PUBLIC HEALTH REPORTS

VOL. 46 MAY 1, 1931 NO. 18

FUMIGANTS [1]

By C. L. WILLIAMS, *Surgeon, United States Public Health Service*

Hydrocyanic acid is one of the most rapidly fatal poisons known to man. Because of this fact its use as a fumigant is attended by grave hazards to human life. These hazards may be guarded against, but their elimination requires the most meticulous care as well as a wide and thorough knowledge of behavior of the gas. Handled by experts it is reasonably safe, but in the hands of the ignorant, reckless, or careless, it is a frequent cause of fatal accidents, as may be verified in the files of our daily newspapers.

Hydrocyanic acid gas is our nearest approach to the ideal fumigant. Confined in inclosed spaces, quite small amounts destroy all animal life therein; but when liberated in the open air its dissipation is so rapid that it requires very large quantities to produce fatal results in human beings. It is this property of rapid dissipation in the open that permits its use as a fumigant. If it were not for this, fumigators could hardly handle the gas, and upon opening a fumigated building passers-by would be killed, whereas, as a matter of fact, it is practically impossible to force gas out of a building in sufficient volume to become dangerous to persons in the open air.

The gas is very penetrating; it will actually penetrate a brick wall if given sufficient time, although within the time allowed for fumigation this rarely occurs. Of course penetration through cracks in a wall is another matter. It will penetrate into the center of a sack of flour in about two hours; and if the concentration is maintained sufficiently high, enough gas will penetrate a sack of flour in six hours to kill weevils. Highly porous material is very rapidly penetrated by this gas—a fact of considerable importance to fumigators, since the gas penetrates their clothing almost at once.

Penetration being merely one feature of diffusion, it is not surprising to find that the gas also rapidly passes out of materials it has penetrated. A comparatively short stay in the open air will remove most of the gas from fumigated articles. An hour's airing, for example, renders a mattress safe to sleep on, unless an excessively

[1] Read before the police school in New York City, January 9, 1931.

heavy concentration of gas has been used. Water, however, absorbs hydrocyanic acid and holds it, particularly in cold weather, so that after fumigation, moist articles require longer airing than dry ones. Ordinarily, gas absorbed by collections of water is given off so slowly that it is not dangerous; but occasionally a relatively large amount is taken up on a cold day, and when a warm day follows, the gas is then given off more rapidly. One or two accidents on ships have been attributed to gas absorbed and later released from bilge water under such circumstances. On one occasion the ship passed into the warm waters of the Gulf Stream.

From what has been said of dissipation of the gas in the open air it will be realized that it is only when gas is liberated in closed spaces, such as closed rooms or ships' holds, that it becomes dangerous. Foods absorb the gas, but not in dangerous quantities from the concentrations generally used in building fumigations. It is well, however, to air fumigated foods for two or three hours before eating them. Foodstuffs fumigated in fumigation chambers with high concentrations of this gas (10 to 20 ounces HCN per 1,000 cubic feet) should be aired at least 24 hours.

Hydrocyanic acid gas is not injurious to the vast majority of the articles of commerce. In the concentrations used for ship fumigations to kill rats it is not injurious to any known material, including such delicately flavored commodities as tea and tobacco. This is a very important consideration and one of the dominating ones in the establishment of this gas as a fumigant. In heavier concentrations (10 ounces per 1,000 cubic feet) it is injurious to delicate vegetables, such as lettuce and probably to bananas, interfering with the ripening processes. It probably would kill living foods, such as oysters, although the necessity of fumigating oysters has never arisen. Fumigated eggs usually will not hatch. (Probably few people would suspect that the gas penetrates through the shells of eggs.)

Because only small amounts are required, hydrocyanic acid gas is a cheap fumigant, probably the cheapest effective fumigant. For the destruction of rats, only two ounces of HCN per 1,000 cubic feet of space is required. At $1 a pound, this amount costs 12½ cents.

METHODS OF USE

Hydrocyanic acid is used as a fumigant in one of three ways:

(1) It is generated on the premises.

(2) It is supplied ready prepared as a liquid in steel cylinders, from which it is forced by air pressure and introduced as a fine spray, which at once evaporates.

(3) It is supplied as a solid which is spread on the floor. This solid form may be liquid HCN absorbed in an inert material, from

which it evaporates, or it may be calcium cyanide powder, which absorbs moisture from the air and generates HCN.

The following is a list of the cyanide fumigants generally employed arranged according to the method of preparation:

(A) GENERATION METHODS

(1) *Hydrocyanic acid gas* generated by adding sodium cyanide to 50 per cent sulphuric acid.

(2) *Hydrocyanic acid, cyanogen chloride mixture.*—The gas is generated by adding NaCN and sodium chlorate to 50 per cent hydrochloric acid.

(3) *Safti-fume.*—This is the same as the hydrocyanic acid-cyanogen chloride mixture, except that the NaCN and $NaClO_3$ are ready mixed with sand and other more or less inert ingredients in the form of briquettes, which are dropped into HCl.

(B) HYDROCYANIC GAS IN SOLID FORM PERMITTED TO EVAPORATE

(4) *Zyklon.*—Liquid HCN absorbed in Fuller's earth. Packed in heavy cans.

(5) *HCN discoids.*—Liquid HCN absorbed in unsized paper disks. Packed in heavy cans.

(6) *Cyanogas.*—Calcium cyanide, a fine powder, packed in heavy cans.

(C) HYDROCYANIC ACID IN LIQUID FORM; INTRODUCED AS A SPRAY

(7) *Liquid hydrocyanic acid* in heavy steel cylinders. Forced through a hose and out a spray nozzle by air pressure.

Of these various preparations the most effective is liquid hydrocyanic acid. It is the most dangerous to use, both to the fumigators and to the innocent bystanders. The Interstate Commerce Commission requires that it be shipped only in heavy steel cylinders, the size usually employed holds 75 pounds. Since the liquid is extremely volatile, should a cylinder be broken in a traffic accident the results might be disastrous; for despite its rapid diffusion in the open air, the large amount immediately liberated would probably overcome those in the immediate vicinity at once. However, these cylinders are very strong and no accident due to their being broken by outside force has been reported. For use on ships the liquid is transferred to smaller and lighter (tested to 600 pounds pressure) steel cylinders holding 18 and 30 pounds. These are transported on the fumigating boat. In fumigating buildings the heavy cylinders are invariably used.

Set in the tops of the cylinders are two valves. From the outlet valve a steel tube leads to the bottom, the other opens directly into the cylinder, and through it air is pumped, just before use, until a

pressure of 75 to 100 pounds is reached. To the outlet valve is attached rubber pressure tubing ending in a spray nozzle; this is led into the space to be fumigated, the valve is opened, and the liquid forced out by the air pressure is sprayed into the air. The amount used is measured by placing the cylinder on a platform scale and noting the progressive loss of weight. In large buildings it is necessary to lay the hose to various parts before starting. Flour mills and similar large structures frequently fumigated are often equipped with a built-in system of lead or copper piping with an outside connection for the cylinders.

The dangers particularly attendant on the use of liquid hydrocyanic acid are from two sources: One is the fact that the gas reaches full concentration immediately, so that anyone caught in the building does not have time to get out. The other comes from leaks in the tubing, particularly at the joints. It is the latter that is the main danger to fumigators. As regards the former, of course, no one should be permitted to be in a building or ship about to be fumigated, and it is the fumigators' particular business to see that all are out; but despite the most careful guarding, unauthorized persons sometimes get caught. If liquid hydrocyanic acid is the fumigant they will never be caught again. This danger is a very real one, even to the best-trained fumigators. Recently on a ship a hose line, inadvertently left under pressure, was being uncoupled when a spray of liquid suddenly flared out from the loosened coupling. It missed the fumigator's face by a few inches and his trained instinct told him to keep breathing out till he was 20 feet away, so that he escaped; but for a moment it looked as though there would be a vacancy in that fumigating crew. A fumigator of 16 years' experience was killed in New Orleans by pulling apart a clogged hose line. The liquid hydrocyanic acid shot back into his face.

There is one other danger connected with liquid hydrocyanic acid and that is spontaneous explosion in the cylinders. This is not a serious danger at present, but its possibility should be kept in mind in case of cylinders that have been in storage six months or longer. When hydrocyanic acid is permitted to acquire an alkaline reaction, it disintegrates, the chemical change becoming progressively faster and faster. Nitrogen and ammonia gases are formed and these accumulating in the cylinder increase the pressure. At a certain point the reaction becomes violently explosive, sufficiently so more or less to wreck everything in the immediate vicinity. Commercially it is now preserved by the addition of acetic acid. No explosive accidents have occurred during the past several years, but the companies supplying hydrocyanic acid keep track of the cylinders and call them in three months after shipping. Tests have shown that acetic acid in proper amounts prevents explosive deterioration for a

year or more, so that the safety margin is large. Explosion in fires will be referred to later.

Somewhat less effective in equivalent amounts, but far more easily and safely handled, are Zyklon and HCN disccids. These products are essentially the same. Zyklon has the advantage that the cans may be opened with a hammer, while discoid cans must be opened with a special opener making a clean cut close to the rim. Discoids have the advantage that each disk holds approximately one-half ounce of hydrocyanic acid, thus permitting reasonably accurate dosage of small compartments. Both come packed in 40-ounce cans of much heavier gage than the ordinary tin can. To use them, the can is opened and the contents are shaken out and spread on the floor. The cans may be opened out of doors and carried in, but usually they are opened inside, in which case the operators must wear gas masks. The gas begins to come off immediately, and within one hour most of it has evaporated. If fumigation time is two hours or more and ventilation is continued for an hour or more after fumigation, the spent discoids or Zyklon residue will be found quite dry and harmless and may safely be left where they are. An exception must be noted here: One would suppose that even a very ignorant fumigator would realize the necessity of spreading out the fumigant to insure rapid evaporation, but it does sometimes occur that careless men will pour these materials out in piles or stacks which may retain some liquid HCN for as long as four or five hours, possibly longer in severely cold weather. An overnight (12 hours or longer) fumigation, however, insures that the residue will be found dry and free from all but traces of HCN.

The simplicity of use of HCN discoids and Zyklon is quite apparent. One merely takes his fumigant, in cans of convenient size, into the building, opens them, spreads the contents, and goes out, closing the door behind him. After fumigation, the residue is swept up and, with the empty cans, thrown into the trash. What could be simpler? Yet, it has its attendant danger and one that is equally inherent in all the generation methods of fumigation. That is, the fumigator must take the fumigant into the space fumigated and remain long enough to open the cans and spread it around. In the case of generated gases he must remain long enough to drop the cyanide into the various acid barrels or crocks. This means that he must be exposed to the gas for a certain length of time. In small buildings or on ships this is a trifling consideration, the time of exposure being quite short; but in large buildings, in which spreading the fumigant may take an hour or more, it is often a serious problem, sometimes requiring the arrangement of relays of fumigators. The danger arises through the absorption of HCN through the skin.

A good gas mask protects completely against cyanide in the inspired air, at least up to a concentration materially above the concentrations usually used in fumigation of buildings or ships; but to protect the surface of the entire body, a complete rubber suit would be required. This is impractical for several reasons, not the least of which is that it would soon be most uncomfortably hot on the inside. Yet it is not so very unlikely that skin absorption of cyanide may force some such protection in certain kinds of fumigation procedure.

It was in order to stress this point that I mentioned earlier that HCN rapidly penetrated clothing. In fact the penetration through clothing, promoted as it is by the motion of the fumigators and air currents set up by the heat of the body, is practically immediate. A person may go into a relatively concentrated gas, say 2 or 3 ounces per 1,000 cubic feet, without noting any skin effect; but if he enters a concentration of 6 to 10 ounces per 1,000 cubic feet, he will at once experience a sensation of warmth over the entire body which becomes more and more pronounced. After five minutes spent in such an atmosphere the entire skin surface becomes noticeably reddened, and sensitive persons may experience an actual burning sensation. If this warning is disregarded, a feeling of weakness appears, followed by nausea and vomiting and often by headache. A still more advanced sign of poisoning is difficulty in breathing, the subject feeling as though giant hands were holding the chest and preventing its expansion. This is the last warning, being the forerunner of loss of consciousness and paralysis of the respiratory nerve center. Experienced fumigators seldom reach this stage, but it is not unusual to see them emerge from a large building decidedly wobbly in the knees and distressingly sick. While there is not available at present any exact data regarding absorption through the skin, it is, I believe, safe to state that, protected with a good gas mask, one may remain in air containing 2 ounces HCN per 1,000 cubic feet for one-half hour without experiencing signs of poisoning. In a concentration of 4 ounces per 1,000 cubic feet, this should be reduced to 15 minutes, and in 8 ounces per 1,000 cubic feet to 5 minutes. Of course the distribution of 8 ounces of Zyklon or discoids per 1,000 cubic feet, in a building does not mean that the fumigators are exposed to such a concentration, since the full amount will not have entered the air short of one hour. Since the fumigators are nearly always going away from the gas it is unlikely that they are actually exposed for the greater part of the time to more than 1 or 2 ounces per 1,000 cubic feet.

Zyklon and HCN discoids do not present the transportation dangers of liquid HCN. Being in a solid form they do not flow; and with the evaporation rate much slower, quite a large amount

(relatively, not in terms of tons, of course, but of pounds) may be spilled in the open without immediate disaster. Leaking cans are not a menace in the open, since the gas is given off so slowly through ordinary leaks that one would have to hold such a can close to his face to become poisoned. Because of this reduced danger from breakage, the Interstate Commerce Commission permits shipment in heavy-gage cans. Leaking cans in storage may be a source of danger, since the gas is then liberated in an inclosed space. For this reason it should be stored only in well-ventilated rooms.

Cyanogas, which is the trade name for calcium cyanide, differs from Zyklon and HCN discoids in one important respect: This is that the residue is poisonous. Calcium cyanide is a very fine powder, usually packed in cans. When the cans are opened and this powder is spread out, it absorbs moisture from the air. This causes a chemical change to calcium hydroxide and HCN, the latter being given off into the air. But, and here is the difficulty, some of the HCN is absorbed by the calcium hydroxide and changed to calcium cyanide and water. Under any circumstances there is always some calcium cyanide left in the residue which, therefore, must be gathered up and safely disposed of. One method of getting around this is to take advantage of the fine powder form of the material and to blow it into the air, from which it settles as a fine dust. There appears to be no great objection to this, in the absence of foods, from a safety standpoint, it being inconceivable that anyone would sweep up this powder and eat it; but where foods are fumigated they become inseparably mixed with the fumigant. If calcium cyanide is left for several days' airing, the cyanide content finally becomes so low as to be negligible.

The so-called barrel methods, or generation methods, of fumigation, which require the placement of barrels or other containers, in which sodium cyanide is mixed with an acid, all involve the same essential procedure. There are two main variations: In one only HCN is generated; in the other, a mixture of HCN and cyanogen chloride is produced. The procedure in either case is to mix the acid with an equal amount of water in a barrel or crock (depending on the size of the space to be fumigated), put it in place, drop into it sodium cyanide in a paper or cloth bag, and leave. It sounds simple; but if this has to be done on each of five floors of 40,000 square feet each, and each one cut up into various sized compartments, the difficulties will be multiplied. Yet, I once saw this feat performed by five men, none of whom wore a gas mask or even had a mask among them. They decided they would never get out alive if they tried to drop the cyanide by hand, but got around the difficulty after considerable tedious labor by suspending the cyanide in bags over each barrel and leading the suspending cords over pulleys all the way to the front door on the

street level. They had over 100 cords tied at the door, representing more than 6 miles of cord. When all was ready they cut all the cords and shut the door. With gas masks the dropping is usually done by hand, in which case the fumigators became exposed to absorption through the skin, as occurs with Zyklon and similar materials.

The generation method involves a large amount of work. The ingredients must be mixed in the proper proportions and amounts, and this involves measuring the acid and water and weighing the cyanide, although the latter procedure is much simplified by the use of cyan-eggs, that is, sodium cyanide in the shape of balls, each weighing 1 ounce. The apparatus is bulky and cumbersome and must not only be put in place but must also be removed. The spent acid cyanide mixtures must be safely disposed of.

Aside from cyanide dangers, the acids used are injurious. Sulphuric acid is a highly corrosive poison, either internally or externally. It is ruinous equally to the fumigators' clothing and their skins; several serious accidents have been caused by breaking of jugs of acid. It is also highly injurious to floors and fittings. Its corrosive action on barrels often causes them to spring leaks, and if too much material is put in a barrel it may boil over. Hydrochloric acid used in the generation of cyanogen chloride mixture is far less injurious than sulphuric acid, but it is by no means harmless.

The generation method, like all other cyanide methods, has its own peculiar danger. Here it is the spent acid cyanide mixture, which is not truly spent at all. When the barrels are removed, the shaking up of the mixture often causes the liberation of considerable volumes of HCN gas. It is hardly necessary to discuss this further; the danger is obvious. It might be said that experienced fumigators are aware of this danger, and on smelling the gas get out at once or put on masks. I have seen some very rapid ascents up the ladders leading out of ships' holds in the days before gas masks became generally used. Several fatalities from this cause have occurred, though none I believe, of recent date.

Cyanogen chloride mixtures are generated by putting diluted hydrochloric acid in the barrels and dropping into it a mixture of sodium cyanide and sodium chlorate. The resultant gas is a mixture of about one-third HCN and two-thirds CNCl. Recently a modification of this method, commercially known as "Safti-fume," has been put on the market. It consists of the cyanide and chlorate mixed with sand and some other materials put into the form of solid, but porous, briquettes, which are dropped into the acid. The cyanogen chloride is a very highly irritant gas, particularly to the eyes, nose, throat, and lungs. In even moderate concentrations it is practically intolerable, causing pain and weeping in the eyes, discomfort in the nose and

throat, and pain and coughing in the chest. It is not as effective a fumigant as HCN, but is largely used on account of its warning properties.

WARNING GASES

This brings up the subject of warning gases. These are substances added to the fumigant for the purpose of giving warning of the presence of the gas. Hydrocyanic acid has a distinctive odor and may be detected by experienced fumigators in quite a low concentration. To the uninitiated, however, its odor does not indicate danger, nor in lethal concentration does it cause discomfort. Persons have been killed without ever knowing that they were in danger, as occurred recently when three members of a family were found dead sitting at the breakfast table while the fourth, also dead, was reading a newspaper when overcome.

Because of such accidents, numerous attempts have been made to incorporate in the fumigant gas, other gases which, due to highly irritant properties, give a distinct warning of their presence, even when in quite small amounts. The aim has been to render a fumigated space literally intolerable until airing has removed all but traces of the fumigant. This objective has never been completely realized. Nearly always the warning substance used has been a tear gas, although evil smelling gases and some that primarily cause coughing or choking sensation have been tried with some success. Usually the warning gas is present in small amounts; chloropicrin, the gas most commonly added to HCN, seldom constitutes more than 5 per cent of the mixture. In some cases, however, advantage is taken of the fact that most warning gases are themselves poisonous and may be used as fumigants. Chloropicrin, for example, is advocated by the manufacturers as a fumigant. The use of cyanogen chloride is another attempt in this direction.

There are two distinct dangers connected with the use of warning gases. One is, that when present in sufficient quantity to be actually intolerable, they constitute a menace to the fumigators, who may be rendered helpless by the effects of the warning gas. Tear gases, for example, may get inside a gas mask in sufficient amount to blind the fumigator. The other is that the warning gas may disappear before the HCN, so that fumigators misled by the absence of warning gas may declare a place safe when it is not. Two cases of this nature have occurred on ships in my own experience. This failure of after-warning appears to be due to the warning gases being much less penetrating than the HCN. The latter is absorbed by porous materials, while the warning gas, not being absorbed, is blown away by air currents. Upon its disappearance, the room is declared safe and is closed; but the absorbed HCN, slowly liberated, passes into the now confined air where it produces an unsuspected dangerous concentration.

Another way in which warning gases sometimes fail is when penetration occurs through a porous partition. It is my belief that this occurred in a recent fumigation accident. The gas apparently penetrated through a brick wall, probably mainly through numbers of small cracks. The HCN portion of the gas, being much more penetrative than the CNCl, came through first and caused poisoning of several persons (fortunately not fatal) before the CNCl penetrated in sufficient quantity to give a positive warning.

Thoroughly competent fumigators do not rely on warning gases alone. They do, however, use them as a help, both as a warning to others and to assist in detecting the gas themselves.

