

## Preventive and Social Medicine: A Victorian Legacy

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Set in this stormy Northern sea,  
Queen of these restless fields of tide,  
England! What shall men say of thee,  
Before whose feet the worlds divide?

Oscar Wilde

When Dr. Kumar asked me last summer to give a plenary lecture at this conference, I asked, "What is social medicine?" "Social medicine," he replied, "refers to those aspects of society that influence medical care; housing, education, sanitation, and so on." To learn more about social medicine, I turned to George Rosen's *A History of Public Health*, republished in 1993, with a foreword by Edward Mormon<sup>6</sup>. Mormon wrote as follows about Rosen and social medicine:

"During and immediately after World War II, Rosen involved himself in the social medicine movement. Social medicine was an approach to health care that stressed the social determinants of disease. At the time in the United States the phrase *social medicine* sounded very much like *socialized medicine*, and that concept was politically suspect." So his book was published with the title: *A History of Public Health*.

Rosen begins with the history of sanitation and housing, in the very earliest civilizations, and here he describes these matters in ancient India<sup>7</sup>.

"Some four thousand years ago, a people of whom little is known developed a great urban civilization in the north of India. Sites excavated at Mohenjo-daro in the Indus Valley and at Harappa in the Punjab indicate that these ancient Indian cities were consciously planned in rectangular blocks, apparently in accordance with building laws. Bathrooms and drains are common in the excavated buildings. The streets were broad, paved, and drained by covered sewers. These drains were laid some two feet below the level of the street, and they consisted for the most part of molded bricks."

I should note also in this brief historical review the monumental work of Rene Sand (8). He wrote an extensive history on *The Advances in Social Medicine*, initially published in French. Sand writes: "Social medicine is the final flowering of curative and preventive medicine. It satisfies —man's sense of communal responsibility." I have taken the brief comment below from Sand's book. We can go no further on the origin of preventive and social medicine as practiced today without brief mention of statistics. In the 19th Century, the use of statistics in medicine gained momentum, including the application of theories of probability. Certainly today all

countries, with few exceptions, have a general population census as well as statistics on agriculture, industry, housing, unemployment, etc. Such statistics gives a comprehensive picture of physical, economic, and social life of the nation, and the health of its people.

It was from this focus on statistics that emerged the study of demography, first attributed to the Achille Gaillard, who gave the name demography to the mathematical study of people. Later, Whipple supplied the simplified definition "demography is the statistical study of human life." The purpose of statistics -from the Latin *status*, state -was to bring together facts that would illustrate the conditions and prospects of society; the state of the state, the *health* of the state, if you will.<sup>1</sup>

I give this brief historical review because it leads nicely into the subject of this lecture "Preventive and Social Medicine: A Victorian Legacy." For this commentary, I have drawn on John M. Eyer's book, *Victorian Social Medicine: The Ideas and Methods of William Farr*<sup>1</sup>. There were others, of course, but William Farr, especially, used statistics to advance the general welfare. For these reasons, Victorian statistics became a science for social reform. Later in Farr's career, he and Florence Nightingale collaborated on various initiatives for social medical reform, and the reform of the Medical Department of the War Office. Their work together will be the focus of this talk.

I know full well that we owe much to France and Germany for the origins of social medicine prior to similar efforts in England. But when Victorian social medicine came into full flower during the reign of Queen Victoria, its influence spread to the far reaches of the Raj, and its former colonies such as the U. S., in all more than 25% of the globe. So I shall be more Anglophone than Francophone on this subject of social medicine. Jan Morris provides a compelling portrait of England in the 1830s; and the "symptoms of change in a country which was enduring the menopause between an agricultural and an industrial society."<sup>4</sup>(2)

The British General Register Office was established in 1831. Dr. William Farr joined the office in 1839. That year he wrote, "The annual rate of mortality in some districts will be found to be four percent, in others two percent. In other words, the people in one set of circumstances live fifty years, while in another set of circumstances they live twenty-five years. In these wretched districts, nearly eight percent are constantly sick"<sup>1</sup>.

