

Figure I. "Map of the City of Washington Showing Location of Fatal Cases of Lung Diseases for the Year Ending June 30, 1892." Originally in color, dots and crosses were marked in red and blue to indicate different diseases.



# EPIDEMIOLOGIC MAPS OF WASHINGTON DC, 1878-1909

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*Photographs of maps by Karlton Jackson*

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## SYNOPSIS

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IN ORDER TO demonstrate the dire effects that contagious epidemic diseases were having on the population of Washington DC, Public Health Officers of the District of Columbia used epidemiological maps in their annual reports to city commissioners from 1878 until 1909. These maps charted information graphically that was included as statistical tables elsewhere in the reports. Their evolution occurred during a period when the Health Officers themselves were coming to grips with the causes of diseases that included diphtheria, scarlet fever, typhoid and malarial fevers, smallpox, consumption (tuberculosis), and diarrheal diseases. The maps may have encouraged laws that were passed during this period which required Washington DC physicians to report cases and deaths from these diseases.

**E**pidemiological maps used in the reports of the Public Health Officers of Washington DC trace the gradual understanding of contagious diseases from 1878 until 1909. Some diseases, such as scarlet fever and diphtheria, were understood by the 1890s to be contagious and potentially epidemic. However, others, including tuberculosis (consumption), which were also contagious and highly epidemic, did not get such rapid response and attention by the Public Health Officers of Washington DC until the 20th century. Maps help us grasp what the Public Health Officers themselves were trying to understand: the differences and inter-relationships between and among the various diseases they were mapping, their contagious aspect, their potential to cause epidemics, and how to control them.

The maps discussed here were contained in the annual *Report of the Public Health Officer of the District of Columbia*. Public Health Officer Smith Townshend began using epidemiological maps in his annual report to the commissioners of the city of Washington DC in 1878, the same year that *Public Health Reports* first appeared. His 1878 report

## Delimiting Diseases

stated that the map was included "for the purpose of facilitating investigations into the causes of disease, as well as for general information to be obtained therefrom." In the early years, beginning in 1879, two maps were issued with each annual *Report*. One charted infectious lung diseases and the other charted fevers and diarrheal diseases. Disease concentrations, such as the ones shown (Figure 1), from an 1892 map of fatal cases of consumption, pneumonia, and other acute lung diseases, helped the Public Health Officers of Washington DC visualize the impact of some of these diseases on city neighborhoods.

Each map contained a key that showed how diseases depicted on it were encoded. Deaths from particular dis-

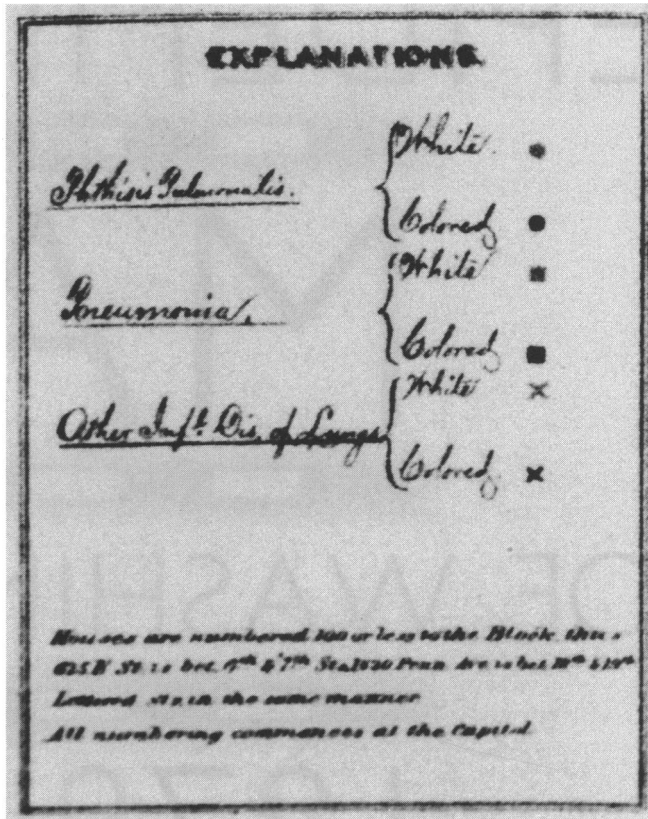
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eases appeared on the maps as a blue or red dot, "x", or block, depending upon the disease reported. By the 1890s, more elaborate symbols were also used.

