Health & Medicine

Beyond Typhoid Mary

The origins of public health at Columbia and in the city.

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In 1908, just as New York was emerging from a severe economic depression, Columbia's College of Physicians and Surgeons (P&S) organized a series of lectures featuring some of the nation's foremost engineers, public health officials, statisticians, and social welfare activists. Microbiologist William Sedgwick, from the Massachusetts Institute of Technology; William Park 1886PS, the director of the New York City Department of Health's Bureau of Laboratories; Hermann Biggs, chief medical officer for the City's Department of Health; and Frederick Hoffman, vice president and chief statistician of the Prudential Life Insurance Company, were among the luminaries who came to the 59th Street home of the college. Week after week the speakers told the audience of young physicians and their teachers of the enormous strides that public health had made in the preceding decades and of the even greater possibilities that lay ahead. What was needed for future advances was to train professionals in the art and science of disease prevention.

The series introduced students and faculty alike to the various disciplines that had, over the course of the previous four decades, transformed the health experiences of New York's population. For much of the nineteenth century, public health had been largely an engineering enterprise as the City built the Croton Reservoir System and massive aqueducts to move water from Westchester County and the Catskills to Manhattan. While smallpox outbreaks had largely been contained by mass inoculation campaigns, the extension of the water supply into poor neighborhoods limited the occurrence of water-borne diseases like cholera. The draining of swamps in Queens and the Bronx was leading to declines in outbreaks of mosquito-borne diseases such as yellow fever and typhoid.

Engineers had also built a massive sewer system, an extensive subway and transportation system, and new housing with better ventilation for the poor living in the City's teeming tenements. Regular garbage pickups had begun. All of these improvements to the City's infrastructure had led to dramatic declines in mortality rates from infectious disease.

However, engineering as a means of improving the City's health seemed to have reached its limit. This new generation of administrators, engineers, and scientists argued the need for more targeted methods for eliminating outbreaks of diseases transmitted person-to-person. They maintained that a merging of traditional environmental controls with the new science of bacteriology could make horrifying epidemics a thing of the past.

Sanitary engineering had cleaned up broad swaths of the City. Now medically trained health professionals could identify local sources of disease and infected individuals whose treatment or isolation would further reduce the spread of disease. "It is sincerely to be hoped that this beginning will lead to some permanent organization upon the lines of Sanitary Science and Public Health," Dean Samuel W. Lambert said of the lecture series in the 1909 P&S annual report, adding that a "special committee [has] outlined the possibilities for funding such a permanent department in connection with Columbia University."

The grand possibilities of the new merging of sanitary science and medicine had just been illustrated neatly, in 1907, through the City's experience with Mary Mallon, a cook for some of New York's elite families, who would become known as "Typhoid Mary." Mary Mallon was a "healthy" typhoid carrier, whom George Soper, an 1899 graduate of Columbia's School of Mines program in engineering, had identified as the source of an outbreak of typhoid among some wealthy New Yorkers vacationing at their summer cottage in Oyster Bay, Long Island.

Soper had been called in as an engineer to track the sources of pollution that led to the outbreak of this disease usually caused by drinking water contaminated with human feces. After detailed inspections of the water supply, the oysters regularly harvested in the bay nearby, the sewer system, and other possible sources of contamination, Soper concluded that the problem was not caused by leaks or cross-contamination of sewage and drinking water. Rather the problem, he argued, was that Mary, as a cook in the house, had been passing bacteria into the food that she prepared for the family.

Using the newly developed epidemiological techniques and laboratories of the New York City Department of Health, Soper helped establish the effectiveness of the new advances in staining, microscopy, and bacteriology as tools in stemming the spread of infectious disease. Although Mary exhibited no symptoms of typhoid, she was forcibly taken by the Department of Health and placed in isolation on North Brother Island, the City's isolation hospital in the East River. Except for one brief interlude, she remained on the island for the rest of her life, nearly 30 years. Soper believed he was the first to use the laboratory in tracking down the source of an epidemic caused by a healthy typhoid carrier.

Such detective work showcased recent advances in bacteriology, histology, and hygiene. During the lectures, Norman Ditman, an instructor in pathology at Columbia's medical school, argued that between 20,000 and 25,000 lives had been saved by the recent advances in public health, and Herman Biggs, the director of New York's Department of Health, made the claim that in large measure, "public health is purchasable," meaning that the public's willingness to invest in a variety of public health activities, laboratories, vaccination campaigns, and the like could determine how long New York's population would live and how free from the ravages of infectious diseases they would remain.

The Unsanitary Condition of the City

The need for the inclusion of public health into some aspect of the training of physicians was clear. For many at those lectures in 1908 it was not difficult to remember the experience of mid-nineteenth-century New Yorkers, many of whom died of rampant outbreaks of infectious diseases such as cholera, typhoid, smallpox, and yellow fever. Nor was it difficult to recall the suffering of children who died of diphtheria, whooping cough, and a host of other intestinal or pulmonary diseases. Tuberculosis was a chronic and continual reminder of the dangers that attended city life.