What was to be done about that? For the next forty years Farr was at the very center of social and medical reform, based on sound statistical and epidemiological data, to improve the health of the people. Farr's writings portray the interplay of a number of Victorian attitudes about health, and their relationship to human welfare and social change. He was not alone in England in these concerns. Edward Chadwick, and

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later, after the Crimean War, Florence Nightingale should be noted particularly. The first use of the word statistics in anything resembling its present meaning is attributed to Martin Schmaizel (professor at Jena, died 1747) for a course of lectures on resources and policies of the various states of the world (*Oxford English Dictionary*)(1).

England in 1837 was a country only half-aware of its luck. It was enduring a period of social turbulence, which the more nervous of the landed classes assumed to be the start of a revolution<sup>2</sup>. The first Reform Bill, the Chartist agitation, the Luddites, Peterloo—all were symptoms of change and uncertainty, in a country which was enduring the menopause between an agricultural and an industrial society. The example of the French Revolution was still forceful, and Disraeli's "two nations" were more than tictional- at least one in ten of the British people were paupers, naked women pulled wagons through mine shafts, poor little children of eight and nine were working twelve-hour days in the dark factories of the north. The traditional English hierarchy seemed threatened at last—doomed, the gloomier patricians thought, since one man in seven now had the vote. The Established Church of England was undermined by non-conformism, agnosticism or worse. The nation's way of life was disrupted by the movement of labour to the towns, and the stylish English cities of the eighteenth century were invested now by tenements and factories:"

Here I will focus primarily on William Farr and Florence Nightingale, because they worked together for 20 years after the Crimean War in an unusual synergy to examine the social causes of disease and human misery. To be noted are their assumptions about economic and political processes that influence health. So, we must now turn to these two giants of the Victorian Age, William Farr and Florence Nightingale. I have on another occasion referred to them as Florence Nightingale, the midwife to epidemiology, and William Farr, the attending physician.

From the many biographies of Florence Nightingale emerges the portrait of a remarkable woman. Lytton Strachey, in *Eminent Victorians*, looked beyond the shadow cast by the legendary Lady with the Lamp<sup>3</sup>. In the real Miss Nightingale, he wrote, "there was !!IQ@ (italics added) that was interesting than in the legendary one; there was also ~ (italics added) that was agreeable." She was no softy in other words. Imagine a head matron of a hospital with the drive and personality of Margaret Thatcher! Florence Nightingale was born in Florence in 1820, while her parents were on the grand tour of Europe. She was christened Florence after her birthplace. Except, perhaps, in medical circles, Florence Nightingale is no longer on everyone's lips. But 140 years ago she was a folk heroine throughout the British Empire and indeed, the English-speaking world. Thousands of baby girls in Great Britain and the United States were named "Florence" in her honor.<sup>1</sup>

She was her father's favorite—beautiful, highly intelligent, witty and willful. Her father taught her Latin, Greek, German, French

and philosophy; her mother laid plans for a full social life with, of course, a suitable marriage. That was not to be. Florence rebelled at her mother's plans. She felt she was called by God to do more, and, as a first step, insisted on learning mathematics. She would use this later in collaboration with William Farr on statistical data for sanitary reform. More about that shortly.

Her interest in the "sick-poor," as she called charity patients, began with visits to hospitals in Europe that employed trained nurses, an uncommon practice in England at the time. Florence was to change that. Her own desire to be a nurse was greeted with horror by her family, although she was over 30 years old at the time. At the age of 33, she broke free from the reins of her mother, and with financial help from her father, she became superintendent for the "Institution for the Care of Sick Gentlewomen in Distressed Circumstances." In March 1854, Britain and France declared war on Russia. In September the allied forces landed in the Crimea. The campaign was a disaster, with the British Army nearly destroyed. Not by the enemy, but by disease, and starvation.