There is one fumigant, still used often enough to be considered, that is quite intolerable in amounts far below the immediate lethal concentration for man, and that is sulphur dioxide, produced by burning sulphur. This gas is highly irritant to the lungs, however, and while human deaths by being directly fumigated with it are rare, severe bronchitis and fatal pneumonia following exposure to it have been by no means uncommon. Formaldehyde is practically intolerable in relatively small amounts, but it is rarely used as a fumigant to-day because it has little effect on animal life.

HCN POISONING

Hydrocyanic acid and other gaseous cyanogen compounds, including cyanogen chloride, are distinct from all other fumigants in general use, in the rapidity with which poisoning is induced. A man walking into a concentration of 8 ounces or more per 1,000 cubic feet and breathing normally therein will become unconscious in 30 seconds and will be dead beyond hope of recovery in from 3 to 5 minutes. If he goes into the much lower concentration of 2 ounces per 1,000 cubic feet, used to kill rats, and breathes normally, he will lose consciousness within a minute and will be dead within 10 minutes. If a person rendered unconscious is brought at once into the open air before he stops breathing, he will usually recover unaided and will suffer, as a rule, no serious aftereffects, of which the principal ones are headache of very variable duration, nausea and vomiting, and rapid pulse rate. If he has stopped breathing, artificial respiration must be instituted. If the heart is still beating, his chances of recovery are good, but the aftereffects are more severe, as a rule, the most important being weakness of the heart, which may persist for several months. There are cases on record of recovery from cyanide poisoning after artificial respiration for as long as eight hours. As long as the heart continues to beat, there is hope. When the heart beat has definitely ceased, all chance of recovery has gone with it.

It is the rapidity of poisoning, particularly the rapidity with which the victim is rendered helpless through loss of consciousness, that has

given rise to the fear and respect exhibited toward the cyanides in any form. Particularly is this true of the gas. The gas taken into the lungs is absorbed over a large surface rapidly and directly into the blood stream, which takes it at once all through the body. The amount of cyanogen that will poison is so minute that its effect is felt at once. In the case of all other fumigants at present in use, much larger amounts must be taken into the body to cause immediate poisoning. This requires time. But there is another factor: Cyanogen acts first on the nerve cells, particularly the more highly developed and specialized cells. Thus the cells controlling consciousness are the first affected, their failure rendering the victim utterly helpless to effect his own rescue. Next, the respiratory center is paralyzed and breathing ceases. Apparently the lower nerve centers are at first stimulated, or at least rendered more sensitive, for generalized convulsions are a constant accompaniment of cyanide poisoning, though they cease, as a rule, before the heart stops.

Persons breathing small amounts of cyanides over relatively long periods, say one-half hour to several hours, are likely to be affected in various ways. They may lose consciousness but continue breathing, and may finally die in convulsions or recover after several hours of coma. Then, again, they may retain consciousness but fall dead of heart failure on making some extra exertion. Usually a prominent symptom in cases of slow poisoning is extreme weakness and headache. Convalescence in such cases is likely to be slow, sometimes taking several months to a year or more. This type of poisoning may occur when persons have entered closed places still holding a small amount of gas.

While the possibilities have been stated, the usual occurrence is death or recovery within a relatively short time. In the great majority of cases the issue is definite within a half hour. Once natural breathing is reestablished, recovery may be expected, and usually it is rapid, the patient often being able to walk away from the scene and usually feeling quite well within two or three days. Nearly always the determining factors are the amount of gas and the length of time the patient has been exposed to it.

TREATMENT OF HCN POISONING

There is just one treatment of cyanide poisoning, and that is fresh air and plenty of it. Fresh air must enter and leave the lungs as in normal respiration. If the subject is breathing normally, carrying him into the open is enough. If his breathing has stopped, is materially slowed, is shallow, or is irregular, artificial respiration is required. When normal breathing reappears, artificial respiration may be discontinued, but may have to be resorted to again if breathing again becomes irregular. There is no known antidote for cyanogen, and so

the only method of recovery is to throw it off. Fortunately it is given off by the lungs quite rapidly, though not as rapidly as it is absorbed.

Usually the ordinary methods of artificial respiration are sufficient. If a mechanical respirator is used, it is essential that it be one that does not cause rebreathing of the expired air. Since the expired air is laden with the cyanogen being thrown off from the lungs, it is obvious that if any of this is rebreathed the patient is repoisoned by his own breath. Pulmotors and other mechanical respirators are certainly labor-saving devices; but it is doubtful whether they are any more effective than artificial respiration by hand in cases of cyanide poisoning.

RESCUE AND GAS CONCENTRATION

The rescue of persons overcome by cyanide fumigation is likely to be a rather futile procedure, for the reason that by the time the emergency squad reaches the scene there will only be dead bodies to rescue (and this is stated without reflection on the speed of the emergency squad). By rescue, of course, is meant the removal of persons overcome from the presence of the gas. As a rule, rescue must be at least as prompt as rescue from drowning, the situations being quite analagous. Immersion in water for 10 minutes or more is generally fatal, and immersion in cyanide gases for the same length of time is likely to be equally so. In the latter case, however, there are exceptions, depending on the concentration of the gas. The lower the gas concentration, the longer the exposure that can be withstood. Consequently it is never proper to give up a person who has been in gas, even for considerable periods, until it has been definitely determined (by use of a stethoscope) that the heart has ceased beating.

The subject of rescue is inseparably bound up with gas concentration, and so a slight digression may be allowed for its consideration. The usual practice in preparing a building for fumigation is to close all openings to the outside, including sealing, with strips of gummed or greased paper, the cracks around doors and windows. The purpose of course, is to keep the gas within the building. Despite the most painstaking care, however, it is practically impossible to seal a building 100 per cent. There is always considerable leakage. If there is any considerable wind blowing, the leakage will be greatly increased. In addition to leakage, a very considerable amount of HCN gas is absorbed by the walls, floors, fittings, and stored materials, still further reducing the concentration in the air. As a result of this leakage and absorption it is very rare to find at any time an actual concentration of gas in the air as high as that calculated on the basis of the amount of fumigant introduced. If liquid HCN has been used, the maximum concentration appears at once. If the solid fumigants are used, or any of the generation methods, the highest concentration appears in from one-half to one hour after starting.

The loss of gas is usually fairly rapid, particularly during the first two or three hours, becoming progressively less and less. At the end of four hours it is probable that more than half of the gas introduced has been lost; at the end of six hours two-thirds or more is gone. At the end of 12 hours there is rarely enough gas left to be immediately dangerous. At the end of 24 hours there is seldom more than the odor. However, one can not depend on this general rule entirely. The gas distribution is likely to vary, some compartments or rooms retaining more than others. If a wind is blowing, there will always be a higher concentration on the side away from the wind. The greater the amount of gas originally introduced, the longer a lethal concentration will persist, but not proportionately longer. Even with quite large initial doses one seldom finds any considerable amount left after 12 hours.

The practical bearing of concentration on rescue relates to the relative time at which victims are overcome. If they have been caught in the building at the beginning of fumigation, the rescuers must work in a high and increasing gas concentration; but if they have entered it several hours later, they will be in a much lower gas concentration which not only makes it much easier for the rescuers to reach and remove them, but also increases their chance of recovery.

Another condition wherein concentration is important is the case of persons overcome in buildings adjoining the one fumigated. There are two classes of such accidents. In one, the gas leaks into the adjoining building through some connecting avenue, such as breaks in a party wall, pipe tunnels for plumbing, or similar openings. The other is where gas escaping from a building is blown into an adjoining one; this is most likely to occur when the fumigated building is opened after a relatively short exposure. In either instance, the concentration is necessarily much lower in the adjoining building than in the fumigated building. Usually, it is not high enough to necessitate the use of gas masks by the rescuers, who, as a rule, can count on five minutes or more that they will be able to withstand the gas. Poisoning in these cases is slow. It is in this type of accident that persons are overcome without being aware of their danger. It is in preventing such accidents that warning gases have their most useful field in the fumigation of buildings.

When gas masks are available, they should always be worn in rescue work; but if not available, persons may yet often be rescued without serious danger to the rescuers if the rescuers keep their heads. Time is a most important factor to the victim, and so any material wait for gas masks is not justified in cases where the victims can be quickly reached. The immediate danger is from inspired air; therefore the precaution to be taken is not to breathe. Almost anyone can hold his breath for as long as one minute. In this length of time

it is quite possible to reach a man as far as 100 feet from the entrance and drag him out. In the vast majority of cases the rescuer can count on taking at least one full breath without being overcome. This assurance will permit him to continue his efforts until forced to breathe, when he should stop and return at once to the open air. This is in the interest of both himself and the victim; for if he too is overcome there are then two to be rescued instead of one. After taking four or five breaths in the open it will be possible for the rescuer to return; but on this occasion the breath can not be held as long as at first, a condition that should be kept in mind. When the taking of a breath can no longer be postponed, some 10 seconds additional time before taking an inspiration may be gained by consciously prolonging expiration. That is, when you must take a breath, breathe out first as slowly as you can and as much as you can. This extra 10 seconds is sufficient time to get to a door from a location as much as 100 feet away. When two or more rescuers are at work, one may drag the victim part way out, the other then coming in and bringing him the rest of the way.

Rescuers should, whenever possible, work in pairs, even when equipped with gas masks. If not equipped with gas masks, one man should remain in the open watching the other till he comes out. The reason for this is obvious. If the rescuer falls, the second man should go in and *bring him out first;* he can surely be saved, while the chances for the other victim are already problematical.

If there is reason to believe that the gas concentration is low, say, for example, the building has been under fumigation for six hours or more, or if persons in an adjoining building have been overcome, the rescuers may be more venturesome; but in any case they should remember that, the victim having been overcome, they too will be overcome if they stay too long. The best guide in such cases is the appearance of a sensation of weakness, particularly weakness of the legs. If difficulty in breathing in the shape of a sensation of pressure preventing expansion of the chest appears, the warning is imperative; get out at once. In any case it is usually unwise to remain in even low concentrations without a gas mask for longer than five minutes.

When a tear gas has been used as a warning, rescue work without gas masks is greatly complicated. When the warning gas is chloropicrin, it is often possible to remain in the gas for a minute or more without being actually blinded, although pain in the eyes may become quite severe. Chloropicrin is seldom more than 5 per cent of the gas present, sufficient to warn, but in concentrations of less than 4 ounces HCN per 1,000 cubic feet, not enough to blind one. If cyanogen chloride mixture is the fumigant, the rescuer without a mask is likely to find himself in the same fix as the victim. In this mixture, the cyanogen chloride constitutes 60 to 70 per cent of all the gas

present and is so extremely irritating to the eyes as to blind those entering it unprotected. The blinding effect lasts as long as one is in the gas, but this is quite long enough to prevent one from finding his way out. The irritative effect of cyanogen chloride, however, is so immediate and severe that it is doubtful whether the most courageous rescuer would proceed more than a few feet into it before turning back. A man deprived of his sight in a deadly gas is practically helpless, and so further attempt would be merely foolhardy.

In rescue work there is no point to throwing open the building under fumigation as a preliminary act to the removal of the victims. The time so lost is likely to be fatal to those overcome, whose only chance is immediate removal to fresh air. There is no hope that the building will clear of gas in time to save those within. In fact, opening the building may complicate matters by liberating large volumes of gas into the immediately surrounding air. An exception should be noted in the case of gas getting into adjoining buildings. While here, too, the first object is to remove the victims the next step should usually be prevention of further unwanted gas infiltration by opening the fumigated building.

GAS MASKS

Any gas mask that uses charcoal as a filtering material will protect for a time against cyanide gases. If only charcoal is present in the canister, it can not be relied upon for longer than 10 or 15 minutes. Against the cyanides far greater protection is afforded by a canister containing an alkali such as sodium hydroxide. One type of HCN canister contains caustic pumice (a mixture of pumice and an alkali) and charcoal and protects against all types of cyanide gases for a considerable period, as much as an hour. Against cyanogen chloride the best protection is a mixture of caustic pumice and iron gell (iron hydroxide). The army canister for HCN-CNCl mixture contains these substances. Of course we are speaking of gas concentrations used in fumigation. Very high gas concentrations go through the canisters; that is, some of the gas gets through. This occurs sometimes to fumigators opening cans of Zyklon or discoids, the gas concentration from the freshly opened cans directly under their masks being for the moment quite high. It also occurs in the fumigation of tobacco warehouses, where concentrations as high as 200 ounces per 1,000 cubic feet are sometimes used. The so-called all service canisters will protect against cyanide for a sufficient time to effect rescues, although in the presence of cyanogen chloride they are likely to let through enough of this substance to cause considerable discomfort.

Gas masks used in cyanide gases must fit closely to the face. This is essential in the presence of a substance that is poisonous in such small amounts. Leaks in the face piece or around the edges can not

be permitted. Most gas masks are made in different sizes, commonly three sizes, so that it is usually necessary for each individual to learn which size fits his face. The No. 2 size fits the average face.

The life of the canister is limited. Those designed for the cyanides will generally protect against the amounts used in fumigation for from one to four hours of steady breathing. When the canister is becoming ineffective, breathing through it becomes much more difficult. Experienced fumigators can tell from the smell of the gas when a dangerous amount is coming through; but the best procedure for the inexperienced person is whenever there is any cause to suspect the reliability of the canister to get a new one. After a canister has been used in cyanide, the next time it is used a cyanide smell will be noticed for a few breaths; but this should soon disappear. When one enters the gas a slight odor of cyanide generally comes through. This, too, should cease within two or three minutes. If it persists or gets strong, the mask or the canister is leaking. In the case of cyanogen chloride, determination of leaks is very easy; if sufficient gas to be dangerous comes through, the wearer will be practically blinded by the eye irritation. If he can stand the irritation, then only very small amounts are getting through.

OTHER FUMIGANTS

There are a number of other substances employed in fumigation, none of which at present, however, are used in this country to the extent that cyanides are used. All that have come into use to date are very much less poisonous than the cyanide gases, but they are used in very much larger amounts.

Sulphur dioxide, generally produced by burning sulphur, either on the premises in iron pots set in pans of water, or in special furnaces from which the gases are led through a large pipe into the space under fumigation, is the gas par excellence in the matter of warning of its presence. In concentrations far below the quickly fatal level it causes severe irritation of the throat, producing a sensation of choking as well as persistent coughing. It is not rapidly fatal like HCN and so persons caught in it have ample time to make their way out. Although eye irritation occurs, it is not blinding. It is the only nearly safe fumigant that we know.

Sulphur fumigation has been almost entirely abandoned in this country, because the gas penetrates very slowly and not very deeply so that its results are unreliable, because it is highly injurious to many foodstuffs, most fabrics, and nearly all metals, and because of the fire hazard due to burning it inside of the space fumigated.

Sulphur is mentioned principally because sometimes an emergency call is made from a house the occupant of which has bought a sulphur candle at a drug store and burned it in a room. The amount of sulphur dioxide produced in such a case is usually much too little to be

dangerous. The principal result is that everyone is driven out of the house.

Formaldehyde is an irritant gas, irritating the eyes, nose, and throat. It is not dangerous to human life unless it is in an enormously high concentration and then only after long exposure.

Within the past five years three substances have been developed as fumigants which will probably become quite wide spread in use. These are ethylene dichloride, ethylene oxide, and a mixture of ethylene oxide and carbon dioxide, marketed under the trade name of "Carboxide." The first named, ethylene dichloride, is not greatly used at present; and when used it is generally mixed with carbon tetrachloride to remove the fire hazard. It is for the same purpose that carbon dioxide is mixed with ethylene oxide. Ethylene oxide, however, is also used alone.

These fumigants are much less poisonous than HCN and, hence, must be used in much higher concentration. Their value comes from two properties: They are relatively more poisonous to insects than to warm-blooded animals, including human beings, and they are relatively slow in their action. These properties permit fumigation for the destruction of insects with greatly reduced hazard to human life. They are not nearly so rapid in their action as HCN, permitting more time for those trapped to escape.

These gases are not highly irritating and, hence, small amounts do not give positive warning of their presence. That they are irritants and cause damage to the lungs has been shown by some recent studies of the United States Bureau of Mines. Up to date there has been comparatively little use of them for the fumigation of buildings, and it is doubtful whether they will ever come into general use for such purpose. They must be used in a high concentration, maintained over several hours—conditions that involve a cost several times that of HCN fumigation. However, they may come into use in the fumigation of buildings so placed that the use of HCN involves too great a hazard. At present they are employed in connection with specially constructed fumigation rooms or vaults.

From what we know at present, these gases may be entered for short periods, three to five minutes, without serious risk; but if longer stay is necessary, gas masks should be worn. Gas masks containing charcoal in the canisters will protect against them for a time. I am not aware whether special gas masks for them have been as yet developed.

Ethylene dichloride, alone or mixed with carbon tetrachloride, is a liquid at ordinary temperatures and is marketed in steel drums. Ethylene oxide and Carboxide are both gases at room temperatures. The former may be packed under pressure as a liquid and is shipped in this form, the latter remains as a gas and is supplied in heavy steel

pressure cylinders. The immediate danger in handling these materials is much less than that with HCN. In using Carboxide, for example, the required number of cylinders is placed in the space to be fumigated and a man opens the valves on one after another till all are opened, and then goes out. This has been done in relatively large spaces where as many as a dozen cylinders were used by fumigators unequipped with gas masks, without apparent injury.

These gases require considerable study before any very definite statements can be made concerning them. We are steadily gaining knowledge of their action on human beings through their growing use in medicine as anæsthetics. In ship fumigation for quarantine purposes they are of little value, because to kill rats they must be used in relatively enormous doses.

FIRE HAZARDS

Fire hazards fall into two categories: One is the hazard of starting or increasing a fire; the other is the danger of poisoning to those fighting a fire. The latter danger would appear only when fire breaks out in a building that is being fumigated. In this instance, of course, it would be impossible for firemen to enter a building under fumigation with HCN unless they were protected by gas masks. This is an important consideration, since many fires that may be rapidly extinguished from inside a building are difficult to fight from the outside. If the firemen do not have gas masks, the only thing to do is to break open doors and windows as rapidly as possible so that the gas may escape. It is realized that the fire itself may be greatly augmented by feeding it fresh air. Once a fire really gets under way, the draft produced will very rapidly clear out the gas.

There is no danger of explosion from the amounts of HCN used in building fumigation, except with the very heavy dosages sometimes used in tobacco warehouses. The lowest explosive mixture of HCN is 6 per cent of the vapor in the air, while in fumigation it is rare to have more than 2 per cent. Apparently there is little danger of explosion or combustion of Carboxide, or ethylene dichloride with carbon tetrachloride; but either ethylene oxide or ethylene dichloride alone is very inflammable and may be used in such amounts as will cause explosion or direct extension of the fire by the gas.

Fires have been started with the solid forms of HCN (Zyklon, discoids) by their being scattered close to stoves in which the fires had not been extinguished. In the generation methods of producing HCN a considerable amount of heat is evoked by the reaction. With straight HCN (NaCN and sulphuric acid) the heat produced is not sufficient to start a fire; but with the original HCN-CNCl technique, spontaneous combustion sometimes occurred. Safti-fume, in the form of briquettes, appears to have overcome this hazard by slowing the reaction.

In storage, HCN, Zyklon, HCN discoids, ethylene dichloride, ethylene oxide, and Safti-fume briquettes, somewhat increase the fire hazard. They are not themselves likely to start a fire, but being inflammable may materially increase its proportions. In a fire Zyklon and discoid cans soon explode, without much violence, but the liberated combustible gases spread the flames. It requires a relatively hot fire to cause the explosion of the fumigants packed in heavy steel cylinders; but when these do let go the explosion is a violent and destructive one. Safti-fume briquettes contain sodium chlorate. The heat of a fire causes multiple small explosions of this chemical.

Fortunately, in cases where fire reaches stored fumigants, HCN is burned, the resultant gases being relatively innocuous. The same is true of ethylene dichloride and ethylene oxide, so that poisoning by the gases in such cases is not to be feared. This is not to be confused with fires starting in buildings under fumigation. In this case the already diffused gases are in too low concentration to burn, but quite sufficient to poison; and until removed by ventilation (which may be accomplished by the fire itself), they must be reckoned with.

Sulphur and carbon bisulphide are two fumigating materials which produce a poisonous gas, sulphur dioxide, when burned. When produced in dangerous quantities, however, it is intolerable without gas-mask protection.

