The Basis of Communicable Disease Control

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Any public health measure we employ has a background of tradition and precedent. Some of these traditions have outlived their usefulness and have been abandoned; others have been modified to meet (or to resist) changing conditions and have become firmly embedded in our public health structure.

Let us review briefly the historical aspects of the reporting of communicable disease in this Nation in order to understand why and how we have built our present system.

An axiom that was established very early in our national history was: Before a community can do anything to prevent the spread of communicable disease, it must be aware of the existence of the disease.

The colony of Rhode Island recognized this principle as early as 1741, when it passed an act requiring tavern keepers to report contagious disease that occurred among their patrons. In 1743, this same colony instituted a law which formulated the present-day principles of communicable disease reporting. Diseases to be reported to the local authorities were smallpox, yellow fever, and cholera. Typhus was added later. The early reports were made to the mayor or town clerk. This general plan was adopted throughout the Colonies. When local boards of health were formed, beginning in 1792, the reports were made directly to the chairman of the board.

The first State law that relates to disease reporting that I have found is cited in "The History of Quarantine in Louisiana," by Joseph Jones (*1*). A Louisiana State law was passed in 1821 requiring all inn keepers, tavern keepers, and boardinghouse keepers to report the names of any sick persons in their establishments to the local board of health within 12 hours. This regulation applied to the period of May 1 to October 1. All physicians having a patient sick with yellow fever, or bilious malignant fever, or pestilential fever had to report this circumstance to the board of health in writing within 24 hours. The law applied to the period May 1 to November 1. The purpose of this law was, of course, to detect, as early as possible, the presence of yellow fever.

The principle established in those early days was that the diseases to be reported must be pestilential, that is to say, they must be epidemic, virulent, and contagious.

Throughout the nineteenth century, the major pestilential diseases were considered to be smallpox, cholera, and yellow fever. Only during the latter part of the century was the notification of the more common communicable diseases required. In 1901, only a half century ago, Chapin (*2*) made a nation-wide summary of laws relating to the reporting of communicable diseases. He states that all State and municipal notification laws mentioned smallpox, and most included cholera. Diphtheria, membranous croup, scarlet fever, and yellow fever were specifically recognized as reportable in 11 States

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only. Typhus fever was reportable in nine States; typhoid fever, in seven. This latter disease was reportable also in a few cities. Measles and whooping cough were reportable in only a very few cities and in no States. Tuberculosis was reportable in two States in 1901. Syphilis and other venereal diseases were not reported at all. Pneumonia was reportable only in Hartford, Conn.; malaria, in Oakland, Calif.; and hydrophobia, in Ohio only. Thus our present administrative procedures and complicated reporting systems have developed during this past 50 years.

Original Purpose of Required Reporting

The primary purpose was to determine, as early as possible, the presence in the community of "diseases dangerous to the public health." This was done in order to institute, as rapidly as possible, isolation procedures for the individual and quarantine of the family household, the infected arriving ship, or even the quarantine of a whole community.

As early as 1743, a Charleston regulation required reporting by the incoming ship's captain to the pilot of the port of any illness aboard. At first the infected vessels were quarantined in the roadstead until everyone died or recovered. A few years later, Charleston was the first American community to establish a pesthouse on land.

Quite logically, during most of the nineteenth century, no reporting was required of tuberculosis, pneumonia, infantile diarrhea, malaria, typhoid fever, nor any other of the common infections, since these were believed to be due to environmental factors such as poisoned air, decaying vegetables or animals, bad smells, or perhaps telluric influence. Thus, isolation and quarantine were thought to be of no value in checking these diseases. At this time, as we have noted, the only diseases to be reported were smallpox, yellow fever, and cholera. They were reported because they were epidemic, virulent, and obviously contagious diseases that were dangerous to the public health, and against which active protective measures might be taken.

This broad general urgency to check pestilence is still our primary motive in requiring the reporting of communicable disease.

New Concepts in Disease Reporting

As the science of epidemiology developed and more and more information was obtained about the general principles of the etiology and mode of spread of contagion, we began to desire more accurate and detailed epidemiological information concerning all communicable diseases. Thus, there grew up rapidly a long list of diseases which the health department insisted must be reported. Physicians resented this intrusion on their time, and objected strenuously to revealing personal (often confidential) matters relating to their private patients. This resentment has continued through the years, particularly when the physician could not see that anything would be gained—either of direct benefit to the community or to his patient—from these reports. It is common knowledge that many private patients insisted that their physicians should not report their diseases to the authorities. This was particularly true in the case of tuberculosis and venereal disease, as well as other conditions that bore a social stigma.

