which is commonly accepted as characteristic of medical agencies. This softens the blow and makes the investigation a medical, rather than a public, and possibly punitive one.

16. Information and Education

a. Professional

(1) Medical - The control of the venereal diseases will depend, in great measure, upon how well the medical profession is informed and trained in the management of these diseases. Whether the physician is engaged in the private practice of medicine, in the treatment of patients in a venereal disease clinic, in medical teaching, or as a health officer, it is he who will make the diagnosis and treat the patient or conceive and direct the control program. It is a matter of fundamental principle, therefore, that the prefectural health department give adequate attention, in the development of its venereal disease program, to the following procedures in medical information and education.

(2) The modification of the curriculum of the medical school toward better instruction in the public health aspects of venereal disease control. The required course should consider general methods and interpretations, control of infectiousness, standard diagnostic and treatment procedures in early and latent syphilis and gonorrhea, the general management of late syphilis, prevention of of cardiovascular and congenital syphilis and neuro-syphilis, prevention of the serious complications of gonococcal infection, the use of drugs, and precise instruction in the details of technic with emphasis on indications, reactions and contraindications. Most important of all is the inculcation of modern, sound, basic public health principles. Prefectural health departments have an unusual opportunity, through their close contact with the faculties of medical schools in their prefectures to stimulate medical schools to greater effort and efficiency in teaching venereal disease control.

(3) Postgraduate instruction of practicing physicians. Although this is secondary to better instruction of the medical student, it nonetheless is of great importance. Postgraduate instruction will have to be carried out