CONCLUSION

In this talk the dangers and difficulties of fumigation have been somewhat overstressed. It is quite true, as has been frequently demonstrated, and is daily demonstrated in New York City, that trained fumigators can do their work and handle the most deadly gases with safety, both to themselves and to others. It is, on the other hand, quite as true that, in the hands of the ignorant or careless, fumigation is a menace to all concerned. Hydrocyanic-acid gas is a deadly gas. It is not, however, so deadly as popular belief would make it. A single whiff of it will not kill you; in fact in the great majority of instances a good many whiffs may be taken with safety. Yet, one unfamiliar with its effect should not needlessly expose himself. Above all remember this advice: Keep your head and do not be stampeded because there is cyanide. On the other hand, do not rush in headlong; stop a moment and think.

MORTALITY IN CERTAIN STATES DURING 1930, WITH COMPARATIVE FIGURES FOR RECENT YEARS [1]

For several years the United States Public Health Service has secured from State health departments current mortality data and has published from time to time death rates from certain important causes from as many States as could furnish the information to the

[1] From the Office of Statistical Investigations, United States Public Health Service.

service. The monthly data so collected are, of course, available for an annual summary also, and the tables here presented have been compiled to give a preliminary summary of mortality during 1930.[1]

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census; the final figures are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the following tables are intended to serve as a current index of mortality until final figures are issued by the Bureau of the Census.

For purposes of comparison, the mortality records for a few preceding years are given. These comparative rates for preceding years are taken from the same source as are the current reports. Although final figures are often available for these earlier years, the preliminary figures are retained as being more nearly comparable with current preliminary rates.

Populations used throughout are revised estimates as of July 1 of each year based on the 1930 and 1920 censuses.

In Table 1 the death rates from all causes and from certain specific causes for groups of States have been brought together. The number of States included varies with the cause; but for a given cause the same States are included for each of the years from 1923 to 1930. Tables 2, 3, 4, and 5 show the States that are included in the summary for each disease presented in Table 1, and also the death rates from that cause in each of the States for each year. The death rates for the groups are repeated in those tables, but it seemed worth while to bring together in Table 1 the rates for the different causes and years in as large a group of States as possible. In every case all States for which data were available for the whole period 1923–1930 were used in making the summary. In addition, the detailed tables (Tables 2, 3, 4, and 5) show rates for 1930 and such other years as could be secured from States for which data were not available for the whole period.

The rates for the majority of the diseases included in Table 1 are based on reports from 17 States, with an aggregate population of nearly 56,000,000, or more than 45 per cent of the total population of the United States. Other causes in this table are based on fewer States, but the smallest population considered is more than 34,000,000. While the rates in these States may not be the same as those for the total registration area, it is highly probable that the trend in these

[1] The summary for 1929 was published in PUBLIC HEALTH REPORTS for May 2, 1931.

rates will be comparable with the trend in the rates in the total registration area.

The death rate per 1,000 from all causes in the group of 19 States was 11.3 in 1930, as compared with 12.0 in both 1929 and 1928 and with 11.5 in 1927. Each of the years 1929 and 1928, it will be remembered, included part of the influenza epidemic of the winter of 1928–29. The year 1930 was free from any widespread influenza epidemic and the death rate from all causes is slightly below the low level of 1927. Considering individual States, out of the total of 25 States with data for both 1929 and 1930, 20 showed a decrease, 2 showed an increase, and in 3 States the rate was the same for the two years.

In 17 States for which infant mortality figures were available the infant death rate per 1,000 live births was 64 in 1930, as compared with 68 in 1929, and with 66 in the low year of 1927. The 1930 figure is the lowest of any of the years covered in this report. Of 21 States with data for both 1929 and 1930, only 4 failed to participate in the decline in infant mortality. Inasmuch as the death rate for malformations and diseases of early infancy changes very little from year to year, a line has been inserted in Table 1 to show the infant mortality from all causes except malformations and early infancy. Infant mortality from causes other than malformation and early infancy has declined 24 per cent since the year 1923, as against a decrease of 19 per cent for the same period in the infant mortality from all causes. Nearly one-half of the present infant mortality is due to malformations and diseases of early infancy, and this group of causes has decreased very little.

In the eight States for which maternal mortality figures are available throughout the period 1923–1930, the deaths of mothers per 1,000 live births have decreased slightly, but rather consistently, the rate of 5.8 in 1930 being the lowest for any of the years included. A comparison of 1930 with 1929 in the larger number of States for which data are available for those two years is less favorable, 10 of the 20 States showing a decrease in 1930 over 1929 with the other 10 States showing an increase.

The typhoid fever death rate in 1930 was not so favorable as in 1929, being, in the group of 17 States, 3.5, as compared with 3.2 in the preceding year. The 1930 rate, however, is the lowest of any year covered in the table except 1929. The increase in 1930 over 1929 was quite general, 18 of the 27 States with data for both years having higher rates in 1930 than in 1929 and 2 States having the same rates in the two years, with only 7 States showing a decrease.

The rather sharp decline of diarrhea and enteritis under 2 years of age was also interrupted in the year 1930, the rate being slightly greater than in 1929 but less than in any of the other years included

and not much more than one-half of the rate for the year 1923. Of 25 States with data available for both 1929 and 1930, 16 showed an increase and 9 a decrease in 1930 as compared with the preceding year.

It is a well-known fact that the diseases of children, such as measles, whooping cough, scarlet fever, and diphtheria, tend to occur in cycles, and therefore the death rate for any one year is a poor indicator of the average mortality from these diseases. The measles mortality in 1930 was slightly greater than in 1929, but less than in any other year since 1925. Of 27 States with data for the last two years, 18 showed increases and 9 decreases in 1930 over the preceding year. The death rate from whooping cough in 1930 was less than in any year included in the table. All but four of the 27 States with data for the past two years had a lower rate in 1930 than in the preceding year. The death rate from scarlet fever was also the lowest of any of the years included. Of the 27 States with data for the past two years, 18 showed a decrease, 5 an increase, and 4 remained the same in 1930 as in 1929. Diphtheria continued its almost uninterrupted decline, the rate of 4.2 in 1930 being little more than one-third of the rate in 1923. Of 27 States with data for 1929 and 1930, 22 decreased and only 3 increased in 1930 as compared with 1929, the other 2 States having the same rate in the two years.

The death rate from poliomyelitis was higher in 1930 than in either 1928 or 1929—in fact, only two years since 1923 showed higher rates. Of 26 States with data for the past two years 16 showed an increase, 9 a decrease, and 1 remained the same in 1930 as in 1929. Since 1929 had the lowest rate of any year included, the increases in 1930 over 1929 might be expected.

The meningococcus meningitis death rate in 1930 was less than in 1929, but was higher than in any of the other years included. The year 1929 seems to represent the peak of a gradual rise in the death rate from this disease. Of 26 States with data available for both years, 14 decreased, 11 increased, and 1 remained the same in 1930 as in 1929.

As already mentioned, influenza maintained a low level during 1930, the rate being less than that for any other year included and somewhat less than that for the low year of 1927. In each of the 27 States with data available for the past two years the rate was less in 1930 than in the epidemic year of 1929.

Pneumonia, likewise, was considerably lower in 1930 than in 1929 and 1928, but not quite down to the 1927 level. However, it was lower in 1930 than in any other year included except 1927. If influenza and pneumonia are considered together, the rate for 1930 is slightly below that for 1927. In 27 States with data on pneumonia mortality

available for the past two years, 17 decreased and 10 increased in 1930 as compared with 1929.

The death rate from tuberculosis continued an uninterrupted decline throughout the period included, the rate being 71.7 in 1930 as against 77.5 for the preceding year, and both of these rates are lower than those for any other year included. Since 1923 the rate has been reduced by more than 25 per cent. Of 27 States with data for 1929 and 1930, 24 showed a decrease and only 3 an increase in 1930 as compared with 1929.

The diabetes death rate was higher than in any preceding year included except 1928, which had the same rate as 1930. Although the trend appears to be upward, the increases have not been large, the rate for 1930 being 20.0 as compared with 19.7 in 1929. Of 24 States with data available for both years, 14 showed an increase and 10 showed a decrease in 1930 as compared with 1929.

The death rate for cancer was higher for 1930 than for any preceding year, although the increase over 1929 was small. The increase since 1923 was slightly less than 10 per cent. Of 25 States with data available for both years, 18 showed an increase and 7 showed a decrease in 1930 as compared with 1929.

At first glance it might appear that the death rate from heart diseases had reached a peak in 1929, for the rate for 1930 is somewhat less than that for either 1929 or 1928. The 1930 rate, however, is considerably above that for 1927 and the rates for the other preceding years included. In connection with any comparison of the 1930 rate with 1929 and 1928 it must be remembered that the winter of 1928–29 included an influenza epidemic, and during all of the influenza epidemics of recent years there have occurred considerable numbers of deaths from causes other than influenza and pneumonia in excess of the normal expectation for such diseases. This is particularly true of heart disease and to a lesser extent of the other chronic diseases. It is, therefore, probable that the decrease in the heart disease rate for 1930 as compared with 1929 and 1928 is the reflection, not so much of a low rate in 1930 as of an abnormally high rate during the influenza epidemic of 1928 and 1929. The decrease in 1930 as compared with 1929 was rather general, 15 of the 23 States with data available for both years showing a decrease and 8 showing an increase. A comparison of 1930 and 1927, however, for which years 13 States had comparable data available, shows that each of these States had a higher rate in 1930 than in 1927.

The death rate from nephritis was less in 1930 than in any year since 1925. Of 24 States with data available for the past two years, 10 showed a decrease and 14 an increase in 1930 as compared with 1929. During the period 1923–1930 nephritis death rates fluctuated considerably, but the 1930 rate is only slightly above the 1923 rate.

The death rate from cerebral hemorrhage, apoplexy, was less in 1930 than in any of the other years included. The decline, however, has been small; of 21 States with data available for the last two years, 10 showed a decrease and 11 an increase in 1930 as compared with 1929.

TABLE 1.—*Summary of mortality from certain causes in a group of States, 1923–1930*

Diseases (numbers in parentheses are from the International List of Causes of Death, third revision, Paris, 1920)	1930	1929	1928	1927	1926	1925	1924	1923	Number of States included [1]	Estimated population as of July 1, 1930 (in thousands)
	Death rate per 1,000 population									
All causes	11.3	12.0	12.0	11.5	12.4	12.0	11.9	12.5	19	62,725
	Deaths under 1 year per 1,000 live births									
Total infant mortality	64	68	69	66	75	75	73	79	17	53,004
All except malformations and early infancy	35	37	38	34	41	42	42	46	9	29,872
	Deaths of mothers per 1,000 live births									
Maternal mortality	5.8	6.2	6.4	6.4	6.6	6.7	6.5	7.0	8	34,693
	Death rate per 100,000 population									
Typhoid fever (1)	3.5	3.2	4.0	5.0	5.9	7.4	6.0	6.3	17	55,971
Measles (7)	3.1	2.5	4.0	3.2	8.1	2.4	6.1	11.6	17	55,971
Scarlet fever (8)	1.7	2.0	1.8	2.0	2.3	2.7	3.2	3.9	17	55,971
Whooping cough (9)	4.2	6.0	5.2	6.1	8.8	6.9	8.0	9.4	17	55,971
Diphtheria (10)	4.2	5.5	6.6	7.2	7.1	7.6	9.1	12.3	17	55,971
Influenza (11)	18.9	54.0	43.1	23.0	41.0	29.4	19.3	42.4	17	55,971
Acute anterior poliomyelitis (22)	1.4	.7	1.2	1.8	.8	1.6	.9	.8	11	41,897
Meningococcus meningitis (24)	2.6	3.0	1.6	1.1	1.1	1.0	.9	1.2	13	45,020
Tuberculosis, all forms (31–37)	71.7	77.5	81.4	82.6	89.7	90.0	93.3	96.9	18	57,854
Cancer (43–49)	100.7	100.0	100.6	98.1	97.1	94.6	92.0	92.0	18	57,854
Diabetes mellitus (57)	20.0	19.7	20.0	18.1	18.5	16.9	16.6	17.8	11	38,952
Cerebral hemorrhage, apoplexy (74)	92.0	95.4	98.0	93.0	95.0	98.0	101.0	99.2	10	34,039
Heart diseases (87–90)	223.1	230.0	228.0	210.3	211.0	196.0	185.0	181.1	12	42,188
Pneumonia, all forms (100, 101)	82.5	94.0	99.0	80.0	103.0	99.3	102.1	115.3	17	55,432
Diarrhea and enteritis, under 2 years (113)	18.5	17.5	19.2	20.1	26.0	32.5	29.0	34.0	16	52,168
Nephritis, all forms (128–129)	97.7	98.5	102.3	98.8	103.9	97.0	94.6	95.3	13	40,358

[1] See Tables 2, 3, 4, and 5 for names of States included. The District of Columbia is counted as a State in this column.

TABLE 2.—*Mortality from all causes in certain States and in a group of insured wage earners, 1923–1930*

State	Death rate per 1,000 population (all causes)							
	1930	1929	1928	1927	1926	1925	1924	1923
States with complete data:								
Total (18 States and District of Columbia)	11.3	12.0	12.0	11.5	12.4	12.0	11.9	12.5
Alabama	11.2	12.2	12.0	10.3	11.7	11.6	11.5	11.0
Arizona	14.6	15.7	15.3	14.1	14.1	14.7	14.6	13.4
California	11.6	11.9	12.6	12.1	12.1	12.2	12.9	13.0
Connecticut	10.5	11.3	11.3	10.8	12.0	11.8	11.5	12.2
District of Columbia	15.2	15.4	15.1	14.8	15.8	15.1	14.3	15.6
Indiana	11.6	12.2	12.2	11.5	12.9	12.5	12.1	12.8
Kansas	10.4	10.4	11.2	10.0	10.4	10.2	9.8	10.9
Louisiana	11.8	11.8	12.2	11.9	12.2	12.7	12.9	11.7
Maryland	13.2	13.5	13.6	13.3	14.9	14.2	13.7	14.7
Michigan	10.6	11.8	11.8	11.4	12.7	11.8	12.2	12.7
Minnesota	9.7	9.9	10.1	9.8	10.3	10.2	10.0	10.4
Nebraska	9.4	9.6	10.0	9.1	9.4	9.3	9.3	9.5
New Jersey	10.7	11.5	11.9	11.2	12.2	11.8	11.9	12.2
New York (exclusive of New York City)	12.4	13.4	13.1	12.8	14.0	13.4	13.3	14.1
Ohio	11.4	12.5	12.4	11.5	12.5	11.8	11.4	12.4
Pennsylvania	11.3	11.9	12.1	11.4	12.5	12.2	12.1	13.1
Tennessee	11.4	12.2	12.2	11.4	12.5	11.2	11.4	11.8
Virginia	11.7	12.0	12.6	12.0	13.0	12.4	12.4	13.1
Wisconsin	11.3	10.7	10.5	10.3	10.6	10.3	10.1	10.6
Other States:								
Florida	13.2							
Georgia	11.8	11.8						
Hawaii	10.4	12.2	11.8					
Idaho	9.2							
Iowa	10.6	10.4	10.4					
Mississippi	10.8	11.6						
Montana	9.8							
North Carolina	11.4	11.9	11.7					
South Dakota	8.5	8.6	9.0					
West Virginia	10.4	10.6						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	8.3	8.9	8.7	8.4	8.9	8.5	8.5	9.0

TABLE 3.—*Infant mortality in certain States, 1923–1930*

State	Deaths under 1 year per 1,000 live births							
	1930	1929	1928	1927	1926	1925	1924	1923
	Total infant mortality							
States with complete data:								
Total (16 States and District of Columbia)	64	68	69	66	75	75	73	79
Alabama	73	74	74	65	68	73	79	77
Arizona	121	129	143	127	116	133	140	128
California	59	63	62	63	63	69	67	72
Connecticut	60	68	62	59	72	73	69	76
District of Columbia	70	69	65	66	85	87	76	91
Indiana	58	66	64	60	72	68	66	71
Louisiana	80	76	81	77	74	89	94	82
Maryland	73	79	79	81	87	90	87	94
Michigan	63	67	69	68	78	76	72	80
Minnesota	47	48	54	52	57	60	56	61
Nebraska	49	52	53	51	59	58	55	57
New Jersey	57	61	65	61	72	69	65	68
New York (exclusive of New York City)	61	64	65	63	74	71	71	79
Ohio	58	68	66	62	76	69	67	74
Pennsylvania	67	70	72	69	82	82	78	90
Tennessee	71	75	78	72	79	74	78	76
Virginia	71	74	76	75	84	80	76	83
Other States:								
Florida	64							
Georgia	78							
Hawaii	82	101						
Idaho	51							
Iowa	56	52	54					
Kansas	52	57	59					
North Carolina	77							
South Dakota	59	56	59					
Wisconsin	56	61	61					

TABLE 3.—*Infant mortality in certain States, 1923–1930*—Continued

State	Deaths under 1 year per 1,000 live births							
	1930	1929	1928	1927	1926	1925	1924	1923
	All except malformations and early infancy							
States with complete data:								
Total (8 States and District of Columbia)	35	37	38	34	41	42	42	46
Alabama	45	44	48	36	40	41	44	38
Arizona	84	93	105	94	81	97	102	94
California	29	32	33	31	31	35	35	39
District of Columbia	36	34	28	27	42	43	35	45
Louisiana	49	48	50	46	45	54	55	51
Maryland	38	46	42	43	49	48	46	54
Nebraska	19	23	21	21	25	25	23	27
New York (exclusive of New York City)	24	27	27	26	33	33	32	33
Pennsylvania	36	38	38	35	47	46	47	53
Other States:								
Florida	31							
Idaho	24							
Indiana	26							
Iowa	22	21	20					
Kansas	22	26	29					
Michigan	27	31						
Minnesota	17	18						
Ohio	25							
South Dakota	26	27	28					
Tennessee	44	53						

TABLE 4.—*Maternal mortality in certain States, 1923–1930*

State	Deaths of mothers per 1,000 live births							
	1930	1929	1928	1927	1926	1925	1924	1923
States with complete data:								
Total (8 States)	5.8	6.2	6.4	6.4	6.6	6.7	6.5	7.0
Arizona	4.7	4.6	4.8	5.8	7.0	4.5	5.0	5.1
California	5.3	5.2	5.6	5.8	5.5	6.0	5.9	6.7
Nebraska	5.3	5.4	6.0	5.9	6.6	5.7	6.3	5.8
New York (exclusive of New York City)	5.6	5.5	6.4	6.3	6.1	6.1	6.0	6.3
Ohio	5.5	6.6	6.2	6.2	6.8	6.6	6.3	7.1
Pennsylvania	5.6	5.8	5.8	6.1	6.1	6.2	6.1	6.3
Tennessee	7.9	8.1	8.2	6.8	6.8	7.8	7.5	8.1
Virginia	6.6	6.5	7.5	6.3	8.0	6.9	6.4	7.3
Other States:								
Alabama	8.1	8.3	8.2	7.0				
District of Columbia	9.1	6.1						
Florida	9.5							
Georgia	10.6							
Idaho	4.4							
Indiana	5.8	7.0	6.1	6.5				
Iowa	7.0	5.4	5.3					
Kansas	7.0	6.1	7.4					
Louisiana	9.8	10.3	11.1					
Maryland	5.3	5.6						
Michigan	5.9	6.1						
Minnesota	4.8	3.9						
New Jersey	5.7	5.3						
North Carolina	7.6							
South Dakota	5.6	5.5	4.3					
West Virginia	5.7	5.3						
Wisconsin	4.8							