Thus, although the States and local health departments built up elaborate plans for the reporting of an all-inclusive list of communicable diseases, only a relatively few of these diseases have ever been reported adequately (by "adequately" I mean 90-percent completeness). There is now good reason to believe that the disinclination of physicians to report certain communicable diseases will increase rather than decrease. They see no particular need for reporting gonorrhea at the present time, since the patient will be cured before the report reaches the office of the health department. Why report lobar pneumonia, queries the physician, when the health department has no measures of prevention, no specific diagnostic tests are required, and therapy is so effective?

It is clear that the physicians of the next decade will pay little attention to the regulations relating to reporting. Most doctors will report promptly a case of communicable disease that may require hospitalization, a diagnostic facility, or a follow-up service. But when notification of a disease is regarded as a simple formality, without apparent direct benefit to the patient, to his family, or to the community,

the procedure of reporting will often be neglected.

If we are realistic, we know that the physician looks at epidemiologists with a quizzical eye and asks a very pertinent question:

"What is your purpose in requiring me to notify you of the existence of a case of communicable disease? What is to be gained thereby? The changes in the natural history of disease, coupled with social and medical growth, have made these procedures unnecessary. The improvement in community and personal hygiene, the development of new methods of control, the advancement in procedures for more accurate and more rapid diagnosis, and the almost explosive increase of specific therapy have made obsolete this practice of reporting communicable disease to the health department."

Your answer may be that the purpose of notification is to enable the health officer to institute measures that will prevent further spread of serious infection. Thus, the primary object is the rapid and complete reporting of diseases of high infectivity and a high degree of fatality.

In the past, this was a perfectly reasonable demand. Yellow fever, typhoid fever, smallpox, cholera, diphtheria, and scarlet fever all fell in this general category and all were well reported. In each of these diseases, definite control measures became available which were effective and most satisfactory, both from the point of view of the patient and the community.

But the practitioner, who is the source of almost all our information in early discovery of communicable diseases, will promptly point out that the diseases which we have mentioned, including malaria and most of the rickettsial diseases as well, no longer appear in our mortality tables. Actually, they are well under control.

Recently, the Chief Medical Officer of Scotland (*3*)[1] emphasized that, at the present time, the major communicable diseases that are dangerous to the public health are such epidemic conditions as food poisoning, influenza, poliomyelitis, infantile diarrhea, etc. He notes that, in these conditions, notification will not prevent further spread, since known defensive measures have proved of little avail, and our major recourse, therefore, is the prevention of the original occurrence of the disease.

What then is our purpose in requiring the reporting of communicable disease? Are these procedures obsolete?

Essential for Epidemiological Knowledge

Despite this reasonable objection of physicians, we adhere firmly to the philosophy that there is a very sound fundamental reason for required reporting of communicable disease. We realize that this procedure is no longer of great benefit to the sick individual, nor perhaps to his family. But we do believe that the plan is of great community benefit.

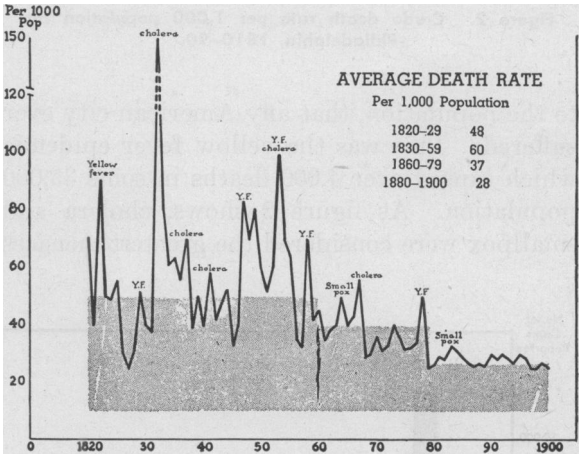

Figure 1. Crude death rate per 1,000 population for New Orleans, 1820–1900.

The graph of the death rate of New Orleans 1820–1900 (fig. 1) illustrates the point that yellow fever, smallpox, and cholera were considered the pestilential and, thus, the reportable diseases of the last century.