Although most often each symbol on each of these maps corresponded with a single occurrence of disease, Townshend admitted that "in a few instances, there has been more than one death in the same locality." A cluster of these symbols in a certain neighborhood indicated a higher concentration of deaths in that neighborhood from diseases that the symbols represented. In 1880, the maps of lung diseases such as *phthisis pulmonalis* and pneumonia were done by race. This practice continued through the early 20th century.

Separate maps of "zymotic" (highly infectious) and lung diseases were undertaken by the DC Public Health Office from 1885 until 1902. Townshend recommended strongly that Washington DC physicians be required to report cases of zymotic diseases to him.

Figure 2. Explanations from the "Map of Washington and Georgetown, 1881."



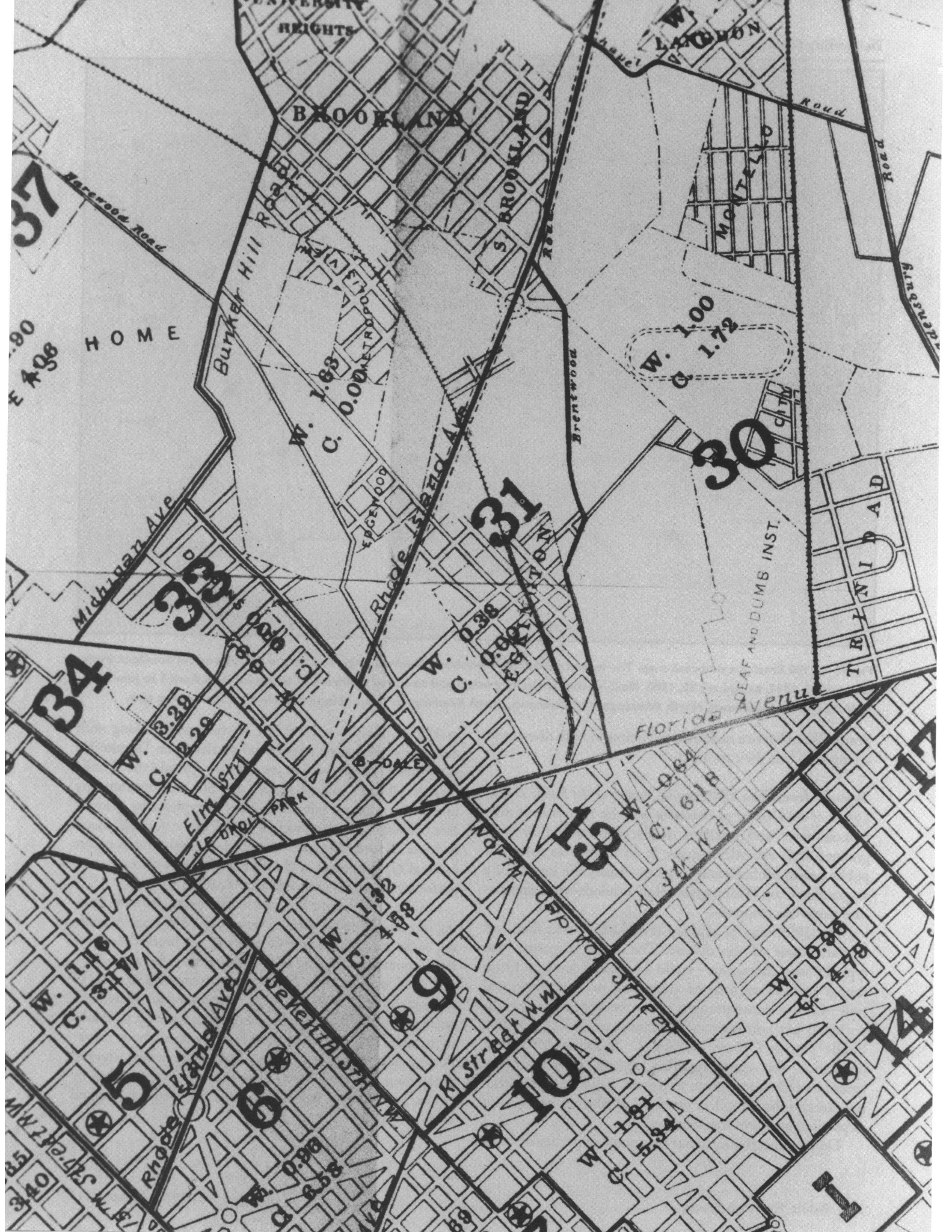
## Mapping Diseases

**Diphtheria and scarlet fever.** On December 20, 1890, the U.S. Congress passed a law that required physicians in the District of Columbia to report cases of scarlet fever and diphtheria to the Public Health Officer. And, indeed, an increased concentration of diphtheria is evident in Georgetown on an 1890 map. Once notified, the Officer was required to quarantine the premises where the disease was reported in order to prevent its