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
TYPHOID FEVER (1)								
States with complete data:								
Total (16 States and District of Columbia)	3.5	3.2	4.0	5.0	5.9	7.4	6.0	6.3
Alabama	7.7	7.5	9.4	12.4	15.1	16.8	14.2	14.7
Arizona	9.6	14.0	8.4	10.3	6.0	12.1	8.7	8.7
California	1.7	1.7	2.0	2.1	2.4	2.5	5.2	3.6
Connecticut	.9	.9	.6	1.1	1.9	2.6	2.6	2.6
District of Columbia	3.3	2.7	3.1	2.1	2.6	5.4	4.1	5.9
Indiana	3.7	3.5	4.4	4.8	6.5	8.0	7.0	6.8
Louisiana	11.7	10.4	12.3	14.0	16.8	33.0	21.4	14.0
Maryland	6.2	4.3	5.3	5.9	7.7	7.4	6.4	6.6
Minnesota	1.0	.9	.5	1.1	1.1	1.9	1.5	2.5
Nebraska	1.6	1.8	1.8	2.7	1.8	2.7	2.2	3.1
New Jersey	1.1	1.4	1.7	1.3	2.6	3.1	2.7	3.0
New York (exclusive of New York City)	1.6	1.5	2.0	2.1	3.4	3.8	3.5	3.4
Ohio	3.3	2.2	2.1	2.7	4.5	5.3	3.6	5.0
Pennsylvania	2.6	2.1	2.0	2.6	3.7	4.8	3.8	4.8
Tennessee	12.2	11.9	13.5	20.5	24.6	25.8	23.8	21.3
Virginia	5.8	4.4	6.1	7.3	11.2	12.8	8.7	10.8
Wisconsin	.9	1.4	.8	1.4	1.5	2.0	1.0	2.2
Other States:								
Florida	4.8							
Georgia	16.4	11.6						
Hawaii	2.4	3.9	6.3					
Idaho	4.7							
Illinois	1.9	1.4	2.2	2.4	3.2	4.6		
Iowa	1.6	2.3	2.3					
Kansas	3.0	2.9	2.4					
Michigan	1.8	1.7						
Mississippi	10.2	8.8						
Montana	3.2							
North Carolina	4.4	5.5	6.0					
South Carolina	16.9	14.4	19.5	23.7	28.0	26.2		
South Dakota	2.9	3.2	2.9					
West Virginia	12.1	11.5						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	2.4	2.4	2.7	4.7	4.2	4.6	4.4	5.2
DIARRHEA AND ENTERITIS UNDER 2 YEARS (113)								
States with complete data:								
Total (15 States and District of Columbia)	18.5	17.5	19.2	20.1	26.0	32.5	29.0	34.0
Alabama	28.8	27.1	35.1	30.0	36.2	31.4	33.7	34.9
Arizona	76.7	118.6	105.6	87.9	76.9	126.8	123.0	100.3
California	14.8	15.3	15.6	19.3	20.3	24.8	28.8	33.6
Connecticut	10.7	14.0	6.9	11.3	16.4	18.9	20.1	21.6
District of Columbia	19.9	18.4	14.6	12.2	27.3	36.2	24.4	30.8
Indiana	18.4	16.9	17.7	17.0	26.5	30.9	25.5	28.2
Louisiana	27.1	26.2	24.9	36.7	32.8	54.8	50.5	32.7
Maryland	38.9	32.5	29.6	29.2	36.3	48.8	43.2	50.9
Minnesota	6.8	4.1	7.4	6.6	9.9	13.5	11.2	14.8
Nebraska	8.3	6.6	9.9	9.4	13.6	17.3	13.9	16.1
New Jersey	11.5	12.2	14.7	16.4	20.2	26.0	26.1	29.9
New York (exclusive of New York City)	10.4	11.3	12.2	13.8	18.6	24.8	21.3	27.7
Ohio	16.4	12.5	14.6	14.3	23.3	27.9	17.6	27.7
Pennsylvania	22.5	19.7	22.2	23.4	32.5	43.2	36.5	47.9
Tennessee	28.6	23.9	32.0	25.9	37.7	35.6	34.1	34.7
Wisconsin	11.2	11.7	11.1	14.1	15.4	20.5	14.8	18.8
Other States:								
Florida	16.2							
Georgia	24.8	17.9						
Hawaii	76.6	103.1	82.8					
Idaho	4.7							
Iowa	6.6	3.9	6.1					
Kansas	12.1	10.4	16.9	20.8	29.2	35.7		
Michigan	14.4	16.0						
Mississippi	15.0	19.2						
Montana	15.3							
North Carolina	29.7	30.1	39.1					
South Dakota	11.0	5.5	9.2					
Virginia	26.1	19.7						
West Virginia	70.1	57.8						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over, including adults as well as children under 2 years	8.0	7.9	8.7	9.1	10.5	12.3	11.3	11.1

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
MEASLES (7)								
States with complete data:								
Total (16 States and District of Columbia)	3.1	2.5	4.0	3.2	8.1	2.4	6.1	11.6
Alabama	2.9	2.4	8.7	4.5	5.0	.8	16.1	12.3
Arizona	19.2	(1)	5.0	6.6	1.3	3.6	8.3	4.9
California	5.2	.3	.5	6.2	2.1	.6	7.1	7.2
Connecticut	.3	3.0	3.8	1.3	12.8	2.6	3.2	11.0
District of Columbia	.2	(1)	3.6	(1)	7.3	.9	.7	7.5
Indiana	1.9	3.7	2.0	1.7	12.0	1.9	5.7	8.5
Louisiana	4.7	2.5	8.6	12.5	.4	.4	23.0	6.2
Maryland	.4	1.4	6.6	1.3	14.1	1.5	3.3	9.7
Minnesota	3.3	3.2	.5	2.3	7.1	.6	5.6	11.5
Nebraska	6.2	2.4	.7	5.2	1.6	(1)	7.1	3.0
New Jersey	3.2	.9	6.4	.6	11.0	3.3	5.3	10.2
New York (exclusive of New York City)	1.4	2.6	3.5	2.6	4.6	3.0	4.5	8.1
Ohio	2.8	3.5	2.9	.6	12.5	1.3	2.6	9.6
Pennsylvania	2.2	3.7	5.0	2.6	11.4	5.5	3.3	18.1
Tennessee	4.9	1.0	7.8	5.4	10.8	2.0	10.4	19.6
Virginia	3.9	1.6	6.4	4.6	4.2	3.2	9.2	22.8
Wisconsin	3.3	2.7	.5	3.4	5.1	2.2	2.7	7.1
Other States:								
Florida	4.3							
Georgia	4.4	1.0						
Hawaii	4.3	5.0	2.3					
Idaho	2.0							
Illinois	1.0	3.6	1.1	4.0	4.8	3.1		
Iowa	8.1	1.4	.5					
Kansas	4.2	2.4	1.0					
Michigan	4.7	3.1						
Mississippi	1.4	4.3						
Montana	2.2							
North Carolina	.1	.6	16.6					
South Carolina	.5	.1	16.1	3.8	.3	.1		
South Dakota	3.0	2.2	1.6					
West Virginia	4.9	4.5						
Industrial policyholders Metropolitan Life Insurance Co., ages 1 and over	2.2	2.4	4.2	3.4	8.0	2.5	5.7	8.4
WHOOPING COUGH (9)								
States with complete data:								
Total (16 States and District of Columbia)	4.2	6.0	5.2	6.1	8.8	6.9	8.0	9.4
Alabama	8.9	9.8	7.7	13.6	11.8	9.0	15.9	13.3
Arizona	9.6	8.2	9.8	6.4	4.0	9.0	11.1	14.9
California	3.5	5.0	6.4	3.8	3.4	10.1	3.7	7.7
Connecticut	2.0	2.6	6.4	2.6	6.2	7.5	5.3	9.1
District of Columbia	4.1	5.0	4.6	3.6	8.3	4.5	2.8	7.5
Indiana	3.0	5.4	4.3	5.6	12.4	5.5	9.6	8.6
Louisiana	5.9	5.4	8.8	10.4	9.0	10.9	7.2	14.3
Maryland	4.4	7.9	7.4	12.1	11.7	11.3	9.1	17.2
Minnesota	2.6	4.5	3.1	3.0	7.0	3.9	5.4	6.2
Nebraska	2.6	3.6	3.2	3.7	7.6	5.6	2.1	5.7
New Jersey	2.2	4.7	4.7	4.6	4.6	6.8	7.3	6.4
New York (exclusive of New York City)	4.0	3.8	3.9	3.7	7.2	3.4	5.7	6.1
Ohio	3.0	8.0	3.8	4.2	10.3	5.8	7.5	8.3
Pennsylvania	3.7	5.7	5.5	4.7	10.0	7.0	7.6	11.0
Tennessee	6.3	7.4	5.2	13.3	14.6	6.6	11.8	11.0
Virginia	10.8	10.9	7.7	18.9	13.4	10.7	21.8	17.1
Wisconsin	3.3	3.8	2.3	2.6	5.6	4.1	4.6	6.0
Other States:								
Florida	3.4							
Georgia	9.0	9.4						
Hawaii	3.5	27.9	4.3					
Idaho	4.3							
Illinois	2.1	3.4	3.7	4.2	5.1	4.4		
Iowa	3.7	4.1	3.2					
Kansas	3.5	3.9	5.0					
Michigan	3.6	5.4						
Mississippi	6.9	9.4						
Montana	3.0							
North Carolina	8.5	8.3	6.2					
South Carolina	10.8	12.7	10.0	13.7	5.2	7.7		
South Dakota	2.7	3.8	5.0					
West Virginia	12.0	12.8						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	1.9	3.0	2.7	3.1	5.0	3.6	3.5	4.8

[1] No deaths.

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
SCARLET FEVER (8)								
States with complete data:								
Total (16 States and District of Columbia)	1.7	2.0	1.8	2.0	2.3	2.7	3.2	3.9
Alabama	1.2	1.4	.4	.9	.6	.8	.6	.8
Arizona	1.4	2.6	2.4	1.5	1.8	1.3	3.2	3.3
California	1.2	1.7	1.0	1.2	.9	1.4	2.3	2.8
Connecticut	1.6	.9	1.3	1.4	2.3	3.0	3.9	3.6
District of Columbia	2.3	2.3	1.5	1.7	1.5	1.1	1.7	2.4
Indiana	2.1	3.2	2.1	2.5	3.0	3.3	2.3	2.8
Louisiana	.6	.6	.5	.6	.6	.5	.4	.3
Maryland	2.1	2.3	.8	1.1	1.3	1.1	2.8	3.3
Minnesota	1.4	2.6	2.4	3.7	6.2	6.3	8.4	9.6
Nebraska	2.2	3.8	3.0	1.3	1.9	2.4	2.7	3.8
New Jersey	1.5	1.1	1.6	2.5	2.1	1.8	1.8	2.7
New York (exclusive of New York City)	1.4	2.0	2.0	1.9	2.1	2.1	3.4	3.3
Ohio	2.6	2.2	2.0	2.4	2.9	3.9	3.8	5.3
Pennsylvania	1.9	2.6	2.6	2.4	2.9	3.7	3.9	4.4
Tennessee	1.6	2.4	1.6	1.8	1.6	1.3	1.3	1.6
Virginia	1.1	1.5	1.0	1.3	1.3	1.7	1.4	1.9
Wisconsin	3.0	2.5	2.5	2.1	2.7	3.7	7.4	8.7
Other States:								
Florida	.3							
Georgia	1.3	1.3						
Hawaii	.3	(1)	1.1					
Idaho	2.0							
Illinois	3.9	3.9	2.1	2.3	3.3	3.8		
Iowa	2.5	2.2	2.2					
Kansas	2.4	3.3	2.7					
Michigan	2.7	3.0						
Mississippi	.6	.3						
Montana	2.8							
North Carolina	1.2	1.7	1.2					
South Carolina	.7	.9	.5	.2	.2	.3		
South Dakota	.6	2.6	2.8					
West Virginia	1.9	1.5						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	2.5	2.7	2.6	3.0	3.4	3.4	4.3	4.4
DIPHTHERIA (10)								
States with complete data:								
Total (16 States and District of Columbia)	4.2	5.5	6.6	7.2	7.1	7.6	9.1	12.3
Alabama	6.9	9.4	9.2	9.7	8.2	6.8	6.0	8.4
Arizona	8.4	6.1	6.0	5.6	5.3	5.7	6.3	9.2
California	3.4	3.4	6.0	5.2	6.0	5.7	15.7	15.3
Connecticut	2.0	3.9	5.6	6.1	5.4	8.4	11.4	12.8
District of Columbia	3.7	7.0	9.4	5.1	6.2	8.0	6.5	9.2
Indiana	4.1	4.7	5.7	7.0	5.8	5.5	7.9	13.9
Louisiana	5.0	6.6	7.0	9.9	7.3	6.5	6.0	7.7
Maryland	3.4	4.5	6.6	7.5	6.3	5.6	7.7	10.1
Minnesota	1.2	2.6	2.8	3.3	6.2	9.3	8.8	8.6
Nebraska	3.2	3.5	4.0	3.4	2.7	5.7	8.0	10.4
New Jersey	8.2	11.2	11.8	10.8	8.5	9.1	9.6	13.8
New York (exclusive of New York City)	2.6	3.5	4.0	4.8	4.6	6.4	7.1	9.0
Ohio	2.8	3.4	5.7	7.9	7.6	6.2	6.8	11.3
Pennsylvania	5.1	7.1	8.9	8.9	8.6	10.6	11.6	15.7
Tennessee	6.6	8.4	8.2	7.5	11.1	7.5	8.5	10.6
Virginia	6.1	7.8	7.7	6.4	9.6	10.0	9.2	14.4
Wisconsin	2.4	2.8	3.4	4.5	5.6	6.2	7.4	13.1
Other States:								
Florida	5.3							
Georgia	4.5	6.0						
Hawaii	11.3	8.9	16.9					
Idaho	3.1							
Illinois	7.1	9.9	8.7	8.9	5.7	5.8		
Iowa	1.8	1.3	2.7					
Kansas	3.6	3.6	3.3					
Michigan	6.2	10.5						
Mississippi	6.8	7.1						
Montana	.7							
North Carolina	7.9	11.0	10.6					
South Carolina	7.3	8.6	10.1	8.7	8.9	6.7		
South Dakota	2.9	1.6	2.2					
West Virginia	6.2	7.4						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	5.7	8.6	9.5	10.2	9.5	10.2	12.7	15.5

[1] No deaths.

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
ACUTE ANTERIOR POLIOMYELITIS (22)								
States with complete data:								
Total (10 States and District of Columbia)	1.4	0.7	1.2	1.8	0.8	1.6	0.9	0.8
California	2.8	.9	1.5	4.4	.6	3.1	.8	.8
Connecticut	1.2	.5	.8	1.0	.4	1.3	1.6	.7
District of Columbia	.6	.8	1.0	1.3	1.5	.9	.2	.2
Indiana	.7	.3	.2	1.4	.6	.9	.5	.8
Louisiana	2.3	.6	1.0	2.0	.7	.8	.6	.5
Maryland	.4	.2	1.6	.4	.8	.9	1.2	.5
Minnesota	1.6	.4	2.3	1.4	.6	5.8	1.3	.7
New York (exclusive of New York City)	1.9	1.2	1.7	1.0	2.0	2.0	1.8	1.1
Ohio	1.6	.6	1.1	2.5	.7	1.0	.6	.5
Pennsylvania	.5	.6	.8	1.1	.5	.7	.9	.7
Virginia	.8	1.3	1.3	1.5	1.1	1.2	1.1	1.2
Other States:								
Alabama	.8	1.0	.8	.9	1.0	.9	------	------
Arizona	3.7	.7	3.1	6.9	.8	3.3	.8	------
Florida	1.1	------	------	------	------	------	------	------
Georgia	1.1	------	------	------	------	------	------	------
Hawaii	(1)	1.1	.3	------	------	------	------	------
Idaho	1.3	------	------	------	------	------	------	------
Illinois	.7	.2	------	------	------	------	------	------
Iowa	1.7	.9	.7	------	------	------	------	------
Kansas	3.6	.5	.5	------	------	------	------	------
Michigan	.8	1.0	------	------	------	------	------	------
Mississippi	.5	.6	------	------	------	------	------	------
Montana	1.1	------	------	------	------	------	------	------
Nebraska	3.4	.7	------	------	------	------	------	------
New Jersey	.4	.4	------	------	------	------	------	------
North Carolina	.4	.6	.6	------	------	------	------	------
South Carolina	.9	.6	1.0	1.4	.9	2.2	------	------
South Dakota	1.6	1.2	------	------	------	------	------	------
Tennessee	1.0	1.2	1.6	1.3	------	------	------	------
West Virginia	.6	.9	------	------	------	------	------	------
Wisconsin	1.0	.4	.5	------	------	------	------	------
Industrial policy holders, Metropolitan Life Insurance Co., ages 1 and over	1.1	.6	1.2	2.0	.7	1.4	1.0	.7
MENINGOCOCCUS MENINGITIS (24)								
States with complete data:								
Total (12 States and District of Columbia)	2.6	3.0	1.6	1.1	1.1	1.0	0.9	1.2
Arizona	16.4	16.6	6.2	.2	.8	.5	.5	.3
California	2.8	6.9	2.2	2.0	2.1	.8	.9	1.1
Connecticut	.9	1.4	1.1	.6	.7	.8	1.6	3.1
District of Columbia	2.0	2.9	1.0	.6	.9	.6	(1)	1.3
Indiana	8.3	2.7	.2	.3	.3	.6	.4	.4
Louisiana	3.6	2.7	.8	1.2	1.1	.5	.6	.9
Minnesota	1.9	1.8	1.8	2.3	.6	.7	.5	.8
Nebraska	2.5	2.6	1.8	.7	1.3	1.0	.5	.8
New York (exclusive of New York City)	1.2	1.3	.7	.4	.4	1.0	.5	.6
Ohio	1.8	2.7	2.0	.7	.5	.8	.5	1.0
Pennsylvania	2.1	2.2	1.6	.7	.9	.9	.8	.8
Virginia	2.3	1.5	1.5	1.0	.9	1.1	1.4	.9
Wisconsin	2.0	3.7	3.3	4.1	4.1	3.8	4.1	4.6
Other States:								
Alabama	1.5	1.0	.7	------	------	------	------	------
Florida	.3	------	------	------	------	------	------	------
Georgia	3.0	------	------	------	------	------	------	------
Hawaii	4.3	22.1	4.0	------	------	------	------	------
Idaho	6.9	------	------	------	------	------	------	------
Illinois	2.4	3.3	3.0	1.8	.8	.8	------	------
Iowa	3.3	1.6	.9	------	------	------	------	------
Kansas	2.8	2.8	1.1	------	------	------	------	------
Maryland	1.3	1.5	------	------	------	------	------	------
Michigan	7.5	17.9	------	------	------	------	------	------
Mississippi	6.9	.8	------	------	------	------	------	------
Montana	4.1	------	------	------	------	------	------	------
New Jersey	1.8	2.7	------	------	------	------	------	------
North Carolina	.8	.5	.5	------	------	------	------	------
South Carolina	4.1	3.0	1.6	1.7	2.2	1.9	------	------
South Dakota	.3	1.3	------	------	------	------	------	------
Tennessee	9.6	2.2	.9	.4	------	------	------	------
West Virginia	1.1	.8	------	------	------	------	------	------

[1] No deaths.