The peaks of the graph were produced by these three diseases. But the great mass of unnecessary deaths (see shaded areas) were due to "natural causes" and were taken as a matter of course, and as a part of normal expectancy in life. The major causes producing these deaths were diarrheal diseases of infants, tuberculosis, communicable diseases of childhood, and water-borne infections. None of these dis-

[1] The author is indebted to this article for many of the ideas presented in this paper.

eases were reportable until comparatively recent years, beginning about 1900.

Philadelphia has had a better health record than almost any of our large cities. But in 1794 it had the greatest disaster, in proportion

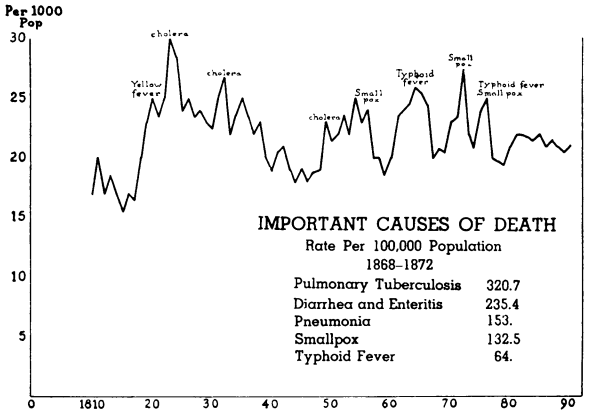

Figure 2. Crude death rate per 1,000 population for Philadelphia, 1810–90.

to the population, that any American city ever suffered. This was the yellow fever epidemic which caused over 4,000 deaths in some 35,000 population. As figure 2 shows, cholera and smallpox were considered the greatest menaces to Philadelphia. But in 1868–72 the tuberculosis death rate was 320.7 per 100,000 population, and the death rate from diarrhea and enteritis was 235.4. Neither of these conditions was reportable because neither was considered pestilential.

The great peaks in the mortality curves disappeared in all areas in the Nation about 1900. The only exception during the past 50 years has been the relatively small peak caused by the influenza epidemic in 1918.

A completely different reason for reporting communicable disease was developed during the twentieth century, beginning about 1900. The major purpose was to elucidate the natural history of the disease "in distinct epochs of time at varying points on the earth's surface" (Frost's definition). The accumulation of these invaluable data for poliomyelitis is illustrated by figures 3, 4, and 5. These data are not mortality, but morbidity data; not deaths from a disease, but its prevalence. They can be obtained only by accurate and complete reporting. These graphs bring out the point that the primary purpose of disease reporting at the present time is to enable the epidemiologist to study the natural history of disease. Some of the results