It was to this chaotic scene that Florence Nightingale, at the invitation of the British Government, took 38 nurses. Supplies were pathetically low. Miss Nightingale later estimated that there were over 1,000 patients with diarrhea, but only two chamber pots! But Miss Nightingale seemed to know what was needed and how to go about getting it. She had soiled clothes washed by soldiers' wives. "The strongest will be wanted at the washtub," said Florence. In Strachey's view, "...it was upon the washtub, and all that the washtub stood for, that she expended her greatest energies."

For a year and a half—until the end of the war—Florence Nightingale fought off fatigue and disease, performing miracles to improve patient care and hospital administration. Her reforms alleviated suffering and saved lives.<sup>1</sup> For this portrait of Florence Nightingale I have drawn on Strachey, L.<sup>8</sup>, Woodham-Smith, C.<sup>9</sup>, Pickering, G. W.<sup>5</sup>, and Eyler, J.M.<sup>1</sup>. I also used these sources, except for Eyler, for my essay on Nightingale in my book<sup>3</sup>.

She saw clearly that this devastation of the British Army was the result of indifference at the War Office. Reform of the War Office became her life's work. Once back in Great Britain, however, she found her way blocked both by her family and by those in power within the Government. She then became "a tyrannical invalid." From age 36 until her death at 90, she was not only an invalid but also a recluse. Yet, from her bed she bullied, cajoled and schemed to reform the War Office.

It is at this point that I must introduce you to William Farr. We have only the barest outline on the early events in William Farr's life. He was born in 1807 into poverty, the first child of a farm laborer. A poor boy, Farr began to teach himself, and by the age of 16 he knew Latin, French, and Italian. A wealthy patron recognized the talent of the lad, and supported his subsequent medical education. He followed an unusual course for an English medical student by taking further training in

Paris. The Paris school had pioneered hygiene and medical statistics. He developed a life long interest in these subjects while in Paris.

From 1830 to 1839, Farr practiced medicine, but on the lowest rung of the medical ladder. He did not have the social connections to be a Harley Street society doctor. So his talent, drive, and ambition were channeled in other directions. As noted by John Eyler in his biography, Farr in his writings exhibited a deep interest in hygiene<sup>1</sup>. In two lectures published in *Lancet* in 1835 he discussed the use of hygiene as a systematic application of science for social reform<sup>2</sup>. For all these reasons, Farr gravitated to social medicine, statistics, and the study of epidemics, and in 1839, as I noted, he joined the General Register Office. He served for 40 years, becoming superintendent of the statistical department. Promotion to the top position of Registrar General was denied him. No doubt, because of his humble origins.

His achievements were many, novel, original, and far reaching. There is general agreement that Farr was among the first to develop a numerical description of an epidemic. Of greater importance, however, was his use of mortality and life tables: to analyze the burden of disease in the population; and to propose solutions to the causes of poor health. As Eyler notes, Farr played an important part in making the life table the criterion of collective health in Victorian England (1). The life table was the safest and surest test to determine the health and vitality of a district, group, or social class.

For example, depicted in Table I are the collective deaths in thirty large town districts tabulated according to age over a ten-year period<sup>1</sup>. In the left column are the deaths in the districts with high death rates. As shown in the middle column he compared these to deaths which *would have occurred* in that

**Table I : Deaths in 30 Large Towns in UNHEALTHY DISTRICTS between 1851-60; and also the DEATHS which would have occurred in the 10 Years if the MORTALITY had been at the same Rate as prevailed in the HEALTHY DISTRICTS (1849-53).**

Ages	Deaths 1851-60 unhealthy districts	Deaths 51-60 which would have occurred at healthy district rates	Excess of actual deaths over deaths at healthy diestric rates
<b>All ages</b>	<b>711,944</b>	<b>384,590</b>	<b>327,354</b>
0-	338,990	135,470	203,520
5-	31,319	19,290	12,029
10-	14,240	11,020	3,220
15-	43,807	7,550	6,257
25-	48,625	36,150	12,475
35-	50,071	30,320	19,751
45-	49,638	26,680	22,958
55-	49,763	27,020	22,743
65-	47,445	31,510	15,935
75-	30,583	22,920	7,663
= 85	7,463	6,660	803

Farr's method of correcting for differences in the age composition of populations whose mortality rates were being compared. Farr, "Suppl. 25<sup>th</sup> A.R.R.G., p. xxvi [PP, 1865, XIII].

ten-year period at *healthy district* rates. In the right column he tabulated the *excess* of actual deaths in ten years over deaths at the healthy district rates. Such a comparison was a marked improvement over the comparison of crude mortality rates, which overlooked differences in age composition, or other demographic differences.