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
INFLUENZA (11)								
States with complete data:								
Total (16 States and District of Columbia)	18.9	54.0	43.1	23.0	41.0	29.4	19.3	42.4
Alabama	32.2	120.2	71.0	30.2	66.5	46.0	26.4	49.4
Arizona	16.9	18.4	62.8	26.4	49.7	35.2	17.7	38.2
California	9.1	20.0	40.2	13.7	23.5	15.8	11.2	20.6
Connecticut	13.4	38.8	22.6	18.8	36.7	27.1	19.5	38.6
District of Columbia	8.2	20.5	17.6	19.6	27.9	13.6	7.2	35.0
Indiana	19.7	59.2	59.6	25.4	50.3	43.8	23.0	56.1
Louisiana	39.9	79.1	62.0	29.6	64.9	49.4	31.2	41.2
Maryland	10.3	42.5	19.1	21.7	33.4	20.6	14.5	34.7
Minnesota	15.9	39.6	42.6	19.1	29.0	24.0	9.0	24.9
Nebraska	17.7	45.9	63.8	26.8	41.7	41.2	19.7	49.0
New Jersey	8.9	25.2	15.7	11.1	19.6	11.1	15.5	21.8
New York (exclusive of New York City)	9.9	37.2	18.2	13.8	30.0	14.8	11.1	28.3
Ohio	19.4	59.6	51.7	23.3	40.4	28.6	13.9	42.1
Pennsylvania	19.8	56.1	43.4	25.1	45.5	30.0	26.1	45.0
Tennessee	31.3	106.3	67.9	32.3	70.6	52.5	38.8	93.1
Virginia	29.4	91.9	47.2	45.9	63.8	44.5	34.2	85.1
Wisconsin	30.7	42.3	44.3	20.9	36.4	32.4	15.4	39.4
Other States:								
Florida	22.7	----	----	----	----	----	----	----
Georgia	32.2	86.3	----	----	----	----	----	----
Hawaii	10.5	17.6	24.4	----	----	----	----	----
Idaho	11.2	----	----	----	----	----	----	----
Illinois	11.7	34.5	----	----	----	----	----	----
Iowa	26.9	51.5	55.3	----	----	----	----	----
Kansas	29.3	51.3	81.2	----	----	----	----	----
Michigan	11.9	37.3	----	----	----	----	----	----
Mississippi	29.3	105.6	----	----	----	----	----	----
Montana	22.9	----	----	----	----	----	----	----
North Carolina	24.4	78.2	45.2	----	----	----	----	----
South Carolina	49.7	80.4	76.6	19.4	33.9	22.9	----	----
South Dakota	24.4	51.5	55.3	----	----	----	----	----
West Virginia	27.8	91.2	----	----	----	----	----	----
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	13.1	37.7	22.0	15.7	27.4	19.4	14.2	30.1
PNEUMONIA, ALL FORMS (100,101)								
States with complete data:								
Total (16 States and District of Columbia)	82.5	94.0	99.0	80.0	103.0	99.3	102.1	115.3
Alabama	85.8	88.0	99.2	68.0	96.0	105.6	118.8	90.8
Arizona	152.6	130.5	170.9	136.6	143.5	143.0	171.9	135.5
California	73.0	78.8	84.6	74.6	74.7	78.2	88.3	90.4
Connecticut	87.3	105.4	106.7	87.1	112.2	111.4	103.4	128.9
District of Columbia	122.1	143.3	133.3	121.8	172.1	138.0	161.4	223.4
Indiana	83.5	98.8	103.9	79.0	109.8	99.2	98.7	116.1
Kansas	54.2	58.0	62.5	50.3	59.0	65.3	68.0	89.0
Louisiana	91.5	85.9	96.0	43.8	59.5	105.2	110.5	95.0
Maryland	117.8	137.8	131.9	127.9	149.3	138.6	143.5	169.5
Minnesota	71.1	70.5	74.2	67.4	74.4	74.3	72.4	78.4
Nebraska	64.0	60.1	71.4	56.7	80.4	77.7	80.9	87.7
New Jersey	77.7	103.5	81.1	54.7	78.9	68.6	63.2	73.7
New York (exclusive of New York City)	83.1	104.4	97.9	86.6	114.3	98.1	92.4	115.5
Ohio	74.6	91.2	98.9	82.4	101.7	100.9	92.8	120.9
Pennsylvania	92.3	105.2	121.9	100.0	137.6	129.4	138.4	158.0
Tennessee	88.9	91.5	98.3	85.0	109.4	86.2	105.3	101.4
Wisconsin	72.6	74.6	88.1	66.3	84.4	90.4	90.9	107.5
Other States:								
Florida	59.0	----	----	----	----	----	----	----
Georgia	84.1	77.0	----	----	----	----	----	----
Hawaii	118.2	141.1	148.7	----	----	----	----	----
Idaho	104.0	----	----	----	----	----	----	----
Illinois	63.5	81.9	103.1	74.9	92.1	83.4	----	----
Iowa	79.6	63.8	70.2	----	----	----	----	----
Michigan	68.2	88.8	----	----	----	----	----	----
Mississippi	60.9	62.7	----	----	----	----	----	----
Montana	80.2	----	----	----	----	----	----	----
North Carolina	92.9	90.3	93.5	----	----	----	----	----
South Carolina	102.4	97.0	113.2	105.1	133.6	114.1	----	----
South Dakota	58.1	62.6	68.5	----	----	----	----	----
Virginia	83.7	76.2	----	----	----	----	----	----
West Virginia	91.5	79.5	----	----	----	----	----	----
Industrial policyholders Metropolitan Life Insurance Co., ages 1 and over	62.5	74.0	72.8	63.0	78.2	69.0	70.2	77.6

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
TUBERCULOSIS, ALL FORMS (31-37)								
States with complete data:								
Total (17 States and District of Columbia)	71.7	77.5	81.4	82.6	89.7	90.0	93.3	96.9
Alabama	82.0	84.6	89.6	86.5	93.7	99.2	96.2	98.2
Arizona	298.4	365.1	342.2	342.2	352.2	362.5	342.1	329.9
California	98.3	106.3	114.8	117.6	119.4	127.3	136.5	136.5
Connecticut	58.8	63.5	69.4	68.6	80.1	76.8	82.8	90.5
District of Columbia	116.8	116.6	120.6	127.9	123.9	118.1	121.9	127.2
Indiana	63.6	70.2	70.0	70.5	82.0	80.9	82.4	91.7
Kansas	36.8	37.8	40.0	34.9	40.6	42.6	41.9	41.3
Louisiana	84.1	86.3	87.7	93.7	101.7	104.4	109.7	108.6
Maryland	99.1	104.6	105.8	102.7	115.1	121.9	120.8	124.5
Minnesota	46.3	54.5	56.0	62.2	67.4	64.1	69.3	75.8
Nebraska	24.5	29.9	26.3	30.0	33.1	33.3	35.8	34.8
New Jersey	69.3	73.1	72.9	74.5	83.3	82.5	86.2	91.2
New York (exclusive of New York City)	66.4	72.4	76.2	77.7	85.1	89.0	91.8	96.0
Ohio	63.0	69.8	73.3	73.5	80.5	77.3	82.7	86.6
Pennsylvania	59.8	66.0	71.4	72.5	79.6	79.3	82.6	86.6
Tennessee	115.7	120.3	129.6	129.1	144.6	135.1	144.9	148.7
Virginia	85.0	91.4	103.9	105.8	111.5	114.6	115.3	123.6
Wisconsin	50.5	53.3	56.5	60.7	66.2	62.2	64.0	66.5
Other States:								
Florida	67.6	------	------	------	------	------	------	------
Georgia	73.4	74.0	------	------	------	------	------	------
Hawaii	102.3	110.4	124.0	------	------	------	------	------
Idaho	32.9	------	------	------	------	78.1	------	------
Illinois	59.6	68.8	73.4	76.3	76.4	------	------	------
Iowa	33.1	32.6	34.9	------	------	------	------	------
Michigan	59.8	66.1	------	------	------	------	------	------
Mississippi	78.4	74.2	------	------	------	------	------	------
Montana	62.3	------	------	------	------	------	------	------
North Carolina	74.7	83.3	78.1	------	------	------	------	------
South Carolina	76.5	78.1	85.4	88.9	94.7	94.6	------	------
South Dakota	48.6	53.9	66.0	------	------	------	------	------
West Virginia	65.4	68.0	------	------	------	------	------	------
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	80.9	87.3	90.6	93.8	99.5	98.2	104.4	110.5
DIABETES MELLITUS (57)								
States with complete data:								
Total (10 States and District of Columbia)	20.0	19.7	20.0	18.1	18.5	16.9	16.6	17.8
Alabama	8.1	8.9	9.7	8.2	7.8	6.7	5.6	5.5
Arizona	6.4	4.9	3.6	2.7	6.5	3.6	6.6	6.0
California	18.1	19.0	18.9	18.3	18.1	16.7	17.6	18.9
District of Columbia	26.6	27.7	27.8	23.0	22.4	15.5	17.6	18.0
Louisiana	12.1	11.2	11.8	11.2	11.1	8.5	8.1	8.9
Maryland	21.2	19.5	23.2	18.9	23.2	18.2	20.3	20.3
Nebraska	20.6	21.5	22.4	20.1	16.6	18.9	17.3	21.4
New York	27.8	26.5	25.1	24.5	23.9	22.7	21.5	23.4
Ohio	21.7	20.7	22.0	19.0	19.4	18.2	16.8	19.6
Pennsylvania	21.9	22.2	22.6	19.4	20.3	18.7	18.8	19.0
Virginia	14.3	11.9	12.3	13.8	13.6	11.4	10.6	12.1
Other States:								
Connecticut	17.9	17.5	------	------	------	------	------	------
Florida	13.9	------	------	------	------	------	------	------
Georgia	11.6	10.2	------	------	------	------	------	------
Hawaii	13.0	12.6	7.2	------	------	------	------	------
Idaho	7.8	------	------	------	------	------	------	------
Indiana	15.7	15.0	------	------	------	------	------	------
Iowa	21.0	18.4	19.3	------	------	------	------	------
Kansas	20.9	21.4	20.4	------	------	------	------	------
Michigan	18.1	19.7	------	------	------	------	------	------
Minnesota	18.2	18.6	20.2	------	------	------	------	------
Mississippi	8.9	7.3	------	------	------	------	------	------
Montana	16.2	------	------	------	------	------	------	------
New Jersey	23.1	23.0	------	------	------	------	------	------
South Carolina	8.9	8.6	9.0	7.2	7.4	6.3	------	------
South Dakota	16.9	18.8	18.2	------	------	------	------	------
Tennessee	10.8	10.2	9.4	------	------	------	------	------
West Virginia	12.5	9.7	------	------	------	------	------	------

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
CANCER (43-49)								
States with complete data:								
Total (17 States and District of Columbia)	100.7	100.0	100.6	98.1	97.1	94.6	92.0	92.0
Alabama	51.9	50.2	50.3	50.3	45.9	44.5	45.3	42.5
Arizona	52.2	53.2	54.0	51.2	46.2	45.3	42.7	43.6
California	125.7	118.3	121.0	116.9	116.2	113.9	115.9	121.4
Connecticut	114.5	116.1	111.7	109.6	109.2	109.7	105.8	99.5
District of Columbia	136.7	131.8	127.2	127.7	122.8	119.6	116.1	106.3
Indiana	99.9	99.8	100.5	102.1	103.5	98.7	95.8	97.5
Kansas	96.4	92.6	99.1	99.4	91.0	83.6	76.5	79.7
Louisiana	68.0	64.4	64.7	65.0	63.0	60.8	60.0	57.7
Maryland	111.4	109.8	115.7	101.1	108.7	104.8	103.8	108.4
Minnesota	119.9	113.9	114.1	108.7	105.7	109.7	103.7	101.9
Nebraska	100.9	94.5	96.5	92.6	88.8	89.2	80.7	78.9
New Jersey	107.1	109.3	105.1	103.8	102.8	103.0	97.2	92.2
New York (exclusive of New York City)	127.1	125.7	123.8	125.5	122.4	121.6	120.5	117.7
Ohio	105.2	104.6	106.1	101.8	102.0	98.1	96.4	94.1
Pennsylvania	94.8	99.5	102.3	98.8	98.6	94.6	92.4	91.4
Tennessee	58.2	58.0	58.3	59.3	57.5	51.4	51.3	48.5
Virginia	61.6	62.8	70.1	65.6	65.1	65.0	62.8	61.4
Wisconsin	112.8	110.0	107.7	103.4	108.8	105.4	100.5	92.6
Other States:								
Florida	68.4							
Georgia	52.2	48.8						
Hawaii	59.6	64.5	62.2					
Idaho	61.4							
Iowa	110.8	107.8	112.0					
Michigan	90.7	93.3						
Mississippi	46.8	44.5						
Montana	78.9							
South Carolina	39.7	42.5	44.6	41.8	40.4	40.9		
South Dakota	72.9	68.0	71.8					
West Virginia	59.4	57.9						
Industrial policy holders, Metropolitan Life Insurance Co., ages 1 and over	79.1	78.8	77.0	75.6	75.1	71.8	71.5	72.7
HEART DISEASES (87-90)								
States with complete data:								
Total (11 States and District of Columbia)	223.1	230.0	228.0	210.3	211.0	196.0	185.0	181.1
Alabama	127.0	135.0	133.2	102.6	108.0	101.0	94.0	78.7
Arizona	123.9	127.7	130.7	116.3	116.4	105.0	91.6	76.2
California	239.7	249.0	242.2	236.0	225.1	222.7	217.9	212.6
District of Columbia	315.9	325.5	314.8	282.1	281.1	285.4	214.3	227.8
Indiana	182.5	197.4	189.6	171.1	169.2	160.2	156.6	156.7
Louisiana	199.1	191.9	183.8	170.4	172.3	160.6	163.6	155.8
Maryland	245.2	239.2	237.5	229.2	233.0	209.8	194.6	203.6
Nebraska	159.4	166.0	171.5	156.6	107.5	122.1	117.9	96.4
New York (exclusive of New York City)	293.1	316.8	309.4	287.5	303.7	274.5	262.5	253.9
Ohio	225.3	227.1	222.7	207.5	204.9	183.9	171.7	174.1
Pennsylvania	231.4	235.3	237.8	218.3	223.4	203.0	187.9	189.5
Virginia	178.2	176.7	198.5	177.0	181.3	168.5	163.9	153.9
Other States:								
Connecticut	183.6	193.8	179.2	182.3				
Florida	179.3							
Georgia	138.0	124.5						
Hawaii	121.4	118.2	112.9					
Idaho	174.6							
Iowa	195.8	215.4	212.9					
Kansas	171.5	163.7	175.3					
Michigan	229.6	245.8						
Minnesota	173.4	155.3	153.8					
Mississippi	104.3	97.2						
Montana	139.4							
New Jersey	232.1	246.0						
South Dakota	123.5	126.5	121.5					
Tennessee	120.3	128.9	124.1					
West Virginia	116.6	112.7						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over (other (organic) heart only (90))	146.4	149.0	144.4	134.7	136.4	128.7	125.2	128.7

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
NEPHRITIS (128, 129)								
States with complete data:								
Total (12 States and District of Columbia)	97.7	98.5	102.3	98.8	103.9	97.0	94.6	95.3
Alabama	96.9	89.2	88.6	78.8	83.4	81.2	71.6	77.4
Arizona	51.8	43.2	44.7	41.8	47.9	48.3	44.3	41.7
California	84.0	89.1	97.4	96.5	95.5	82.8	87.4	89.6
District of Columbia	160.4	162.7	156.9	176.2	156.3	144.8	133.8	132.2
Indiana	84.9	80.9	81.8	80.4	95.7	89.8	93.4	92.7
Louisiana	112.0	108.2	112.7	97.1	103.6	82.7	78.5	73.4
Maryland	149.9	151.3	140.0	151.3	158.7	150.1	141.4	139.3
Nebraska	58.6	68.5	65.2	47.8	49.4	56.1	53.9	57.3
New Jersey	102.2	99.5	103.4	96.3	101.4	96.9	104.5	103.4
New York (exclusive of New York City)	116.3	111.4	110.4	114.1	124.2	118.6	112.4	111.7
Ohio	78.4	84.7	88.2	89.8	89.1	76.9	80.3	80.7
Pennsylvania	100.5	104.8	111.9	103.6	110.8	107.2	99.9	104.3
Virginia	108.3	103.0	119.6	113.9	118.7	114.9	103.7	96.1
Other States:								
Connecticut	73.2	71.1						
Florida	121.2							
Georgia	73.2	71.6						
Hawaii	66.9							
Idaho	39.2							
Iowa	43.2	49.3	52.3					
Kansas	102.7	90.5	94.4					
Michigan	63.7	66.1						
Minnesota	52.2	56.2	57.7					
Mississippi	97.1	95.6						
Montana	73.1							
South Carolina	122.6	105.4	113.1	100.1	103.4	103.6		
South Dakota	45.7	53.7	40.2					
Tennessee	75.9	71.6						
West Virginia	61.3	54.3						
Industrial policyholders Metropolitan Life Insurance Co., ages 1 and over	68.9	70.6	71.8	70.8	74.9	71.2	66.5	69.6
CEREBRAL HEMORRHAGE, APOPLEXY (74)								
States with complete data:								
Total (9 States and District of Columbia)	92.0	95.4	98.0	93.0	95.0	98.0	101.0	99.2
Alabama	61.9	64.2	63.7	54.1	52.9	51.5	47.5	43.3
Arizona	49.3	47.6	42.1	48.0	35.6	35.2	36.2	38.2
District of Columbia	99.2	83.8	107.2	103.7	117.3	114.5	114.8	121.3
Indiana	108.1	108.4	111.2	102.6	109.5	105.7	106.2	104.3
Louisiana	61.8	60.3	64.9	66.3	61.4	66.3	61.0	53.4
Maryland	105.1	102.0	101.5	100.5	114.0	124.3	121.2	121.2
Nebraska	84.5	88.4	83.3	82.4	77.4	79.6	80.0	81.1
New York (exclusive of New York City)	104.5	114.9	115.3	112.5	121.6	120.0	131.1	128.7
Ohio	107.7	112.0	113.9	103.6	112.1	114.5	115.4	116.0
Pennsylvania	82.8	84.1	88.4	86.5	88.2	87.6	93.3	93.4
Other States:								
California	81.9	80.2	86.2					
Florida	106.8							
Hawaii	48.3	53.9	61.9					
Idaho	71.3							
Iowa	95.8	97.1	79.9					
Kansas	99.7	108.9	113.1	99.0	100.1	94.9		
Michigan	89.9	93.6						
Minnesota	79.5	75.3						
Mississippi	66.6	64.9						
Montana	66.6							
New Jersey	80.4	83.4						
South Dakota	61.3	55.0	55.2					
Tennessee	62.9	58.8						
Virginia	95.8	89.4						
West Virginia	63.7	49.3						

COURT DECISION RELATING TO PUBLIC HEALTH

Maintenance of piggeries restrained.—(Michigan Supreme Court; Albaugh et al. *v.* Abbott et al., 235 N. W. 263; decided Feb. 27, 1931.) The plaintiffs, who owned and occupied farmhouses on or near a main thoroughfare, brought suit to restrain the defendants from maintaining piggeries on lands in the vicinity of plaintiffs' homes. The defendants hauled over 80 per cent of the garbage of the city of Battle Creek to their farms and there fed it to several hundred hogs. Because of the growth of Battle Creek, a few new houses had been erected in the vicinity of the homes of some of the plaintiffs. On the ground that the acts complained of constituted a nuisance, the supreme court restrained the defendants from collecting garbage and hauling the same to their respective lands and from maintaining piggeries, but gave the defendants three months in which to carry out the terms of the decree.