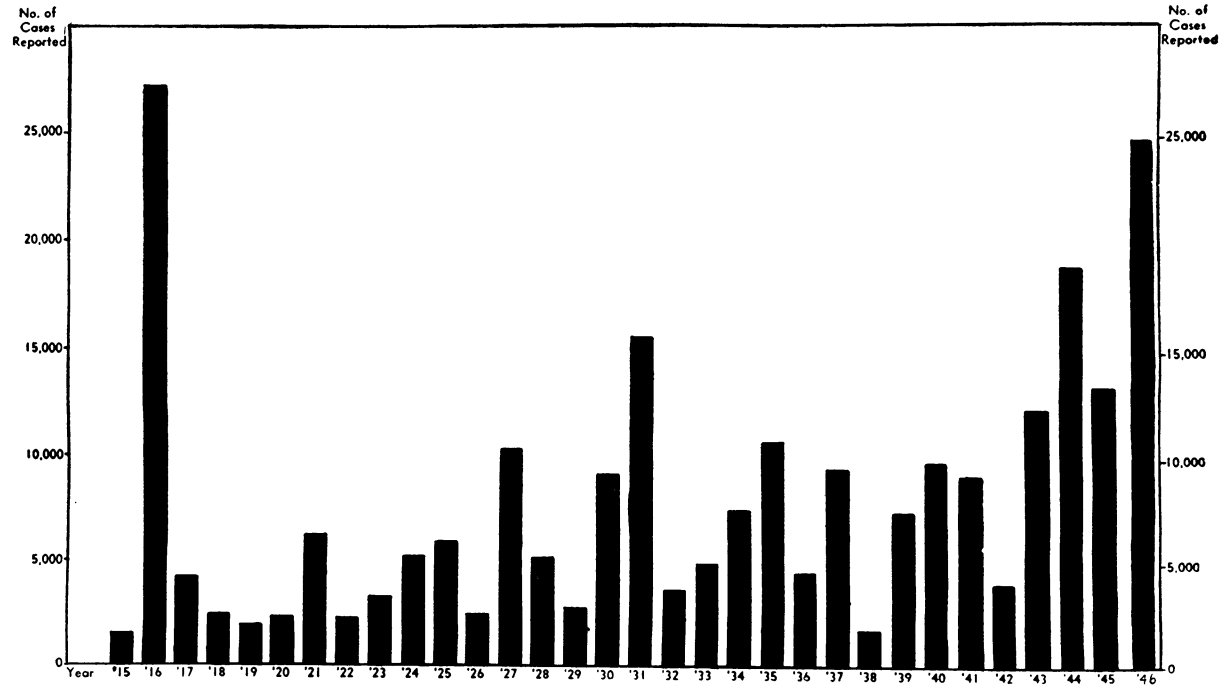

Figure 3. Poliomyelitis cases reported in the United States, 1915–46.

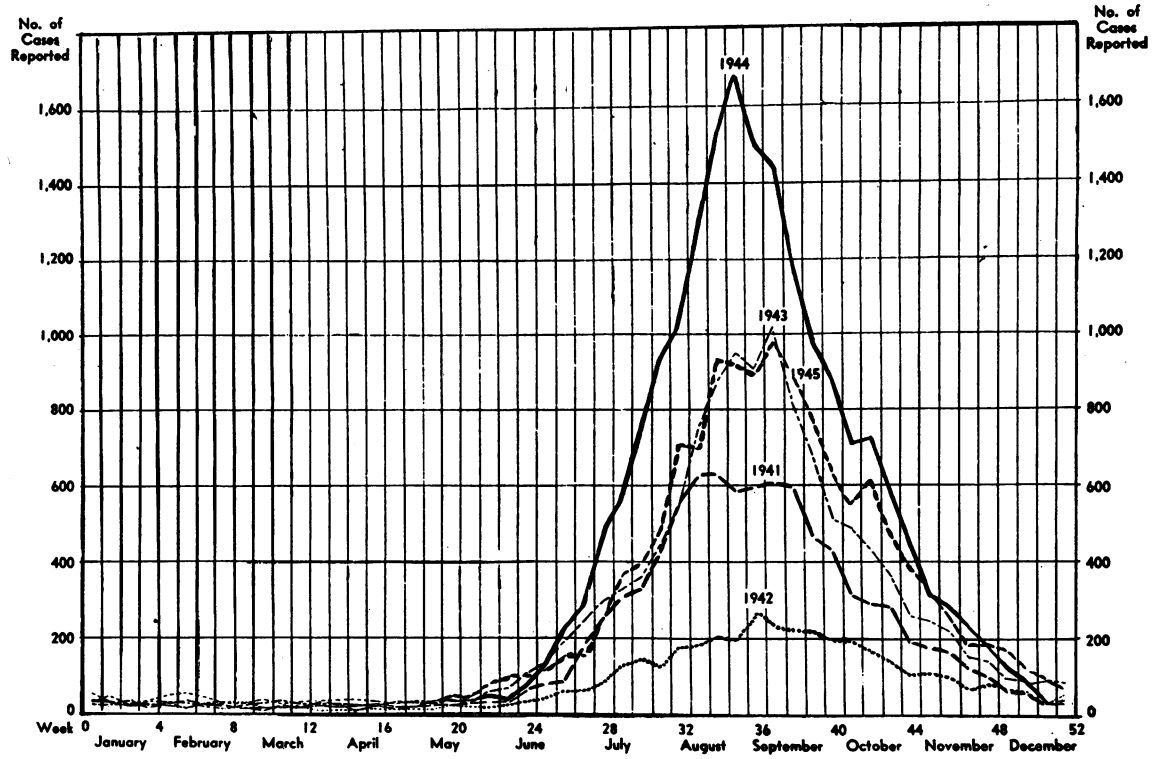

Figure 4. Weekly incidence of poliomyelitis in the United States, 1941–45.

that will be obtained by careful communicable disease reporting may be cited:

1. An analysis of the trends of the prevalence of the disease.
2. Its distribution in various age groups, its sex preference, and its appearance in social groups and in groups of varying economic status.
3. The geographic distribution of the disease and its geographic variations through the years.
4. The seasonal distribution of the disease under study and its correlation with other readily measurable environmental factors.
5. Changes in case fatality ratio.
6. Changes in actual virulence of the infection.
7. The benefits of new methods of therapy in reducing: (*a*) severity of the illness; (*b*) period of hospitalization; (*c*) risk of secondary attacks; and (*d*) incidence of carriers.