In the fifth *annual* report, he illustrated in his tables the life expectancy for two areas, Surrey, a healthy area with a *long* life expectancy, and Liverpool, an unhealthy area, one with the worst, with a *short* life expectancy. In one telling example, he compared the number of living and dead for a generation of a hundred thousand over the subsequent life span of a hundred years for Surrey, a healthy region in England, to that for Liverpool, one of the worst from the point of view of health. In Liverpool by age 5, fifty thousand were dead, whereas in Surrey, only twenty thousand were dead at 5 years of age. At fifty years of age in Liverpool, seventy five thousand were dead out of the original hundred thousand, and in Surrey only forty thousand were dead<sup>1</sup>.

Farr was among the first to give a mathematical expression to the ill effects of crowding on health. In his later studies of the health of towns Farr returned several times to the relation between population density and mortality. It was in the report of the 1851 census that he first modified his approach to consider the influence of density on mortality. In this he noted not only population density, but also the mean *proximity* between people.

Eyler gives us the details of Farr's report. "If a district's population were equally distributed over its surface area, then the proximity could be defined as the mean distance between residents and the density as the number of residents per square mile. The census report offered a geometrical illustration. Two circular areas represented the degree of human crowding in England and Wales in 1801 and 1851. Density was represented by the number of intersections of two series of perpendicular parallel line segments. The distance between adjacent points of intersection represented the proximity."

"Only in the last several years of his career did Farr, using the registration materials for the decade 1861-1870, arrive at a formula for the relationship between proximity and mean lifetime, his last major statistical law, demonstrating with a formula that human life was shortened in a predictable manner as more people crowded into urban areas." It is worth recalling now his ideas about a relationship between crowding and disease, because they are as relevant today as they were then. The influence of crowding on incidence of infectious diseases in schools and Army barracks has been well studied for 100 years or more, and certainly since the birth of bacteriology and virology. In the last 10 years we have learned that tuberculosis has been transmitted in over-crowded airplanes.

The outbreak of chicken influenza in Asia is a compelling tale of Farr's "statistical" law on the ill effects of crowding. Millions of chickens crowded into confined spaces are a "fair field full of folk" for the transmission of disease. There is nothing new or surprising about that. And today we read in *The Washington*

*Post*, February 11, 2004, that avian flu is killing thousands of chickens in New Jersey and spreading elsewhere in the United States.

Contrast these epidemics of chicken influenza with an earlier era when chickens were raised in small numbers on individual farms, six to ten farms per square mile in the United States, and twenty to fifty chickens per farm. Each hen had an individual hutch, mostly used for laying eggs, but was free to wander in the barnyard scratching within the manure piles for the odd bits of oats and other undigested cereals. The eggs were gathered by the farmer's wife and the excess sold at market which was her pocket money. I do not recall from my boyhood days the occurrence of a chicken influenza epidemic.

But I must return to the theme of this essay. In short, through statistics and cold logic, Farr built the case for sanitary reform. And it is this that brings us back to Florence Nightingale.

William Farr as we have seen was at the height of his powers when he met Florence Nightingale at a dinner party in the autumn of 1856. She had just returned from the Crimea, was a national heroine, and was about to begin her campaign to reform the Army Medical Department. As she listened to Farr, Nightingale realized he possessed knowledge and experience she would need to reform the War Office. They began a lively correspondence, and two years later had made a pact. He would help her promote the health of the Army. In return, she would help with his campaign to reduce civilian mortality. Thus in 1856, began a collaboration that lasted nearly two decades.