DEATHS DURING WEEK ENDED APRIL 11, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended April 11, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Apr. 11, 1931	Corresponding week, 1930
Policies in force	75, 140, 465	75, 730, 569
Number of death claims	17, 335	15, 055
Death claims per 1,000 policies in force, annual rate	12. 0	10. 4

Deaths [1] from all causes in certain large cities of the United States during the week ended April 11, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 11, 1931				Corresponding week, 1930		Death rate [2] for the first 15 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9, 023	13. 2	784	[4] 62	13. 4	859	13. 9	13. 4
Akron	56	11. 3	7	69	6. 3	6	8. 6	8. 7
Albany [5]	46	18. 6	3	59	18. 4	4	15. 3	16. 8
Atlanta	83	15. 6	14	143	18. 8	5	16. 5	17. 3
White	40		8	127		4		
Colored	43	(6)	6	172	(6)	1	(6)	(6)
Baltimore [5]	249	16. 0	21	71	16. 1	24	17. 3	15. 8
White	191		17	74		21		
Colored	58	(6)	4	62	(6)	3	(6)	(6)
Birmingham	82	15. 9	8	80	14. 3	7	15. 8	14. 4
White	38		1	17		2		
Colored	44	(6)	7	170	(6)	5	(6)	(6)
Boston	223	14. 8	19	54	16. 5	28	16. 5	16. 1
Bridgeport	35	12. 4	4	66	11. 0	2	13. 1	14. 0
Buffalo	163	14. 6	15	61	14. 2	15	15. 4	14. 5
Cambridge	35	16. 0	3	60	11. 5	3	14. 2	14. 3
Camden	38	16. 7	3	52	10. 1	8	18. 3	15. 0
Canton	24	11. 7	2	46	8. 4	4	11. 2	11. 3
Chicago [5]	763	11. 5	70	62	11. 7	72	11. 9	11. 8

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended April 11, 1931, etc.—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 11, 1931				Corresponding week, 1930		Death rate for the first 15 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Cincinnati	169	19.3	9	54	16.0	6	18.0	17.6
Cleveland	223	12.8	15	44	12.8	15	12.7	12.4
Columbus	89	15.7	6	59	15.4	8	15.3	15.3
Dallas	66	12.7	9	-------	12.7	3	12.7	12.6
White	54	-------	7	-------	-------	2	-------	-------
Colored	12	(6)	2	-------	(6)	1	(6)	(6)
Dayton	52	13.1	5	70	13.9	5	14.0	10.7
Denver	82	14.7	5	48	19.1	5	15.9	16.0
Des Moines	26	9.4	3	53	10.9	2	12.3	12.7
Detroit	296	9.3	26	41	12.1	58	9.7	10.6
Duluth	33	16.9	3	74	14.9	1	12.0	11.5
El Paso	30	14.9	6	-------	20.3	10	18.5	18.7
Erie	29	12.8	3	56	9.9	1	11.6	11.3
Fall River [5] [7]	30	13.6	2	45	15.4	3	13.9	14.1
Flint	20	6.4	3	38	12.5	7	7.9	10.4
Fort Worth	46	14.3	7	-------	8.9	1	12.2	12.1
White	39	-------	7	-------	-------	1	-------	-------
Colored	7	(6)	0	-------	(6)	0	(6)	(6)
Grand Rapids	31	9.4	4	59	14.5	8	9.6	12.0
Houston	61	10.3	3	-------	14.5	11	11.8	13.1
White	44	-------	3	-------	-------	6	-------	-------
Colored	17	(6)	0	-------	(6)	5	(6)	(6)
Indianapolis	111	15.7	4	33	16.1	4	15.5	16.3
White	94	-------	4	38	-------	3	-------	-------
Colored	17	(6)	0	0	(6)	1	(6)	(6)
Jersey City	82	13.4	10	89	13.6	15	13.8	12.8
Kansas City, Kans	30	12.7	0	0	9.0	0	15.6	12.7
White	21	-------	0	0	-------	0	-------	-------
Colored	9	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	108	13.8	10	76	16.2	9	15.4	14.6
Knoxville	27	12.9	4	85	10.8	3	14.4	15.6
White	19	-------	3	71	-------	3	-------	-------
Colored	8	(6)	1	204	(6)	0	(6)	(6)
Long Beach	42	14.4	0	0	10.1	2	11.0	10.6
Los Angeles	288	11.4	33	96	11.7	31	11.7	12.2
Louisville	105	17.8	5	43	17.1	3	17.6	14.9
White	83	-------	5	49	-------	3	-------	-------
Colored	22	(6)	0	0	(6)	0	(6)	(6)
Lowell [7]	20	10.4	1	25	11.4	2	14.8	15.0
Lynn	14	7.1	3	78	16.3	3	12.4	12.3
Memphis	79	15.9	5	53	16.2	9	18.4	18.1
White	48	-------	1	17	-------	7	-------	-------
Colored	31	(6)	4	116	(6)	2	(6)	(6)
Miami	35	16.2	3	76	8.9	0	14.7	13.6
White	22	-------	2	71	-------	0	-------	-------
Colored	13	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	109	9.6	9	39	11.2	20	10.7	10.8
Minneapolis	106	11.7	18	116	9.3	9	12.4	11.2
Nashville	55	18.4	5	74	14.9	5	18.7	17.7
White	40	-------	3	60	-------	2	-------	-------
Colored	15	(6)	2	118	(6)	3	(6)	(6)
New Bedford [7]	31	14.4	6	159	12.5	3	13.4	12.3
New Haven	52	16.7	3	57	9.0	2	13.7	14.4
New Orleans	160	17.8	20	110	20.5	16	19.5	19.6
White	83	-------	9	74	-------	8	-------	-------
Colored	77	(6)	11	179	(6)	8	(6)	(6)
New York	1,616	11.9	124	52	12.7	169	13.4	12.3
Bronx Borough	216	8.5	9	20	9.1	21	9.7	8.7
Brooklyn Borough	550	10.9	56	59	11.8	70	12.5	11.4
Manhattan Borough	648	18.6	48	82	18.9	63	20.5	18.2
Queens Borough	165	7.5	9	25	8.2	13	8.7	8.0
Richmond Borough	37	11.8	2	36	14.7	2	14.3	15.2
Newark, N. J	119	13.9	5	26	14.2	21	13.9	14.1
Oakland	56	10.0	2	26	12.4	1	12.1	12.2
Oklahoma City	59	15.6	10	138	10.8	2	12.3	10.7
Omaha	51	12.3	6	67	13.6	8	14.9	14.4
Paterson	34	12.8	5	86	10.5	6	15.6	13.4
Philadelphia	613	16.3	47	68	13.6	41	16.0	14.1

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended April 11, 1931, etc.—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 11, 1931				Corresponding week, 1930		Death rate for the first 15 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Pittsburgh	225	17.4	23	79	16.8	22	17.9	15.8
Portland, Oreg	60	10.2	5	61	12.1	8	12.8	13.8
Providence	67	13.7	3	28	17.3	4	15.2	15.7
Richmond	69	19.5	6	87	19.4	7	17.9	16.5
White	45		1	22		3		
Colored	24	(6)	5	217	(6)	4	(6)	(6)
Rochester	87	13.7	9	82	13.6	1	13.9	13.1
St. Louis	261	16.4	21	71	16.0	15	18.2	15.3
St. Paul	54	10.2	2	21	10.1	2	11.7	11.2
Salt Lake City [4]	46	16.8	1	15	17.4	4	13.4	14.7
San Antonio	60	13.0	7		12.5	8	15.0	18.4
San Diego	40	13.3	4	81	16.4	3	15.6	15.7
San Francisco	180	14.4	9	60	11.3	8	14.7	13.9
Schenectady	26	14.1	6	176	15.8	0	12.0	12.2
Seattle	80	11.2	2	19	12.9	5	13.3	12.0
Somerville	17	8.4	0	0	10.5	5	11.1	12.4
South Bend	18	8.7	4	100	11.4	2	9.4	10.0
Spokane	24	10.8	2	52	17.1	5	13.2	13.5
Springfield, Mass	35	12.0	2	31	14.2	5	13.9	14.6
Syracuse	48	11.7	5	59	15.4	6	12.8	13.1
Tacoma	26	12.6	0	0	15.1	1	15.2	13.6
Toledo	72	12.7	6	55	12.2	8	13.7	14.1
Trenton	44	18.5	8	139	16.5	3	19.8	18.0
Utica	37	18.9	0	0	17.9	1	16.7	16.8
Washington, D. C	177	18.7	22	122	16.6	13	18.4	16.2
White	103		9	74		5		
Colored	74	(6)	13	223	(6)	8	(6)	(6)
Waterbury	22	11.4	1	30	9.4	2	11.4	11.0
Wilmington, Del. [7]	46	22.5	4	86	20.1	4	17.0	16.2
Worcester	60	15.9	7	96	16.0	6	15.1	15.6
Yonkers	25	9.4	5	131	7.7	1	10.2	9.1
Youngstown	35	10.6	4	56	12.8	9	11.8	11.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended April 18, 1931, and April 19, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 18, 1931, and April 19, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
New England States:								
Maine	4	1	5	9	9	30	0	0
New Hampshire	----	----	----	5	21	5	0	0
Vermont	1	3	----	----	1	92	0	0
Massachusetts	52	72	7	16	522	1,071	2	2
Rhode Island	6	10	----	2	40	3	0	0
Connecticut	7	16	5	10	671	26	2	2
Middle Atlantic States:								
New York	126	115	[1] 13	[1] 21	2,577	1,871	15	16
New Jersey	62	117	12	20	909	1,314	2	2
Pennsylvania	63	130	----	----	4,374	1,800	8	10
East North Central States:								
Ohio	39	28	43	20	673	744	1	6
Indiana	16	16	33	----	855	121	6	20
Illinois	138	135	13	15	1,586	702	20	13
Michigan	45	66	5	----	105	1,874	11	38
Wisconsin	17	11	49	35	790	674	1	3
West North Central States:								
Minnesota	5	9	----	3	71	201	1	3
Iowa	6	4	----	----	56	427	1	8
Missouri	30	32	22	14	620	105	8	18
North Dakota	1	2	----	----	77	19	0	4
South Dakota	11	2	----	----	119	119	0	0
Nebraska	6	20	----	----	5	355	2	1
Kansas	13	12	16	----	48	812	1	0
South Atlantic States:								
Delaware	1	5	1	----	265	12	0	0
Maryland [2]	14	18	23	25	1,612	42	4	2
District of Columbia	18	5	4	----	287	26	5	0
Virginia	----	----	----	----	----	----	----	----
West Virginia	13	13	40	14	99	122	0	5
North Carolina	30	32	17	24	940	62	3	6
South Carolina	7	12	702	639	138	----	2	3
Georgia [3]	7	11	215	76	123	226	0	0
Florida	7	2	14	----	206	282	1	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in Georgia and 4 cases in Alabama.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 18, 1931, and April 19, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
East South Central States:								
Kentucky					341	69	5	4
Tennessee	4	2	96	29	91	143	2	8
Alabama [3]	23	17	346	52	367	130	19	6
Mississippi	3	7					6	14
West South Central States:								
Arkansas	6	6	207	139	32	72	2	3
Louisiana	14	38	33	14	3	92	1	4
Oklahoma [4]	19	7	129	32	21	463	0	2
Texas	36	25	69	8	57	170	0	1
Mountain States:								
Montana	2	5			8	5	1	2
Idaho	1		2			7	0	2
Wyoming	1	1		2	4	23	0	0
Colorado	7	4			274	930	2	4
New Mexico	2	5	2		28	60	1	0
Arizona	1	2	43	1	36	128	1	8
Utah [3]	1	1	14	6	5	232	2	6
Pacific States:								
Washington	10	9	48		55	526	1	3
Oregon	5	5	55	25	150	99	0	1
California	49	46	77	18	1,461	1,766	3	14

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
New England States:								
Maine	1	0	5	39	0	0	0	4
New Hampshire	0	0	1	10	0	0	0	0
Vermont	0	0	2	5	0	0	0	1
Massachusetts	1	0	374	232	0	0	2	3
Rhode Island	0	0	57	35	0	0	0	0
Connecticut	0	0	41	92	0	0	0	1
Middle Atlantic States:								
New York	2	2	897	557	4	4	11	17
New Jersey	0	0	340	242	0	0	3	3
Pennsylvania	1	1	483	469	1	1	14	16
East North Central States:								
Ohio	1	0	380	277	83	148	3	1
Indiana	1	0	276	191	109	167	0	1
Illinois	1	0	553	531	58	150	7	11
Michigan	3	0	333	294	14	88	10	0
Wisconsin	1	0	216	240	29	0	1	1
West North Central States:								
Minnesota	0	0	92	93	3	6	1	1
Iowa	0	0	78	62	81	111	0	1
Missouri	0	0	283	185	56	64	2	10
North Dakota	0	0	25	24	12	24	5	1
South Dakota	1	0	23	12	14	65	0	1
Nebraska	0	0	28	70	21	66	1	0
Kansas	0	0	59	141	93	107	1	5
South Atlantic States:								
Delaware	0	0	34	11	0	0	0	0
Maryland [3]	1	0	65	128	0	0	5	3
District of Columbia	0	0	27	23	0	0	0	1
Virginia		1						
West Virginia	1	0	50	44	4	0	4	12
North Carolina	0	0	50	50	0	21	1	4
South Carolina	1	0	8	5	4	6	7	3
Georgia [3]	0	0	71	22	0	0	1	6
Florida	1	0	5	10	0	0	4	3

[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in Georgia and 4 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 18, 1931, and April 19, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
East South Central States:								
Kentucky	0	0	87	59	2	11	2	4
Tennessee	0	1	19	52	8	15	11	6
Alabama [3]	0	0	88	13	25	3	6	7
Mississippi	0	0	18	10	66	14	3	8
West South Central States:								
Arkansas	2	0	20	8	33	9	3	16
Louisiana	0	0	14	15	33	12	6	5
Oklahoma [4]	0	0	25	65	136	115	1	7
Texas	0	0	41	32	37	48	6	1
Mountain States:								
Montana	0	0	36	48	3	18	1	2
Idaho	0	0	4	7	2	1	1	0
Wyoming	0	0	16	3	7	4	0	0
Colorado	0	0	40	24	2	12	0	3
New Mexico	1	0	7	16	4	5	3	1
Arizona	0	0	4	14	3	21	0	1
Utah [3]	0	0	9	12	0	0	0	0
Pacific States:								
Washington	0	0	41	26	0	65	1	1
Oregon	0	2	19	20	20	27	1	2
California	4	0	155	147	53	77	9	13

[3] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in Georgia and 4 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March, 1931										
Indiana	37	124	228	----	3,026	----	5	1,347	447	7
New Jersey	20	273	187	----	3,275	----	3	1,339	0	8
New York	76	534	----	2	8,213	----	5	4,119	36	37
Ohio	25	199	888	2	3,591	----	6	2,285	256	20
Pennsylvania	84	415	----	----	15,170	3	2	2,464	0	55
South Carolina	----	132	8,696	499	485	294	5	25	12	18
Vermont	----	4	----	----	25	----	0	43	0	0
Wyoming	----	2	3	----	14	----	0	121	16	4

March, 1931	Cases
Anthrax:	
New Jersey	2
New York	1
Pennsylvania	1
Chicken pox:	
Indiana	473
New Jersey	2,044
New York	3,038
Ohio	2,452
Pennsylvania	4,795
South Carolina	304
Vermont	68
Wyoming	107
Dengue:	
South Carolina	4
Diarrhea:	
South Carolina	313
Diarrhea and enteritis (under 2 years):	
Ohio	12
Dysentery:	
New Jersey	3
New York	8
South Carolina (amebic)	1
German measles:	
New Jersey	85
New York	1,394
Ohio	45
Pennsylvania	505
South Carolina	22
Hookworm disease:	
South Carolina	72
Lead poisoning:	
New Jersey	4
Ohio	7

Lethargic encephalitis:	Cases
New Jersey	6
New York	13
Ohio	4
Pennsylvania	9
Mumps:	
Indiana	84
New Jersey	267
New York	1,913
Ohio	1,803
Pennsylvania	2,228
South Carolina	139
Vermont	145
Wyoming	48
Ophthalmia neonatorum:	
New Jersey	4
New York	3
Ohio	57
Pennsylvania	6
South Carolina	9
Paratyphoid fever:	
New York	1
Ohio	1
Puerperal septicemia:	
New York	9
Ohio	7
Pennsylvania	21
Rabies in animals:	
New York	10
South Carolina	21
Rocky Mountain spotted or tick fever:	
Wyoming	1
Septic sore throat:	
Indiana	2
New York	23

Septic sore throat—Continued.	Cases
Ohio	97
Wyoming	1
Tetanus:	
New Jersey	2
New York	2
Pennsylvania	2
Trachoma:	
New Jersey	2
Ohio	1
Trichinosis:	
New Jersey	3
New York	8
Pennsylvania	3
Tularaemia:	
Ohio	7
Pennsylvania	2
Undulant fever:	
Indiana	2
New Jersey	4
New York	13
Ohio	5
Pennsylvania	3
Vermont	1
Vincent's angina:	
New York	[1] 82
Wyoming	1
Whooping cough:	
Indiana	232
New Jersey	708
New York	2,223
Ohio	440
Pennsylvania	1,007
South Carolina	182
Vermont	96
Wyoming	64

[1] Exclusive of New York City.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of March, 1931, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Illinois	Massachusetts	Minnesota	Missouri	New York	Oregon	Rhode Island	Washington
Diphtheria							2			
Malaria	1									
Measles							2			
Meningitis						2	[1] 1			
Poliomyelitis					1					
Scarlet fever		2					2			
Smallpox	3		1							
Tuberculosis			21		16			1	2	1
Tularemia					1					
Typhoid fever				1	2					
Undulant fever					1					
Whooping cough							1			

[1] Meningococcus.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated population of more than 33,285,000. The estimated population of the 90 cities reporting deaths is more than 31,820,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended April 11, 1931, and April 12, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	898	1,089	
96 cities	417	586	803
Measles:			
45 States	20,891	18,776	
96 cities	8,501	7,348	
Meningococcus meningitis:			
46 States	168	314	
96 cities	85	155	
Poliomyelitis:			
46 States	20	22	
Scarlet fever:			
46 States	5,545	5,216	
96 cities	2,290	2,007	1,492
Smallpox:			
46 States	1,056	1,580	
96 cities	125	179	59
Typhoid fever:			
46 States	124	147	
96 cities	32	29	31
Deaths reported			
Influenza and pneumonia:			
90 cities	1,061	1,078	
Smallpox:			
90 cities	1	0	
New Orleans, La.	1	0	

City reports for week ended April 11, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	6	0	0	1	0	1	9	1
New Hampshire:								
Concord	0	0	0		0	16	0	5
Vermont:								
Barre	0	0	0		0	1	0	2
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	59	30	17	2	1	118	3	22
Fall River		3						
Springfield	1	3	1		0	13	38	2
Worcester	1	4	2		0	7	10	5
Rhode Island:								
Pawtucket	5	0	0		0	0	0	4
Providence	8	8	12	1	2	38	3	6
Connecticut:								
Bridgeport	6	5	0		0	7	3	4
Hartford	4	4	1	1	2	47	2	12
New Haven	22	1	0		3	375	5	6

City reports for week ended April 11, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	21	10	10	5	0	273	38	22
New York	323	215	89	20	11	1,355	42	218
Rochester	7	7	0	----	1	12	3	8
Syracuse	15	4	1	----	0	4	0	4
New Jersey:								
Camden	2	6	4	----	0	15	6	6
Newark	88	15	10	5	0	27	2	15
Trenton	4	3	1	6	0	3	8	10
Pennsylvania:								
Philadelphia	150	59	6	14	12	1,315	52	40
Pittsburgh	79	15	12	5	3	112	41	51
Reading	9	2	0	----	0	64	24	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	9	7	4	----	3	93	35	11
Cleveland	215	26	6	28	4	59	322	26
Columbus	13	3	2	2	2	12	5	4
Toledo	62	3	8	4	4	6	26	8
Indiana:								
Fort Wayne	1	2	4	----	3	24	0	7
Indianapolis	44	4	1	----	0	468	28	15
South Bend	6	0	0	----	0	1	0	2
Terre Haute	3	0	0	----	0	3	0	0
Illinois:								
Chicago	119	93	99	6	5	373	85	82
Springfield	12	1	1	----	0	180	0	4
Michigan:								
Detroit	69	42	18	2	2	19	29	26
Flint	11	3	2	7	1	0	3	2
Grand Rapids	4	1	0	----	1	5	0	1
Wisconsin:								
Kenosha	17	0	0	----	0	1	111	1
Madison	20	0	0	1	----	6	45	----
Milwaukee	156	12	4	2	2	123	473	10
Racine	3	2	0	----	0	7	0	0
Superior	18	0	0	----	0	0	0	3
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0	----	1	0	1	2
Minneapolis	116	11	4	----	0	105	229	16
St. Paul	50	7	0	2	2	20	3	5
Iowa:								
Davenport	0	1	0	----	----	3	0	----
Des Moines	1	1	4	----	----	0	0	----
Sioux City	----	1	----	----	----	----	----	----
Waterloo	3	0	0	----	----	0	0	----
Missouri:								
Kansas City	20	3	4	----	0	172	0	19
St. Joseph	3	1	1	----	0	10	1	13
St. Louis	28	36	17	5	1	45	13	13
North Dakota:								
Fargo	2	0	0	----	1	1	4	1
Grand Forks	0	0	0	----	----	0	0	----
South Dakota:								
Aberdeen	6	0	0	----	----	6	1	----
Nebraska:								
Omaha	19	2	5	----	0	1	32	8
Kansas:								
Topeka	12	1	2	1	0	0	50	0
Wichita	20	2	0	----	0	1	3	9
SOUTH ATLANTIC								
Delaware:								
Wilmington	3	2	1	----	0	127	3	10
Maryland:								
Baltimore	86	23	9	6	2	1,086	31	41
Cumberland	0	0	0	----	0	1	0	0
Frederick	0	0	0	----	0	9	0	0
District of Columbia:								
Washington	14	11	5	3	2	373	0	18
Virginia:								
Lynchburg	18	1	0	----	0	14	0	2
Norfolk	14	0	2	----	0	253	3	8
Richmond	1	2	0	----	0	293	0	3
Roanoke	5	0	2	----	1	13	0	0