spread. In January 1891, the Diphtheria and Scarlet Fever Service was created. Dr. C.J. Osmun of the newly created Service later wrote that the practice of isolating victims of diphtheria saved Washington from an epidemic.

Some of the maps pair diseases together for comparison, giving us insight into the thinking of the Public Health Officer. For example, an 1896 map pairs diphtheria and scarlet fever, because the Health Office's Diphtheria and

Figure 3. Segment from "Map of the District of Columbia, No. 2. Showing Death Rates from Pulmonary Tuberculosis of White and Colored Races, in the Various Vital Statistics Districts of the District of Columbia, During the Calendar Year 1907."

Large numbers indicate the vital statistical districts of the city. W = white population; C = "colored" population. Stars indicate the existence of hospitals in the statistical districts. This map segment looks from the mall area, at bottom, up to the northeastern suburbs, at the top.



37

38

34

33

31

30

9

10

14

11

Harwood Road

Bunker Hill Road

Midway Ave

Rhode Island Ave

Florida Ave

Rhode Island Ave

North Broadway

W. 0.98

W. 1.32

W. 1.58

W. 0.84

W. 0.61

W. 0.26

W. 4.78

W. 1.63

C. 0.00

W. 0.38

C. 0.88

W. 1.00

C. 1.72

W. 3.29

C. 2.29

HOME

UNIVERSITY HEIGHTS

BROOKLAND

S BROOKLAND

MONTICELLO

W. 1.00

DEAF AND DUMB INST.