By the mid-nineteenth century, New York had among the worst health statistics in the nation. Vital statistics gathered by the City showed that while one out of every 44 people died in 1863 in Boston and one of 44 that year in Philadelphia, New York's rate was one in 36. Even when compared with European centers such as London and Liverpool, New York seemed strangely unhealthy. Mortality data highlighted the

City’s apparent decline.

The City that Columbia’s medical school served had emerged as the national commercial hub, the nation’s foremost center of trade, industry, finance, and communication. Yet, the poverty, illness, and crowding of the City appeared frightening. Infections and a host of intestinal diseases in the young and old alike accompanied the growth in poverty, population, and immigration. High death rates and pestilence now marked “with shame the great City of New York,” remarked the authors of *Sanitary Condition of the City: Report of the Council of Hygiene and Public Health of the Citizens’ Association of New York*, the 1866 document that spurred the creation that year of what became the City’s Department of Health.

In this report, some of New York’s leading physicians, including many from Columbia, documented the “shame” of the City. Valentine Mott 1807CC, professor of surgery at P&S; surgery faculty member Willard Parker, known as the “father of vascular surgery”; John Griscom, author of *Sanitary Condition of the Laboring Population of New York*, a famous 1845 study; Stephen Smith 1850PS, soon to head New York’s new Metropolitan Board of Health and in 1872 organizer of the American Public Health Association, all bemoaned the “pestilential diseases” that laid bare “the impotence of the existing sanitary system.” The physicians noted that outbreaks of disease paralyzed the commercial and political life of the community: “The people are panic-stricken [and] the interests of commerce suffer by the insensible and certain loss of millions.” It was clear that “the relation of the health and vigorous life of a people to the state, or to commercial prosperity, requires no discussion.” Disease—the effects of which could be measured in dollars and cents—was a liability in the developing commercial capital.

Conquering disease was essential for reestablishing order in a city that appeared to many to be in the process of dissolution. Most frightening was the close connection between disease, moral decay, and the draft riots that in 1863 led to the City’s occupation by federal troops returning from the Battle of Gettysburg. “The mobs that held fearful sway in our city during the memorable outbreak of violence in the month of July, 1863, were gathered in the overcrowded and neglected quarters of the city,” the physicians reminded the reader in the 1866 report on sanitary conditions. The “closely packed houses where the mobs originated seemed to be literally hives of sickness and vice.”

Written as it was by both medical and lay people, public health physicians and moral leaders, the 1866 report incorporated moralistic as well as scientific language, reflecting the contemporary understanding of illness as a sign of depravity or sin. Calling themselves “health missionaries,” the authors wrote,

> Lewd but pale and sickly young women, scarcely decent in their ragged attire, were impudent and scattered everywhere in the crowd. But what numbers are made hideous by self-neglect and infirmity! . . . To walk the streets as we walked them, in those hours of conflagration and riot, was like witnessing the day of judgment, with every wicked thing revealed, every sin and sorrow blazingly glared upon, every hidden abomination laid before hell’s expectant fire. . . . Here disease in its most loathsome form propagates itself.

New York streets were “very filthy” with accumulations of manure from the horses that traversed the area, dead dogs, cats, and rats, household and vegetable refuse that in winter accumulated to depths of three feet or more, the 1866 report also noted. “Garbage boxes,” rarely emptied, overflowed with offal, animal carcasses, and household waste. “Pools” of stagnant water collected in the carcasses of dead animals and over sewer drains that were generally clogged.

These descriptions provided a vivid understanding of the intimate relationship between social and economic forces that created a slum and ill health throughout the City.

The observation that housing, politics, morals, and health were all intertwined underscored the combined missions of public health activities for the next half-century.

“Disease, debasement, and pauperism . . . are found closely allied” and “seriously endanger the sanitary safety of all other classes,” the authors of the report concluded.

An Improved Environment

In the decade after the Civil War, epidemics of typhus, yellow fever, cholera, and other diseases swept through the tenements and slums of the City with fearsome impact. The City responded by creating a permanent institution, the Department of Health, as a part of New York's attempt to regulate conditions that caused disease. Housing, meat, and milk inspection, garbage collection and street cleaning, water distribution, and sewerage services would all be organized through a health department that sought to control the environment. Soon, this department would become a model for other cities throughout the nation, employing the latest scientific advances in bacteriology.