City reports for week ended April 11, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
West Virginia:								
Charleston	0	0	1		0	0	0	2
Wheeling	31	0	0		1	1	0	1
North Carolina:								
Raleigh	10	1	2		0	89	0	1
Wilmington	0	0	0		1	0	0	2
Winston-Salem	14	0	2		0	35	28	2
South Carolina:								
Charleston	0	0	0	36	0	10	0	2
Columbia	2	0	0		0	0	4	3
Greenville	1	0	0		0	0	0	0
Georgia:								
Atlanta	13	2	2	51	6	50	0	12
Brunswick	0	0	0		0	0	16	1
Savannah	3	1	0	7	0	4	4	1
Florida:								
Miami	7	3	2	2	0	12	0	2
St. Petersburg		0			0			0
Tampa	9	1	1	2	2	197	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	66	0	3
Tennessee:								
Memphis	48	3	1		3	90	5	9
Nashville	0	1	1		1	73	0	2
Alabama:								
Birmingham	1	1	1	12	6	72	1	9
Mobile	0	0	0		1	0	0	5
Montgomery	2	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	5	0	0			2	0	
Little Rock	7	0	0		0	2	5	8
Louisiana:								
New Orleans	10	11	12	8	6	0	0	8
Shreveport	8	0	0		0	3	4	6
Oklahoma:								
Muskogee	11	1	0	8		0	3	
Tulsa	5	1	0			7	0	
Texas:								
Dallas	40	5	2	7	3	3	41	9
Fort Worth	8	2	2		4	0	0	7
Galveston	0	14	0		0	3	0	3
Houston	1	4	1		0	3	0	5
San Antonio	3	3	1		4	4	0	10
MOUNTAIN								
Montana:								
Billings	5	1	0		0	0	0	1
Great Falls	30	0	0		0	0	0	2
Helena	0	0	0	3	0	0	0	0
Missoula	1	0	0	5	0	1	0	0
Idaho:								
Boise	3	0	1		0	0	0	0
Colorado:								
Denver	86	8	3		1	17	29	12
Pueblo	0	0	0		0	78	2	3
New Mexico:								
Albuquerque	10	0	1	1	1	2	0	0
Arizona:								
Phoenix	0	1	1		0	0	0	4
Utah:								
Salt Lake City	8	2	0		1	1	14	2
Nevada:								
Reno	0	0	0		0	0	0	2
PACIFIC								
Washington:								
Seattle	43	2	2			4	35	
Spokane	8	2	0			9	0	
Tacoma	11	1	3		1	0	0	1
Oregon:								
Portland	19	7	2	3	0	33	15	9
Salem	1	0	1			7	11	
California:								
Los Angeles	95	35	20	44	4	212	21	14
Sacramento	16	1	3	3	1	1	7	5
San Francisco	80	15	1	20	2	29	10	5

City reports for week ended April 11, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	3	10	0	0	0	2	0	1	0	18	20
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	17
Vermont:											
Barre	0	0	0	0	0	2	0	0	0	1	7
Burlington	0	0	0	0	0	0	0	0	0	7	8
Massachusetts:											
Boston	85	89	0	0	0	5	1	0	0	24	223
Fall River	4		0				0				
Springfield	10	17	0	0	0	2	0	0	0	2	32
Worcester	9	22	0	0	0	0	0	0	0	14	60
Rhode Island:											
Patucket	3	15	0	0	0	0	0	0	0	2	16
Providence	13	24	0	0	0	1	0	0	0	3	67
Connecticut:											
Bridgeport	10	6	0	0	0	0	0	0	0	1	35
Hartford	5	2	0	0	0	3	0	0	0	1	48
New Haven	9	0	0	0	0	2	0	0	0	6	52
MIDDLE ATLANTIC											
New York:											
Buffalo	29	18	0	3	0	8	0	0	0	23	160
New York	347	525	0	0	0	128	9	6	0	170	1,616
Rochester	11	85	0	0	0	1	0	3	0	8	84
Syracuse	12	22	0	0	0	1	0	0	0	13	48
New Jersey:											
Camden	6	4	0	0	0	0	0	0	0	0	38
Newark	35	51	0	0	0	12	0	1	0	27	126
Trenton	4	11	0	0	0	0	0	1	0	1	44
Pennsylvania:											
Philadelphia	105	152	0	0	0	40	1	1	0	43	613
Pittsburgh	30	55	0	0	0	6	0	0	0	35	225
Reading	5	1	0	0	0	0	0	0	0	0	13
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	21	31	1	1	0	13	0	0	0	1	169
Cleveland	37	60	0	0	0	19	0	0	0	28	223
Columbus	11	15	1	0	0	7	0	1	0	1	89
Toledo	15	9	1	0	0	7	0	0	0	8	72
Indiana:											
Fort Wayne	5	1	1	0	0	3	0	1	0	0	35
Indianapolis	9	49	8	8	0	9	0	0	1	57	
South Bend	4	1	1	0	0	2	0	0	0	15	17
Terre Haute	2	1	0	0	0	0	0	0	0	0	15
Illinois:											
Chicago	128	232	2	1	0	38	1	2	0	49	763
Springfield	2	6	0	0	0	0	0	0	0	0	18
Michigan:											
Detroit	113	106	1	0	0	26	1	1	0	78	296
Flint	13	18	1	0	0	1	0	0	0	12	20
Grand Rapids	10	12	1	0	0	0	1	0	0	8	31
Wisconsin:											
Kenosha	2	1	0	0	0	0	0	0	0	0	6
Madison	2	0	1				0	0		1	
Milwaukee	28	16	0	0	0	6	1	0	0	11	109
Racine	4	7	0	0	0	0	0	0	0	12	13
Superior	4	0	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	8	0	0	0	0	1	0	0	0	6	33
Minneapolis	40	17	0	6	0	3	0	0	0	29	106
St. Paul	32	11	0	0	0	1	0	0	0	16	57
Iowa:											
Davenport	2	1	1	10			0	0		0	
Des Moines	10	7	2	17			0	0		0	26
Sioux City	2	0	1				1				
Waterloo	2	1	1	0			0	0		8	

City reports for week ended April 11, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	25	8	2	0	0	6	0	0	0	12	108
St. Joseph	3	10	0	0	0	0	0	0	0	1	34
St. Louis	34	200	2	3	0	14	1	0	0	17	261
North Dakota:											
Fargo	1	4	0	0	0	0	0	0	0	3	8
Grand Forks	1	0	0	0	----	----	0	0	----	0	----
South Dakota:											
Aberdeen	0	0	1	0	----	----	0	0	----	0	----
Nebraska:											
Omaha	3	7	3	14	0	2	0	0	0	8	51
Kansas:											
Topeka	4	1	0	0	0	0	0	0	0	1	5
Wichita	5	2	2	27	0	1	0	0	0	3	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	19	0	0	0	1	0	0	0	2	46
Maryland:											
Baltimore	36	38	0	0	0	14	2	4	1	11	249
Cumberland	0	0	0	0	0	0	0	0	0	0	14
Frederick	0	1	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	24	20	0	0	0	12	0	1	1	6	177
Virginia:											
Lynchburg	0	0	0	0	0	2	0	1	0	2	11
Norfolk	1	2	0	0	0	2	0	0	0	5	----
Richmond	3	4	0	0	0	3	0	0	0	0	59
Roanoke	1	4	1	0	0	0	0	0	0	0	18
West Virginia:											
Charleston	1	2	0	0	0	1	1	0	0	0	14
Wheeling	2	0	0	0	0	2	0	0	0	0	18
North Carolina:											
Raleigh	0	2	0	0	0	0	0	0	0	13	13
Wilmington	0	0	0	0	0	0	0	1	0	8	13
Winston-Salem	1	0	1	0	0	1	0	0	0	3	14
South Carolina:											
Charleston	0	1	0	0	0	1	0	0	0	0	32
Columbia	0	0	0	0	0	1	0	0	0	0	19
Greenville	0	0	0	0	0	0	0	0	0	3	----
Georgia:											
Atlanta	5	89	2	9	0	4	1	0	1	6	83
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	0	0	0	0	0	0	0	0	0	0	20
Florida:											
Miami	0	0	0	0	0	4	0	1	0	0	35
St. Petersburg	0	----	0	----	0	0	0	----	0	----	5
Tampa	0	0	0	0	0	1	1	1	1	0	27
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	6	0	0	0	2	0	0	0	0	22
Tennessee:											
Memphis	9	64	2	0	0	7	0	0	0	0	79
Nashville	2	2	1	0	0	1	0	1	0	2	55
Alabama:											
Birmingham	2	7	0	0	0	9	0	0	0	3	82
Mobile	1	0	0	0	0	2	1	0	0	0	22
Montgomery	0	1	0	0	----	----	0	0	----	0	----
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	----	----	0	0	----	2	----
Little Rock	1	9	0	0	0	0	0	0	0	0	----
Louisiana:											
New Orleans	8	13	0	20	1	13	2	1	0	2	160
Shreveport	0	0	0	0	0	1	0	0	0	0	40

City reports for week ended April 11, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL—contd.											
Oklahoma:											
Muskogee	0	0	2	0	----	----	0	0	----	0	----
Tulsa	3	0	0	5	----	----	0	0	----	1	----
Texas:											
Dallas	5	2	2	1	0	3	0	0	0	22	66
Fort Worth	2	1	4	5	0	3	0	0	0	0	46
Galveston	0	0	0	0	0	0	0	0	0	0	14
Houston	2	5	1	3	0	2	1	0	1	0	61
San Antonio	1	2	0	0	0	3	1	0	0	0	60
MOUNTAIN											
Montana:											
Billings	0	1	0	1	0	0	0	0	0	4	6
Great Falls	1	0	0	0	0	----	0	0	0	11	10
Helena	0	1	0	0	0	0	0	0	0	0	6
Missoula	1	0	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	0	1	0	0	0	0	0	0	0	7
Colorado:											
Denver	12	13	0	1	0	3	0	0	0	29	85
Pueblo	0	1	0	0	0	0	0	0	0	21	13
New Mexico:											
Albuquerque	1	0	0	0	0	5	0	0	0	0	12
Arizona:											
Phoenix	1	0	0	1	0	3	0	0	0	1	----
Utah:											
Salt Lake City	2	4	1	0	0	4	0	0	0	41	46
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	9	6	2	1	----	----	0	0	----	72	----
Spokane	6	3	8	17	----	----	0	0	----	9	----
Tacoma	3	1	4	2	0	0	0	0	0	0	26
Oregon:											
Portland	5	0	10	6	0	1	0	0	0	0	60
Salem	0	1	1	0	----	----	0	0	----	0	----
California:											
Los Angeles	37	34	4	3	0	23	1	1	0	34	288
Sacramento	3	2	0	0	0	4	0	2	1	0	35
San Francisco	23	7	1	4	0	6	1	1	0	40	146

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	1	0	1	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	0	0
New York	8	5	4	2	0	0	1	3	0
New Jersey:									
Newark	1	1	0	0	0	0	0	0	0
Trenton	0	0	1	1	0	0	0	0	0
Pennsylvania:									
Philadelphia [1]	3	1	1	0	0	0	0	2	1
Pittsburgh	6	1	0	0	0	0	0	0	1

[1] Rabies (in man); 1 death at Philadelphia, Pa.

City reports for week ended April 11, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	2	0	0	0	0	0	0	0
Cleveland	0	0	0	1	0	0	0	0	0
Toledo	0	0	0	0	0	0	0	1	0
Indiana:									
Fort Wayne	1	1	0	0	0	0	0	0	0
Indianapolis	7	3	0	0	0	0	0	0	0
Illinois:									
Chicago	21	12	0	0	0	0	0	1	1
Michigan:									
Detroit	7	0	0	0	0	0	0	1	0
Wisconsin:									
Madison	1	0	0	0	0	0	0	0	0
Milwaukee	3	2	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	1	0	0	0	0	0	0	0
St. Paul	1	1	0	0	0	0	0	0	0
Missouri:									
St. Louis	11	5	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	1	0	1	0	0	0	0	0
District of Columbia:									
Washington	0	0	1	1	0	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	1	0	0	0
Columbia	1	1	0	0	0	0	0	0	0
Georgia:									
Atlanta	0	1	0	0	0	0	0	0	0
Savannah [1]	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	3	0	0	0	3	0	0	0
Nashville	2	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	3	2	0	0	0	2	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	2	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	0	2	0	0	0
Galveston	0	0	0	0	0	2	0	0	0
MOUNTAIN									
Colorado:									
Pueblo	2	0	0	0	0	0	0	0	0
Arizona:									
Phoenix	2	1	0	0	0	0	0	0	0
Utah:									
Salt Lake	0	1	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	0	4	0	0	0	0	0	0	0

[1] Typhus fever; 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended April 11, 1931, compared with those for a like period ended April 12, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities March 8 to April 11, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930
98 cities	65	101	65	97	78	82	[2] 53	79	[3] 65	93
New England	79	92	67	65	70	56	46	68	[4] 84	82
Middle Atlantic	67	94	64	97	63	80	48	74	59	92
East North Central	72	134	72	132	82	114	[5] 65	107	86	115
West North Central	63	110	73	74	163	64	42	52	[6] 65	89
South Atlantic	53	104	73	90	61	70	47	64	49	80
East South Central	35	24	23	36	76	48	29	30	17	6
West South Central	68	111	71	136	64	125	85	139	54	153
Mountain	26	23	17	88	87	44	[7] 46	23	35	79
Pacific	55	63	51	45	69	34	53	51	57	51

MEASLES CASE RATES

98 cities	946	646	1,040	776	1,208	879	[2] 1,123	1,004	[3] 1,332	1,195
New England	1,346	743	1,527	1,030	1,479	1,117	1,106	1,449	[4] 1,582	1,562
Middle Atlantic	1,026	396	1,158	539	1,321	611	1,250	789	1,422	966
East North Central	583	471	559	538	723	654	[5] 736	799	831	904
West North Central	595	781	492	994	650	908	532	860	[6] 700	1,199
South Atlantic	2,753	481	3,442	617	3,879	697	3,808	867	4,546	1,067
East South Central	1,146	634	995	1,291	1,635	968	1,501	526	1,751	329
West South Central	37	617	51	547	47	784	88	731	68	721
Mountain	1,462	2,449	1,238	2,890	1,140	2,987	[7] 696	4,731	844	7,674
Pacific	356	1,881	394	1,800	519	2,184	358	2,008	499	2,059

SCARLET FEVER CASE RATES

98 cities	375	337	388	316	402	308	[2] 371	301	[3] 359	320
New England	589	426	676	372	697	363	577	462	[4] 470	351
Middle Atlantic	389	327	392	294	454	299	404	233	413	281
East North Central	399	461	395	418	378	383	[5] 380	377	338	430
West North Central	518	308	589	335	580	306	585	271	[6] 514	399
South Atlantic	310	210	342	286	310	272	290	276	355	308
East South Central	477	96	483	179	559	233	396	143	465	132
West South Central	95	167	101	108	78	111	95	157	105	108
Mountain	400	379	305	352	209	458	[7] 137	238	174	335
Pacific	96	229	110	202	104	204	92	168	104	217

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] South Bend, Ind., and Great Falls, Mont., not included.
[3] Fall River, Mass., and Sioux City, Iowa, not included.
[4] Fall River, Mass., not included.
[5] South Bend, Ind., not included.
[6] Sioux City, Iowa., not included.
[7] Great Falls, Mont., not included.

Summary of weekly reports from cities March 8 to April 11, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930
98 cities	19	25	21	24	17	22	[2] 13	23	[2] 20	29
New England	0	0	0	0	0	2	0	0	[4] 0	2
Middle Atlantic	0	0	0	0	0	0	0	0	1	0
East North Central	9	30	8	20	7	17	[5] 8	30	6	23
West North Central	132	70	130	97	99	99	78	87	[6] 99	149
South Atlantic	0	4	0	2	4	8	2	2	18	10
East South Central	0	24	12	6	12	18	12	0	0	12
West South Central	61	24	95	49	78	45	71	17	81	28
Mountain	17	9	9	35	44	26	[7] 0	106	17	62
Pacific	41	115	43	103	22	71	16	71	53	89

TYPHOID FEVER CASE RATES

98 cities	3	6	4	8	4	8	[2] 4	4	[2] 5	5
New England	0	5	2	0	2	2	2	5	[4] 3	0
Middle Atlantic	2	5	2	6	2	15	3	3	5	1
East North Central	2	1	2	1	2	3	[5] 1	2	3	1
West North Central	0	4	8	10	2	4	4	2	[6] 0	4
South Atlantic	6	12	16	14	12	6	14	4	16	22
East South Central	17	24	0	84	0	30	0	30	6	18
West South Central	14	7	10	10	7	7	10	10	3	7
Mountain	0	53	0	18	0	0	[7] 9	18	0	44
Pacific	4	10	8	10	10	2	2	6	8	4

INFLUENZA DEATH RATES

91 cities	34	13	32	15	29	14	[3] 23	13	[4] 18	16
New England	36	2	19	2	14	10	2	7	[4] 20	7
Middle Atlantic	23	11	23	14	20	10	17	14	12	20
East North Central	28	9	28	9	25	11	[5] 18	10	14	8
West North Central	50	6	47	12	35	6	12	9	15	9
South Atlantic	57	18	49	28	32	16	39	8	30	26
East South Central	101	84	113	78	126	97	126	39	69	45
West South Central	55	43	35	25	55	32	69	36	45	25
Mountain	35	18	35	62	61	53	[7] 27	26	17	26
Pacific	36	2	34	7	41	2	14	0	19	12

PNEUMONIA DEATH RATES

91 cities	191	155	184	161	180	163	[3] 172	161	[4] 156	164
New England	147	169	183	218	156	220	127	181	[4] 175	186
Middle Atlantic	214	178	216	159	220	187	223	184	168	185
East North Central	139	127	132	148	125	117	[5] 121	146	118	127
West North Central	159	144	215	123	171	135	150	117	253	150
South Atlantic	332	196	269	222	263	212	221	196	199	230
East South Central	240	233	208	188	189	227	170	155	176	201
West South Central	206	142	180	199	211	164	238	164	169	181
Mountain	235	123	122	194	131	176	[7] 165	185	191	185
Pacific	125	65	101	77	98	92	53	62	60	72

[2] South Bend, Ind., and Great Falls, Mont., not included.
[3] Fall River, Mass., and Sioux City, Iowa, not included.
[4] Fall River, Mass., not included.
[5] South Bend, Ind., not included.
[6] Sioux City, Iowa, not included.
[7] Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended April 4, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended April 4, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		6			
New Brunswick					2
Quebec	1				15
Ontario		11		1	5
Manitoba			1		2
Alberta [1]					
British Columbia					2
Total	1	17	1	1	26

[1] No case of any disease included in the table was reported during the week.

Ontario—Communicable diseases—Four weeks ended March 28, 1931.—During the four weeks ended March 28, 1931, and the corresponding period of 1930, certain communicable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	4 weeks, 1931		4 weeks, 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	5		10	4
Chancroid	1		7	1
Chicken pox	972		1,189	
Diphtheria	130	5	246	6
Dysentery			1	1
Erysipelas				
German measles	67		621	
Goiter			1	1
Gonorrhea	145		203	
Influenza	105	35	74	7
Lethargic encephalitis		2	5	4
Measles	258		4,412	1
Mumps	721		230	
Paratyphoid fever	11			
Pneumonia		275		230
Poliomyelitis	1			
Puerperal septicemia		1	3	3
Scarlet fever	766	2	1,432	5
Septic sore throat	11		23	
Smallpox	16		149	
Syphilis	153	1	184	
Tuberculosis	135	72	133	84
Typhoid fever	21	3	55	2
Undulant fever	10		7	
Whooping cough	316	5	309	1

The cases of smallpox were distributed as follows: Toronto, 5; Thurlow, 2; and 1 case each in Chelmsford, Tyendaga, Ramsey Township, Burwash, Kingston, Kin, Cobden, Ottawa, and Hamilton.