The two sanitarians shared many interests, and, at least at first, were in agreement on the strategy to achieve their common goals. From Farr, Miss Nightingale obtained expert statistical advice. His experience with statistical problems made his advice especially valuable, and she had the mathematical background to handle it. He commanded a staff of trained clerks whose services she employed in completing her books and papers. For his part, Farr gained access through Florence Nightingale to the high and the mighty, the people of influence, Prime Ministers, members of the Cabinet, the Viceroy of India, the "movers and shakers" at Whitehall. In the U. S. we say the "inner beltway."

The collaboration led to a warm friendship. They left a correspondence of four hundred letters; handwritten; no fax machines or E-mail! The surviving letters mention personal favors exchanged and mutual respect and affection.

Having made a pact with Nightingale in regard to the Army, Farr examined the mortality of the Army of the East, and the enormous losses during the Crimea campaign, from August 1854 to March 1855. Farr noted that the mortality was greater than that in London during the plague of 1665.

In sum, Farr provided the Army Sanitary Commission with the type of analysis and testimony Florence Nightingale wanted. She was clearly pleased with his work, and saw to it that he was on succeeding committees to draw up specific proposals for acting on the Commission's recommendations. A plan for action and execution in other words.

With a reform program launched for the Army in England, Ms. Nightingale turned her attention to the Army in India. The aftermath of the Indian mutiny, or the first war of independence, gave her an opportunity. Once again, through politically influential friends, a Royal Commission was appointed. Farr was one of its members. She was much involved in the deliberations. She had an important collaborator in the new Viceroy, Sir John Lawrence. The warrant for the Indian Sanitary Commission was issued in May 1859, and appeared in 1863.

She kept pestering Farr for more information and data on the Indian statistics. For Florence, the study of statistics was a moral imperative, a religious duty. "We want facts. *Facta, facta, facta,*" she said. "Let us have all the reliable facts we can. And, the dryer the better. Statistics should be the driest of all reading." But Florence knew how to turn dry facts and statistics into clear brilliant writing. Like Farr, her writing was anything but dry.

Indian sanitary reform, she said, rested in his hands. He responded in characteristic fashion "I am working at the Indian Statistics -a most treacherous and troublesome field." He compared mortality and morbidity rates for English soldiers in India to native Indian troops, Indian civilians, English civil servants, English officers, etc., including pensioned or retired former Indian troops.

The Commission recommended reforms in sanitation, barracks and hospital construction, water supply, and so on. But there was stiff criticism from the Government of India. Shimla could be intractable. Farr counseled calmness in the face of criticism, "Let us wait and keep our powder dry. We are not going to fire in the air like people frightened out of our wits." In the end, Farr, Nightingale, and associates carried the day and the conclusions in the Indian Sanitary Commission were adopted.

In her efforts to benefit the "sick poor"—whether they were British and Indian soldiers or mothers in lying in hospitals—Florence Nightingale despaired at the intransigence of those in power. Again and again she had to work through and around those who were blocking her efforts to reform the War Office. She had great difficulty, particularly with Mr. Gladstone, who became Prime Minister in 1868. She wrote to a friend, "One must be as miserably behind the scenes as I am to know how miserably our affairs go on What would Jesus (Christ) have done," she asked plaintively, "if he had had to work through Pontius Pilate?"

Early on, Miss Nightingale learned to master the arcane ways of government. By the time the reports were finished, Florence realized that a report, by itself would solve nothing. As she wrote, "Reports are not *self-executive*." As I noted, she had commissions created to act on the reports. Farr was appointed to some of these. When the work of these commissions was accepted by the Prime Minister, Florence and Farr had won the battle. The adoption of recommendations in the reports initiated by Nightingale and Farr transformed the War Office, the British Army, sanitation, hospitals, nursing, the Poor Law, and the scientific disciplines of preventive medicine and statistics.