These and many more are the epidemiological reasons that give us complete justification for

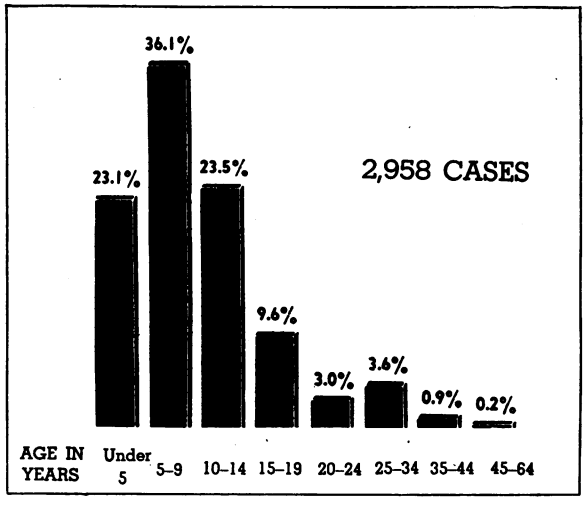

Figure 5. Percentage distribution of poliomyelitis cases by age in Chicago and Detroit, 1939–44.

the regulations requiring reporting of communicable disease. In summary, let us return once more to Frost's definition of epidemiology: "It is the science which considers the distribution, occurrence, and types of diseases of mankind in distinct epochs of time at varying points on the earth's surface, and will provide an account of the relations of these diseases to in-

herent characteristics of the individual and to the external conditions surrounding him and determining his manner of life."

Conclusion

Only through a satisfactory, accurate, prompt system of disease reporting can the science of epidemiology be implemented. It is the cornerstone of the whole structure of the science.

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(*2*) Chapin, Charles: Municipal sanitation in the United States. Providence, R. I., Snow and Farnham, 1901, 970 pp.

(*3*) Health Bulletin of the Chief Medical Officer of Scotland. Notification of infectious diseases. October 1950.

Sale of Dangerous Drugs Restricted by New Law

Drugs which may be dispensed only upon a physician's prescription are now clearly defined by a Federal law, the Durham-Humphrey amendment to the Federal Food, Drug, and Cosmetic Act, which will become effective April 26, 1952. After that date drug manufacturers will be required to label all such drugs with the legend: "Caution: Federal law prohibits dispensing without prescription." Thus, retail pharmacists will be able to tell immediately from the package whether or not a drug is one which requires a prescription.

The new law restricts to prescription sale any drug which "because of its toxicity or other potentiality for harmful effect, or the method of its use, or the collateral measures necessary to its use, is not safe for use except under the supervision of a practitioner licensed by law to administer such drug." The Food and Drug Administration interprets this definition to include, as unsafe, drugs for serious diseases which cannot be treated effectively by the layman. An example of such a drug would be penicillin, which is nontoxic but which requires expert medical knowledge for effective use in treating certain diseases, such as pneumonia.

Under the new bill, prescriptions for drugs which bear the "Caution" label may not be refilled without specific authorization of the prescribing physician. However, drugs which do not require a prescription for the first sale may be sold across the counter in the original package, or as a refill of a prescription without further authorization by the physician.

The new law legalizes telephoned prescriptions for all drugs. Such prescriptions for restricted drugs, however, must be put promptly in writing and filed by the pharmacist.

This legislation will strengthen control over the sale of such drugs as barbiturates, amphetamines, sulfa drugs and antibiotics, thyroid, and male and female sex hormones.

The ethics of the pharmaceutical profession have always required that dangerous drugs be dispensed and prescriptions for them be refilled only on instructions from the physician. The new law makes it legally mandatory for all druggists to follow these practices.