TRINIDAD

Road

Road

Brentwood

EDGEY DOG

EDGEY DOG

PARK

Elm St

Leona

W. 0.98

C. 0.88

W. 1.32

C. 1.58

W. 0.84

C. 0.61

W. 0.26

C. 4.78

W. 3.29

C. 2.29

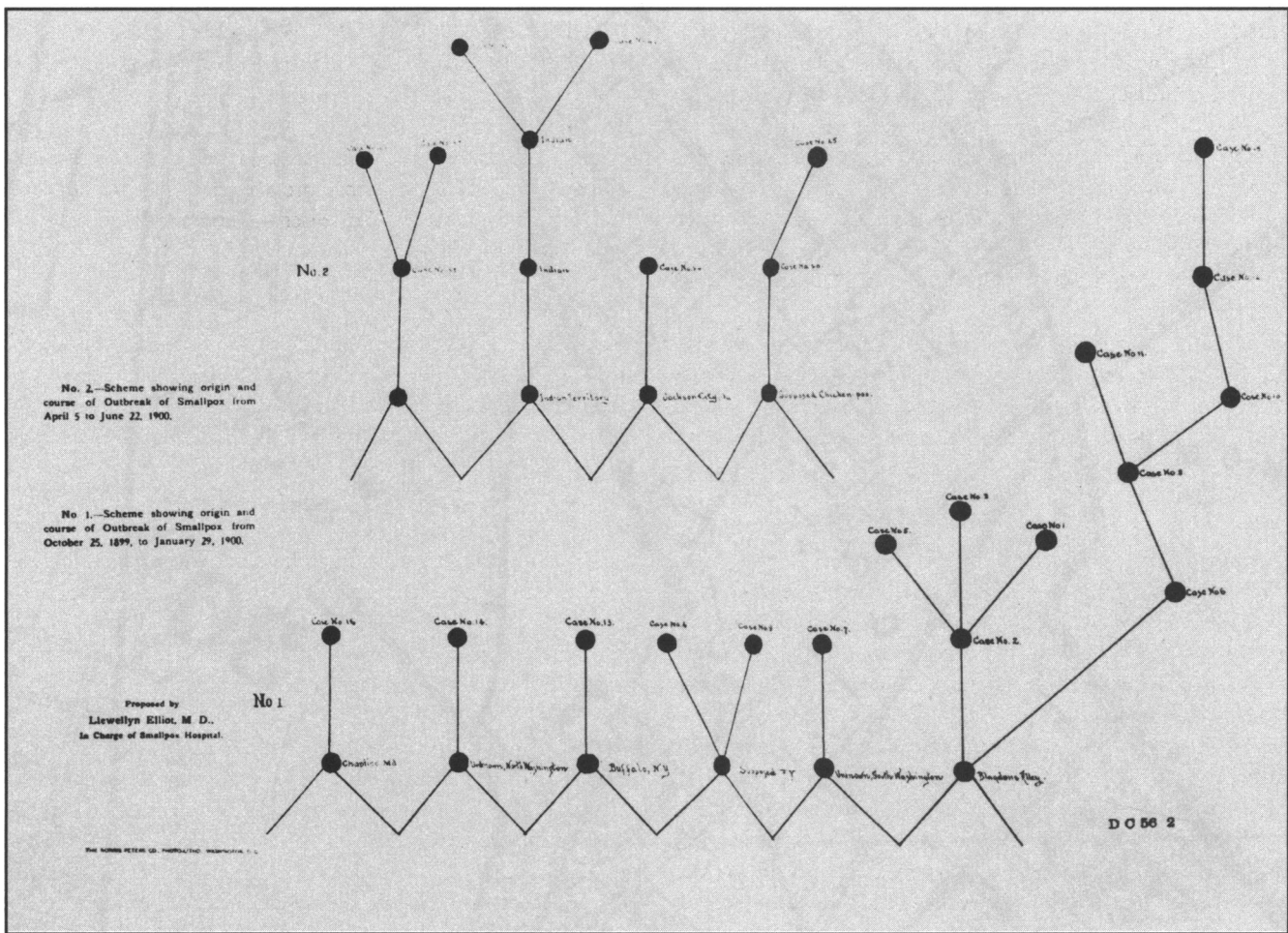


Figure 4. 1900 Smallpox outbreak map. The legend reads “No. 1.—Scheme showing origin and course of Outbreak of Smallpox from October 25, 1899, to January 29, 1900. No. 2.—Scheme showing origin and course of Outbreak of Smallpox from April 5 to June 22, 1900.” Look for “Unknown, North Washington”, “Unknown, South Washington”, and “Blagdon’s Alley” on the bottom row.

Scarlet Fever Service quarantined victims of both diseases in attempts to halt their spread.

**Typhoid fever.** The 1895 annual *Report of the Public Health Officer of the District of Columbia* was the first year to map typhoid fever and smallpox singly; previously they were grouped with zymotic diseases. It no doubt was easier for public health professionals to grasp visually the impact of a single disease on Washington neighborhoods when one disease alone was mapped.

The 1895 map of typhoid fever shows both fatal and nonfatal cases of the disease. The maps suggested that typhoid was contagious—could be spread from a single source such as an infected individual or a contaminated well—because concentrations or clusters appeared in neighborhoods just northeast and northwest of the U.S. Capitol. Public Health Officer William C. Woodward believed, because of this clustering, that typhoid fever had been spread directly from person to person, rather than transmitted through the air, soil, or water, all of which were explored as possible means of transmission.