By the turn of the twentieth century, New York would emerge as preeminent in the field. Older sanitarians' notions of the cause of disease as residing in filth and immorality would slowly be supplemented with newer, more scientific views that disease was caused by specific pathogens, bacteria associated with particular diseases. The isolation of diseased individuals, the vaccination of potential victims of infection, and the laboratory analysis of milk supplies slowly gained a place alongside the more traditional sanitarian focus of the public health department. The advent of the bacteriological revolution had by the end of the century provided a common ground for clinical medicine and public health. Street cleaning, the provision of pure water supplies, and the treatment of bacterial disease were all essential for the control of infections and the elimination of epidemics.

With the revolution in bacteriology that followed the discoveries of Louis Pasteur, Joseph Lister, and Robert Koch in the mid-nineteenth century, a new faith in laboratory science emerged not only among physicians but also among public health workers. "Bacteriology … became an ideological marker, sharply differentiating the 'old' public health, the province of untrained amateurs, from the 'new' public health, which belonged to scientifically trained professionals," points out public health historian Elizabeth Fee, author of *Disease and Discovery: A History of the Johns Hopkins School of Hygiene and Public Health, 1916–1939* (1987). A revolution in ideology overtook the field in the 1880s, as William Sedgwick, one of the first to speak at the 1908 lecture series at Columbia's medical school, would remember: "Before 1880 we knew nothing; after 1890 we knew it all; it was a glorious ten years." A new model was gaining greater acceptance: A bacillus made people sick and diseases like tuberculosis were caused by germs. Dirty, crowded public spaces or unclean homes with moist, warm, and stagnant air were seen as the conduits for disease.

By 1906, it had become apparent that some sort of alliance between medicine and public health was necessary and that P&S was the perfect place for the new practitioners in both disciplines to forge a common ground.

New Health Issues Emerge

In the early years of the new century, the very successes of the reforms had led to the emergence of changing patterns of death in the City. Diseases of “old age,” the very welcome result of improved urban health, began to replace dying children and epidemics as a major concern. Cancer, heart disease, and pneumonia were claiming larger numbers of elderly. The data showed “in an unmistakable manner the success of public sanitary administration which has heretofore directed its efforts almost entirely against infectious diseases,” according to the 1912 annual report of the New York City Department of Health. On the other hand, the report “point[ed] with equal clearness toward the field in which public hygiene must [focus] in the future, namely, the reduction of mortality from the diseases of middle and old age.” What techniques could be employed to address these new challenges? Were the traditional tools of environmental cleanup or the newer techniques of vaccination and medical interventions adequate?

No longer would public health be limited to environmental engineering and food inspection. In future years, on the one hand, public health would find itself coming into conflict with providers of medical care as prevention of disease through inoculation and vaccination, prenatal and well-baby care, factory inspection, and occupational disease prevention as well as treatment of communicable diseases such as syphilis and gonorrhea would force those in the field to venture into areas previously the preserve of the clinician. On the other hand, it would lead to a greater coherence and sympathy with medical science.

At Columbia, Dr. Walter Bensel of the medical school gave “the first regular course of instruction on the important subject of public health and sanitation,” according to Dean Lambert in the 1911 P&S annual report. One of the school’s projects then was a milk station peopled by P&S personnel that guaranteed the bacterial safety of milk provided to the City’s school children. By 1916, Dean Lambert noted that “the proposed development of a School of Hygiene and Sanitary Science” was delayed by a lack of funds. The hope was that with the anticipated early 1920s opening of the

new campus at 168th Street, there would be space for the new school.

However, the 168th Street campus did not open until 1928, and by 1922 the urgent need for providing some sort of public health education to the health officers of the City, the students at P&S, and faculty at other schools had led to the opening of the Department of Public Health Administration as a unit of P&S. This collaboration was made possible with the help of a modest endowment from Joseph DeLamar, a Dutch sea captain who made his fortune in this country in mining and chemicals, and who left his wealth to Columbia (as well as to Harvard and Johns Hopkins).

Dr. Haven Emerson 1899PS, on the medical school faculty from 1902 to 1914 and former commissioner of health for the City, took over as head of the newly created department during its first year and led it for nearly two decades, until 1940. The author of numerous classics, including eight editions of *Communicable Diseases of Man*, Emerson expanded the scope of the department, and by the 1930s it had emerged as a school, teaching courses in epidemiology, public health administration, and the use of mass inoculation in the prevention of disease outbreaks.

In its first few years, the new “school within a school” organized courses on preventable disease and public health administration for fourth-year medical students and graduate nurses at Teachers College. New courses were added on communicable and occupational diseases, mental health, administration of public and private agencies, infant health service, prenatal supervision, and health examination of the preschool child, among others.

Initially, the new public health program was “devoted to the education of the lay public in matters of preventive medicine and particularly in matters of diet and the use of food,” as Dean William Darrach reported in 1923. But it soon grew, becoming today Columbia’s Mailman School, one of the nation’s leading schools of public health.

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