Quebec Province—Communicable diseases—Week ended April 11, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended April 11, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Measles	463
Chicken pox	105	Mumps	14
Diphtheria	43	Scarlet fever	53
Erysipelas	5	Tuberculosis	26
German measles	4	Typhoid fever	13
Influenza	2	Whooping cough	21

CZECHOSLOVAKIA

Communicable diseases—February, 1931.—During the month of February, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	2		Puerperal fever	45	18
Cerebrospinal meningitis	20	10	Scarlet fever	937	39
Diphtheria	1,441	122	Trachoma	146	
Dysentery	1		Typhoid fever	280	27
Paratyphoid fever	6		Typhus fever	26	3

MEXICO

Tampico—Communicable diseases—March, 1931.—During the month of March, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	1		Measles	1	
Diphtheria	2	1	Tuberculosis		33
Enteritis (various)		20	Typhoid fever	2	3
Influenza	71	6	Whooping cough	7	2
Malaria	146	8			

VIRGIN ISLANDS

Communicable diseases—March, 1931.—During the month of March, 1931, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases
Chicken pox	2
Gonorrhea	2
Syphilis	3
Tuberculosis	3

St. Croix:	Cases
Chicken pox	2
Gonorrhea	1
Tuberculosis	3

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931		
					17	24	31	7	14	21	28	7	14	21	28	4	11	18
Ceylon: Colombo	C												1					
China:																		
Canton	C	1															1	
Shanghai	C	2																
India	C	18,944	11,112	10,687	3,504	4,022	4,275	3,533	3,529	2,549								
	D	9,782	5,933	5,689	1,770	2,165	2,231	1,957	1,846	1,325								
Bombay	C	19	13		20	1										1		
	D	17	7		6	3												
Calcutta	C	33	22	28	36	29	24	32	27	33	45	65	80	102	129	125		
	D	16	16	20	25	19	19	23	22	25	26	39	49	68	69	70		
Karikal	C			1					4		1	4	2	1		2		
	D								4			4	2	1		2		
Madras	C	1		201	47	36	16		18	20	19	15	4		7	4		
	D			67	21	11	7	8	5	4	14	6	5		2			
Negapatam	D						1	2	1		2							
Rangoon	C			1														
	D			1	1													
Tuticorin	C	1	5	1	1					1								
	D	1																
India (French):																		
Chandernagor	C	1	1	2			1			1	2	2	2	2	2			
	D			3			1			1	3	1	2	3	1			
Pondicherry	C	1	4	31	9	4	3	3	10	20	31	39	29	25	26	20	5	
	D		4	21	3	3	3	2	10	9	6	9	6	5	4	3	1	
India (Portuguese)	C	14		1														
	D	9																
Indo-China (see also table below):																		
Pnompenh	C	1	2			1	2	1		3	3	3					1	
	D		2				2			1	2	2		1				
Saigon and Cholon	C	1	3	9	4	1		1			3	1	1		1	3	2	
	D		1	4	2	1					3	1	2	1	1	1		
Philippine Islands: [1]																		
Ports—Iloilo	C		1	1			2											
	D		3	1			2											

[1] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931			March, 1931					April, 1931		
					17	24	31	7	14	21	28	7	14	21	28	4	11	18
Philippine Islands—Continued.																		
Provinces—																		
Capis	C						3	56	69	54	28	35	29	11	4	4		3
	D						2	45	55	39	23	29	24	10	4	3		3
Iloilo	C	30	45	28	11	41	36	57	27	42	10	16	2	5				
	D	23	27	22	9	27	25	49	21	22	11	11	2	2				
Masbate	C												21					
	D												9					
Negros, Occidental	C	56	163	120	19	32	33	6	1	1	2							
	D	41	123	97	15	17	19	5	1	1	2							
Negros, Oriental	C							1										
	D							1										
Samar	C	16	8	17														
	D	12	8	9														
Sorsogon	C	5																
	D	4																
Siam	C	4	6	2	2		1			1				4	4	2		
	D	4	6	2	1									1	1			
Ayudhaya District	C															1		
Bangkok	C	3	4	2	2		1		1			1		1	1		1	
	D	2	4	2	1							1		1	1			
Bismulok Province	C													4	4			
	D													1	1			

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20
Indo-China (French) (see also table above):															
Annam [1]	C	3													
Cambodia [1]	C	59	38	22	8	1	17	28			7	19	36		35
Cochin-China [1]	C	27	33	28	5	5	3	8			7	4	13		5

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended—											
						January, 1931			February, 1931				March, 1931				April, 1931
						17	24	31	7	14	21	28	7	14	21	28	4	11
Algeria:																		
Algiers	C	6	11	2	1	1		1		1							1	
	D		3														1	
Bone	C							1										
Constantine, vicinity of	C		1		50			1		1								
	D							1										
Oran	C	10	2															
	D	3	1															
Plague-infected rats		6	1															
Philippeville	C	3	2		1													
	D	1			1													
Argentina:																		
Cordoba Province	C						1				2							
Entre Rios Province—Diamante	C											2						
Jujuy Province—Palpala	C							1			1							
Santa Fe	C										2							
Belgian Congo	C		1	1											2			
	D		1	1											2			
British East Africa (see also table below):																		
Tanganyika	C			3	2							15	7					
	D			3	2							4						
Uganda	C	165	171	111	67	7	8	2	8	6	4							
	D	164	168	112	67	6	8	2	8	6	4							
Ceylon: Colombo	C	3	1	9	9	1	1	1	5	6	2	1	2	1	3	3		1
	D	3	1	8	9		1	1	4	7	2	1	3	1	3	2		1
Plague-infected rats			1	2				1	1	1	1	1			8	1		
China:																		
Manchuria—Tungliau and Nungan	C	1																
Shensi	C		1															
Dutch East Indies:																		
Batavia and West Java	C	107	143	208	239	56	57	37	30	29	36	46	30					
	D	103	146	206	238	54	53	37	24	29	35	46	28					
East Java and Madura	C								4									
	D								4									
Java and Madura	D	335	501	557	615	142	102	98	85	89	100	99	80	65	81			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended—											
						January, 1931			February, 1931				March, 1931				April, 1931
						17	24	31	7	14	21	28	7	14	21	28	4	11
Egypt:																		
Alexandria	C	9	7	4	3				1	1			1	1				
	D	6	7	1														
Plague-infected rats				3	1		1				1							
Assiout	C		3	9	7	2	19	2	3	9		17	15	6	10	1	1	5
	D		1	1	1	2	2	2		4		3	4		4	1	1	
Aswan	C			3														
Beni-Suef	C					1												
	D					1												
Cairo	C																1	
Deirout	C						19	2		6	10							
	D						2	2			4							
Gharbieh	C							1										
	D							1										
Girga	C				7				1						14	37	35	31
	D				2				1						2	5	17	13
Kena	C															5		
	D															2		
Manfalut	C				23	5	21	4		11		2	2	3	5	9		
	D				5	2	3	1		4		1			2	1		
Minieh	C			1			1	1							2	1		
	D							1							1	1		
Port Said	C		2															
France: Marseille	C	4	4															
Greece (see also table below): Pyrgos	C	2																
India	C	2,371	2,721	3,259	3,740	1,169	1,279	1,438	1,449	1,270	1,095							
	D	1,068	1,497	1,856	2,226	837	737	957	891	862	774							
Bassein	C		1		2	1		1	2				1					
	D				1	1			2	1								
Bombay	C	2	1				1			1				1	1	1	1	
	D	2	1				1			1					2	1		
Plague-infected rats		64	30	32	38	10	6	9	9	14		8	10	17	14	21	18	

Madras Presidency	C	196	185	148	220	73	99	75	65	30	19	13						
	D	110	124	78	154	47	53	39	43	17	18	7						
Rangoon	C	2	2		2		2									1		
	D	2	1		1		1									1		
Plague-infected rats		1	1	4	2	2	1	1			8							1
India (Portuguese)	C		3															
	D		3															
Indo-China (see also table below):																		
Pnompenh	C	2		6	1	1	3	2	1				1					
	D	3	1	6	1	1	3	2	1		1	2	1	2	1	1		
Saigon and Cholon	C	1																
Iraq: Baghdad	C	1	P	4			2	3				1	2	1	3	3	1	
	D	1		2			2	2					2		3	1	1	
Madagascar (see also table below): Tamatave	C	1	5	4	2		5	4										
	D	1	3	3														
Morocco	C		5		19	13												
	D				8	4												
Nigeria: Lagos	C	5	38	9	5				1									
	D	5	5	9	5				1									
Plague-infected rats		11	13	5	5													
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	1	6						4	5	9	3	1	2	2			
	D		5						2	4	6	4		1	1			
Bangkok	C		1	1	3		4	4		1	2	3		29				
	D		1	1	3		4	3	1		1	4		6				
Nagara Rajsima	C	1	1	11	17	3	2	1	3	7						1		
	D	1	1	9	10	2	3	1	4	6								
Syria: Beirut	C		6		1				1		1							
Tripolitania	C		1	13		2	2	1	3		1			1				
	D			1		2			1									
Tunisia: Tunis	C		1	P	13	1					9	2	3		5			
	D										7							
Union of Socialist Soviet Republics:																		
Gouranduz	D							28										
Transcaucasia—Karabakh	C						6											
Union of South Africa:																		
Cape Province	C		1	P														
Orange Free State	C				2				P	P	1	P						
	D				2						1							
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C				1													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
British East Africa (see also table above):							
Kenya	C	87	53	58	62	50	69
Greece (see also table above)	C	-------	-------	2	-------	-------	-------
Indo-China (see also table above)	C	2	5	2	5	1	-------
Madagascar (see also table above):							
Ambositra Province	C	-------	-------	4	44	95	100
	D	-------	-------	4	44	87	96
Antisirabe Province	C	11	21	3	18	27	66
	D	11	21	3	18	26	57
Miarinarivo Province	C	2	7	18	12	18	28
	D	2	7	18	12	18	26
Moramanga Province	C	27	18	20	19	13	7
	D	27	17	20	19	11	5
Tananarive Province	C	39	79	125	170	178	92
	D	38	79	116	164	172	89
Peru	C	21	10	42	34	8	-------
	D	8	2	20	14	-------	-------
Senegal:							
Baol [1]	C	79	48	53	-------	-------	-------
	D	20	23	35	4	-------	-------
Dakar [1]	C	108	3	-------	-------	-------	-------
	D	90	8	-------	-------	-------	-------
Louga [1]	C	75	61	37	10	-------	-------
	D	33	30	25	3	-------	-------
Thies [1]	C	34	12	24	27	2	-------
	D	20	4	15	23	1	-------
Tivaouane [1]	C	110	20	53	31	2	-------
	D	54	14	31	25	1	-------

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
Algeria:																		
Algiers	C				1			1	1		1					2		
Bone	C																	
Constantine	C		1												1			
Oran	C			3														
Arabia: Aden	C								1	1								
Belgian Congo	C				79	27	23											
Belgium	C									1								
Brazil:																		
Porto Alegre (alastrim)	C	26	28	36			3			1	1	2	3					
Rio de Janeiro	C		2															
British East Africa (see also table below): Tanganyika	C	95	17	385	84	21	25	18	6	35	42	13	1					
	D	6	1	36	4	1	1	2	1		12	1						
British South Africa: Southern Rhodesia	C	153	95	18	18	2	1											
	D			3														
Canada:																		
Alberta	C	22		1	19		7			1								
British Columbia—Vancouver	C	2	3	1	3				2	1	2	5						
Manitoba	C							1				1						
Winnipeg	C				1							1						
Nova Scotia	C							1								1		
Ontario	C	19	59	23	17	10	3	32	4	10	4	7	8	2	3	3	1	
Kingston	C				6	1					1							
North Bay	C				2					1								
Ottawa	C		37	12	2	1	1	1			1							
Sault Ste. Marie	C				1	11	8	5	6			2						
Toronto	C			4										1		1		3
Quebec	C			2			2											
Saskatchewan	C	3	2	18		7	6	5	20	17	18	18	10	40	10	8		
Regina	C										1					2		
Canary Islands: Las Palmas	C															1		
China:																		
Canton	C									2			1	1	2	2	2	
Chungking	C	P	P	P	2													
Foochow	C	P	P	P	P		P		P		P		P					
Hong Kong	C				1		1			2	5		2			1	1	
	D									1	1	1				2		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
China—Continued.																		
Manchuria—																		
Harbin	C		1					1				1						
Kwantung—Dairen	C			4	1											2		
	D			1														
Nanking	C	P	P	P	P	P		P	P	P	P	P	P					
Shanghai—																		
Foreigners only	C	1	2	8	14	1	1	6	4	4	7	2	3	3	1	1	1	
Including natives	D		1	4	11	2	4	4	3	5	2	4	3	5	2	2	1	
Swatow	D	4	3	3	5	1	1	3	2		3	3	7	3	6	9		
Tientsin	C	1	1	2		1												
Chosen (see table below).																		
Colombia: Cali	D	2		1														
Dutch East Indies:																		
Java—Batavia and West Java	C	14	26	6	4		28		1					1				
	D	4	4	2	2		1		1	1								
Sanggi Islands	C		29															
	D		3															
France (see table below).																		
Great Britain:																		
England and Wales	C	325	372	508	665	187	272	286	213	221	50	247	227	171	219	226		
Bradford	C	1	1	1	1		1		3		1				1			
Cardiff	C	1																
Leeds	C	1	2		2												1	
London	C	29	172	184	161	45	47	33	24	23	16	23	36	26	54	32		
London and Great Towns	C	52	296	433	560	154	198	194	147	150	186	189	158	117	154	166		
	D		1	1							1							
Sheffield	C						1	1	1		16	6	10	2	1	6		
Stoke-on-Trent	C		1				1						1					
Greece (see table below).																		
Honduras:																		
Amapala	C												1					
Ocotopeque and Gracias districts	C												P					
Puerto Castilla	C				4	7	1		3	3								
Tela	C																	1

India	C	2,322	2,412	3,627	5,623	2,068	2,396	2,477	2,682	2,996	2,766							
	D	572	606	874	1,381	497	486	523	739	665	620							
Bombay	C	1		1	2	2	2	2	1		1	3	2	4	1	4	1	
	D			1	2			1			1	1	1		1	2	1	
Calcutta	C	12	9	18	59	28	28	40	47	35	51	83	82	53	69	75	86	
	D	11	7	11	40	16	22	29	33	26	41	66	55	36	54	50	63	
Cochin	C	12	25	22	15	5	6	8	10	19		16	24	15	17	14		
	D	1	3	4	1					1		1	1					
Karachi	C			3				2	1			4			3			
	D			1				1	1							2		
Madras	C	19	9	20	4	4	7	3	2	4	1	3	1	6	3	9	4	
	D	8	2	3							1				2	1		
Moulmein	C						2											
Negapatam	C	14	9	6														
Rangoon	C	2	1	1						2		1	1	1	1	1		
	D		1											1				
Tuticorin	C	1																
Vizagapatam	C	1							1			8		1		1		
	D											2				1		
India (French):																		
Chandernagor	C	3	3		5	3	2	1	3	2		6	6	3	3	6		
	D	1	1		3	1						1						
Karikal	C	1			3	1	2		2	2		16	1			1		
	D	1			2		2		2	2		16						
Pondicherry Province	C	38	11	19	34	16	8	13	8	1	1	10	7	7		4		3
	D	36	11	17	32	16	8	13	8	1	1	10	7	7		4		3
India (Portuguese)	C				4	1	4			2	3	6	3					
	D									2		1						
Indo-China (see also table below):																		
Pnompenh	C	2		1	2				1					1				
	D			1					1									
Saigon and Cholon	C		2	2		3	1		2		2	2		1		1		1
	D		2	2		2			2			1		3	1	2	2	1
Iraq:																		
Baghdad	C	2										3	6					
Mosul Liwa	C	69	6	16	1		2		1		5							
	D	27		2							1							
Ivory Coast (see table below):																		
Japan:																		
Kobe	C											1	1					
Taiwan	C								1									
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	3	3	3			1									1		
Juarez	D	1	1															
Mexico City and surrounding territory	C	13	9	6	10					7	5		11	13	13			
	D	3	2	6	6				1	1	3	2	2	5	5			
Vera Cruz	C		1							1		1	1		1	1		
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C				2													
Nigeria: Lagos	C															2		
Panama Canal Zone	C							2										
Poland	C		8	3	25						1							
Portugal: Lisbon	C	16	20	37	72	27	31	15	30		12	19	9	16	15	17		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
Siam	C	1			1	1	1	1	1	1	1							
Somaliland, British: Boales	C	1	1	1														
	D	1			1													
Spain	C		51	67	68			10	8	10	4	10	46	45	15	21	22	
Straits Settlements	C	5	10	17	6	3	1	2	1			2				2	1	
	D	1	2	7	3			1				1				1		
Sudan (Anglo-Egyptian)	C	82	5	50	64	1	7		3	1	1	44	51	3	1	4		
	D	7	1	5	6		7					6	4		1	1		
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C	1																
Syria (see table below).																		
Tunisia: Tunis	C	2			17	6	1	1								4		
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P				P				P					
Orange Free State	C		2	P					P			P	P			P		
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Upper Volta	C			6	4						8	10				3		
	D				2											1		
On vessel:																		
S. S. Clan Mactoggart at Suez	C									2								
S. S. Muncaster Castle at Manila from Hong Kong	C				1													
S. S. Matheran at Suez from Calcutta	C						1											
S. S. Clan Buchanan at Suez	C											2						
S. S. Rotterdam at Naples from Venice	C															1		

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	93	192	258		86		38	9	14		48	46		46
Ivory Coast	C			4		2		9							
Sudan (French)	C	39	P	17				43		96					
	D	3		2				16		4					
Syria: Beirut	C	1										1			

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424		653	
Chosen	C	65	35	3	22		
	D	21	15	5	6		
France	C	1					
Greece	C	1	6				4
Mexico (see also table above)	D	659	718	822	893		1
Morocco	C	3	8	4	4	20	25
Turkey	C	51	21	19	74		
	D	13	4	2	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
					17	24	31	7	14	21	28	7	14	21	28	4	11
Algeria:																	
Algiers	C	1	2						1	1					3		
Constantine Department	C	1	2	6		6	6	19			4			1		2	
Oran	C		5			1	2					1					
Australia; western	C															1	
Bulgaria	C	3	11	3	9	2	1	1		2		3					
	D			1													
Chile: Valparaiso	D													1			
China:																	
Canton	C					2							1				
Manchuria—Harbin (see also table below)	C		1			3											
Shanghai	C					2											
Tientsin	C		1														
Chosen (see table below).																	
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C	2	2														
	D	2															
Beheira Province	C			1													
	D			1													
Cairo	C		1	1				1									
Port Said	C	2				1											
Eritrea: Asmara	C												1				
Great Britain: Scotland	C							1									
Glasgow	C						2										
	D						1										
Guatemala.[1]																	
Iraq: Baghdad	C								2	1	1	1	1				
	D								1								
Latvia (see table below).																	
Lithuania (see table below).																	

Mexico (see also table below):																	
Durango	D						1										
Mexico City, including municipalities in Federal District	C	11	14	12	13	12	6	8	13	13	9		46	66			
	D	4	7	10	8	9	9	8	4	7	5		20	13			
San Luis Potosi	D		2						2	2		1	1	1	2	1	1
Morocco	C	3	1	8		5	6	2	7	8	5	8	2	2	3		
	D					2				1							
Palestine	C	3	7	4	1	1			3				2	1	1		1
Paraguay: Asuncion	D					2	2										
Poland	C	37	42	63	19	21	16	50	49	41	43	56	62	58	85	82	
	D		7	3	2	1	4	1	3	3	4	9	4		7	4	
Portugal: Oporto	C	4	6			1											
Rumania	C	41	34	113	54	43	51	45	49	53	12	38					
	D	2	3	5	1	7	6	2	5	11	3	5					
Spain	C	4	1														
	D		1														
Tunisia:																	
Sbeitla, vicinity of	C															20	
	D															7	
Sfax	C														2		
Tunis	C		28			7	4	5			6	12	5	2	7		
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P	P	P	P						
Municipality of East London	C	1	1	3		1	1	1									
Natal	C	P		P	P	P	P	P	P	P							
Orange Free State	C	P		P	P	P	P	P	P		P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																	

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
China: Harbin (see also table above)	C	5	-------	3	-------	-------	-------
Chosen: Seoul	C	2	1	7	1	1	1
Czechoslovakia	C	1	-------	-------	16	16	60
Greece: Athens	C	6	4	4	4	10	10
Latvia	C	1	2	-------	-------	-------	-------
Lithuania	C	7	24	1	5	6	26
	D	1	2	-------	1	3	3
Mexico (see also table above)	D	26	47	47	-------	-------	-------
Turkey	C	11	-------	28	3	2	-------
Yugoslavia	C	2	-------	2	2	-------	20
	D	1	-------	1	-------	-------	2

YELLOW FEVER

	Cases	Deaths
Brazil:		
Bahia State—Mar. 14, 1931	1	-------
Ceara State—Mar. 14, 1931	2	-------
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	-------
Apr. 5–11, 1931	1	-------
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 21, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—Continued.		
Cambucy—		
Jan. 1–25, 1931	3	3
Feb. 1–7, 1931	1	1
Friburgo (imported), Jan. 25–30, 1931	1	-------
Padua—		
Jan. 18–24, 1931	1	1
Feb. 1–7, 1931	1	1
Gold Coast:		
July 10, 1930	1	-------
Albosso, Aug. 4, 1930	-------	1