In later years, Farr and Miss Nightingale drifted apart, because he embraced the contagion theory of disease and accepted microbes as infectious agents, although not until 1865. Florence would have none of it. "He's given up" she said. For Florence, fresh air, cleanliness, and wash tubs were enough. And oh yes, political action, and sharp elbows. But despite their differences, Farr and Miss Nightingale remained friends, and retained their admiration for each other. In Farr's letters to Miss Nightingale, he expresses his fondness and affection for her. She was equally warm-hearted and gracious in return. He was bitterly disappointed in his failure to become Registrar General, but she offered support and expressed her affection.

Farr died before she did. After his death, she wrote to Florence Farr, Farr's daughter and her namesake; "I mourn for your and our loss; and rejoice for your Father and our friend, who is now set free to bless new worlds. How much he must enjoy. I could write so much about him."<sup>1</sup> A sudden decline in Miss Nightingale's powers occurred about 1868. Although she started nothing new in the last years, she never lost her interest in, and good will for, her creations. Viceroy of India came to consult the old invalid, and the War Office continued to send official papers to her.

Sir George Pickering has painted, in his brief chapter, a picture of a woman one could admire, but perhaps, not like. She used her friends and scorned her enemies. She was a bully, but her ruthless persistence was more than matched by the force and clarity of her ideas. One small measure of the power of her example is that within 50 years after she established the first Nightingale School of Nursing in London, 1000 such nursing schools had been established in the United States alone.

Eyler concludes his book on Victorian Social Medicine with this observation<sup>1</sup>: In reviewing Farr's social and medical ideas, there is one generalization that should be made. Farr's example illustrates in a forceful manner, the interplay of ideas about society, medicine and social science during early Victorian England. The 1830s emerged as a period of incubation for a set of related socio-medical attitudes common among public-minded Victorians who flourished in the mid-century. The reform campaign heightened the concerns of the middle class with the unrest among the urban poor, and awakened medical interest in hygiene and public health. In the end, Eyler notes, the attitudes of Farr and other social Victorians had a remarkable longevity, and have influenced social medicine and public health to the present day.

I would make one further conclusion about the work of Farr, Nightingale, and the other English and European medical statisticians who in the nineteenth century employed the power of mathematics to discover the social causes of disease, and recommend rational effective remedies. To my mind, this was the first introduction of *quantitative research* into medicine. True, the quantitative aspect was based on mathematics, and not on chemistry, physiology, or microbiology. That would come later. And yet this use of medical statistics was a departure from descriptive *qualitative* medicine that had been

practiced since the era of Galen. I believe this transition from qualitative medicine to quantitative medicine was really a new paradigm, to use a much abused expression, often employed for little reason at all.

Morbidity and mortality had begun to decline in England and Europe, even before the discoveries of Pasteur, Koch and Lister, because of the reforms of social medicine that were based on sound quantitative statistical analysis. We overlook, I fear, in this age of molecular biology, and the human genome, dare I even use the phrase "molecular medicine, that mathematics ushered in the era of quantitative medicine for the health and welfare of human kind. Miss Nightingale and William Farr made a difference in their own century. They made a difference by applying immediately what they learned. She was, in truth, the midwife to social medicine; Farr the attending physician.

At the close of the Victorian Age, Oscar Wilde wrote:

*Set in this stormy Northern sea,  
Queen of these restless fields of tide,  
England! What shall men say of thee,  
Before whose feet the worlds divide?*

Wilde got it partly right. The world has indeed divided many times over during the last century since Queen Victoria's golden jubilee. And his question? England! What shall the world say of thee? The influence of William Farr and Florence Nightingale on social medicine and public health during the Victorian Era, has and will endure, forever and forever. England. That is what the world will say of thee.

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Preventive health. The Victorian Government provides a range of programs to maximise older people's health and wellbeing and social participation across all life stages. Dementia-friendly environments. A Victorian government resource providing information and advice on designing and caring for people with dementia in residential aged care settings. Close Menu (This link is for visual users only). Back to Implementation case studies.