Despite uncertainty about the source of particular cases,

in 1895 typhoid was classified as contagious—along with diphtheria, whooping cough, and scarlet fever. Despite his supposition about person to person spread, the Public Health Officer’s annual report did not demonstrate any interest in isolating individual cases of typhoid by quarantine, already a regular practice of the office for diphtheria and scarlet fever. Legislation requiring physicians to report cases of typhoid fever to the Public Health Office was not passed by Congress until February 4, 1902.

In the 1897 report, the health officer explained the pairing of malarial and typhoid fevers in an 1896 map. According to the report issued by Woodward, an observed decrease in the number of deaths from malarial fever between 1896 and 1897 was probably due to the misreporting of cases of typhoid fever as malarial fever. Woodward attributed the small number of malaria cases, perhaps incorrectly, to Washington DC’s climate. Woodward’s contention about misreporting was illustrated on an 1897 map, which showed many more reported deaths from typhoid fever (marked by circles with a cross beneath) than from malaria (marked with asterisks).

**Smallpox.** Public health authorities in many parts of the world had employed smallpox vaccination and isolation for almost a century. In 1895, local patients were brought to the Smallpox Hospital located in the southeastern part of Washington DC, near the jail and almshouse. Smallpox victims could carry the disease from one city to the next and spread it widely before they were identified as the source and quarantined. Yet between 1878 and 1909, only one geographical map of smallpox in Washington DC was made, in 1895.

In 1900, the physician in charge of the Smallpox Hospital, Dr. Llewellyn Elliot, produced two smallpox origin maps (one of which is shown in Figure 4). Many of the local cases, which were numbered, were thought to stem from cases in other cities. Others, however, were thought to originate locally.

**Consumption.** Consumption was mapped singly from 1896 through 1902. There was a change in terminology from *phthisis pulmonalis* in earlier maps of the city (Figure 2) to "consumption" on an 1883 map. Both terms referred to the wasting away of the body that accompanied the disease that would later become widely known as tuberculosis. Reported deaths from consumption during these years probably included many that were not tuberculosis.

Consumption was reported in the annual *Report of the Public Health Officer of the District of Columbia* as the leading cause of death in Washington DC year after year during the late 19th and early 20th century. Maps of the city provided strong visual evidence for the high annual death toll from tuberculosis (consumption) in Washington DC and its suburbs. Beginning in 1900 elsewhere in the world, segregation of tuberculosis patients was becoming common practice. However, the communicable disease isolation wards of Washington DC hospitals were not yet used for tuberculosis. In the annual *Report* for the year 1901, the Health Officer stated that they were pursuing no legal requirement mandating that physicians report cases to the Public Health Office. This set tuberculosis apart from diseases such as scarlet fever, diphtheria, and as of 1902, typhoid fever.

In 1902, Woodward sought to educate the public about how to prevent the spread of consumption. He sent a circular letter to Washington DC physicians who reported deaths from the disease. The letter advised disinfecting the apartment in which the disease occurred and offered the assistance of his staff for this purpose.

In the 1906 annual report, the city's Public Health Officer reported the introduction of a bill in Congress which would require that physicians report cases of tuberculosis "to a prescribed governmental agency." By act of Congress, on May 13, 1908, this act became law.

**Diarrheal diseases.** These diseases included dysentery, diarrhea, and enterocolitis and also occurred in great number each year in Washington DC, which is recorded on the maps. Interestingly, the Public Health Officers' sanitary measures employed to eliminate contamination of water, food, and milk supplies may well have been more effective against diarrheal diseases than against those diseases transmitted by person-to-person contact for which they were used.

**Last epidemiologic maps.** In 1904, the *Report* included maps charting deaths by number per statistical district. On map No. 2, 1907 (Figure 3), death rates within each statistical district from tuberculosis by race ("white" or "colored") are given.

By 1909 epidemiological maps were no longer issued in the Health Officer's annual report. But during the period they had been used, the maps lent graphic vitality to the data contained in statistical tables of deaths. Graphic presentation of evidence can provide the viewer with more information in less space. The viewer's mind can easily translate a visual cluster of disease symbols on a map to the image of sick people dying in a particular neighborhood. Indeed, these maps may have helped the Public Health Officers of Washington DC lobby Congress to enact laws requiring that physicians report cases of infectious diseases to the public health office.

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## References

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