

EFFECT OF SEWERAGE AND WATER WORKS ON TYPHOID DEATH RATE*

Increased Sanitation at New Orleans Was Followed By Expected Decrease in Typhoid—Necessity of Guarding Against Other Sources of Infection

BY GEORGE G. EARL

General Superintendent, Sewerage and Water Board, New Orleans, La.

It has been suggested that the experience in New Orleans, La., with the introduction of effective drainage in 1900, and of sewerage in 1907, and water purification in 1908, and the gradual increase in the percentage of premises served with the two last-named facilities, and the adoption of sanitary measures only possible with the assistance of these systems, all emphasize certain well-known effects on community health as produced by these various steps and at the same time indicate the importance of other considerations.

There is published herewith, in tabular form, for the decade 1880 to 1889 inclusive, and for the decade 1890 to 1899 inclusive, and for each year thereafter, the general death rate of the city per 1,000, and the death rates per 100,000 from typhoid and malaria.

To the end of 1899 the city of New Orleans was very poorly drained, its soil was saturated with water, and what drainage existed was entirely on the surface.

Drainage Reduced Malaria

In 1900 the new drainage system commenced to affect substantially the whole populated area, and there was at once a very marked and progressive decrease in the general death rate, and a still more marked decrease in the death rate from malaria, but no effect on the typhoid fever death rate.

The tabulation shows the rate of utilization of the new sewerage and water supply systems in percentage of premises

*From report prepared for the annual meeting of the American Public Health Association.

served from 1908, when these systems started in operation, and the progressive extension of the drainage system to eliminate soil saturation to surface or water standing on surface, and to permit of the drying out of the upper soil strata in outlying areas of the city.

The combined result with all three systems shows a reduction of total death rate from 1899 to 1918, eliminating the influenza epidemic of 1918, of from 27 to about 19 per 1,000; a reduction of the death rate from malaria of from 104 to 4 per 100,000; and a reduction of the typhoid death rate of from 39 to about 18 per 100,000.

All of the above figures include deaths in the charity hospital, a very large institution which receives patients from several states surrounding Louisiana, as well as from Louisiana, and a considerable percentage of the total deaths, and probably the larger percentage of the deaths from typhoid fever, are of non-residents, at this and other city hospitals.

Gives Most Credit to Sewers

It is a fact, however, that within the city, in deaths among residents of the city, there appears to no evidence that the general water supply has now or ever has had any influence on the typhoid fever death rate, and it is with a view of emphasizing the necessity of guarding other sources of typhoid infection and other means of its dissemination that it is believed the experience at New Orleans is especially valuable.

Until 1912, when 38% of the premises of the city were served by sewers and 65% by filtered water, there was no marked decrease in the typhoid death rate, which averaged 59 per 100,000 for the decade ending 1899 and averaged over 37 per 100,000 to the end of 1912.

Since 1912, the average typhoid death rate has been less than 18 per 100,000, but it has averaged 22 per 100,000 during the last three years, when over 90% of the premises of the city were connected with the sewers and furnished with filtered water, and when in addition to especially efficient filtration, the water after filtration was sterilized with chlorine, whereas it only averaged 18 per 100,000 for 1912 to 1915 inclusive, when a less number of premises were served with water or sewerage facilities and when there was no sterilization of the water after filtration.

EFFECT OF SANITARY IMPROVEMENTS ON GENERAL DEATH RATE AND ON MALARIA AND TYPHOID DEATHS

Year.	Thousands of population.	Percentage of premises at end of year connected with					Main drainage system.		Death rate per 1,000 per annum—from all causes.			Deaths per 100,000 per annum					
		Sewers.	New water supply.	Miles of sanitary sewers in place.	Miles of water mains.	M.G.D. consumption.	Thousands of acres drained.	Miles of lateral storm drains, 10-ins. to 30-ins.	Max.	Min.	Average.	From malaria.	Max.	Min.	Average.		
1880-9.....	219-42	..	..	..	..	..	10†	..	33.5	25.4	28.6	213	99	156	33	13	21
1890-9.....	242-84	..	..	..	..	..	15†	..	30.2	24.1	27.2	142	68	104	67	24	39
1900.....	287	..	..	..	..	..	15†	..	..	..	25.9	..	..	68	..	..	40
1901.....	292	..	..	..	..	..	20	..	..	..	22.2	..	..	40	..	..	48
1902.....	297	..	..	..	..	..	21	..	..	..	22.1	..	..	33	..	..	45
1903.....	302	..	..	..	..	..	21	..	..	..	22.2	..	..	27	..	..	38
1904.....	307	..	..	115	..	..	21	..	..	..	22.2	..	..	22	..	..	36
1905.....	312	..	..	160	..	..	22	..	..	..	23.5	..	..	15	..	..	32
1906.....	318	..	..	224	35	..	22	..	..	..	21.4	..	..	13	..	..	30
1907.....	323	1	..	273	160	..	22	..	..	..	23.6	..	..	12	..	..	55
1908.....	328	5	3	302	485	..	22	75	..	..	22.4	..	..	20	..	..	33
1909.....	333	13	22	322	508	..	22	132	..	..	20.3	..	..	13	..	..	29
1910.....	339	20	38	353	512	..	22	154	..	..	21.4	..	..	9	..	..	32
1911.....	345	28	50	393	518	15.7	22	170	..	..	20.4	..	..	9	..	..	31
1912.....	352	38	65	426	530	16.6	22	181	..	..	20.1	..	..	8	..	..	14
1913.....	358	55	73	462	547	19.2	23	190	..	..	19.8	..	..	6	..	..	17
1914.....	365	67	85	477	565	22.7	24	233	..	..	20.3	..	..	9	..	..	21
1915.....	372	86	90	486	581	25.1	25	265	..	..	20.8	..	..	9	..	..	21
1916.....	378	92	93	496	591	27.8*	25	293	..	..	18.1	..	..	7	..	..	23
1917.....	384	93	94	501	591	29.7*	28‡	303	..	..	19.6	..	..	4	..	..	23
1918.....	389	94	96	505	594	33.2*	30‡	325	..	..	25.5†	..	..	4	..	..	20

*Water sterilized with chlorine.

†Very poorly drained.

‡From influenza, 4.5; pneumonia, 3.4; other causes, 17.6; total, 25.5.

§Not including 18,700 acres agricultural land drained to outside drainage stations.