HISTORICAL EPIDEMIOLOGY AND GRID ANALYSIS OF EPIDEMIOLOGIC DATA

Reimert T. Ravenholt, M.D., M.P.H., F.A.P.H.A.

"None will deny the wisdom of a precept which directs us to look ever more carefully on what has gone before. In our constant search for the new and for new interpretations of the already known there is a compelling necessity to reexamine constantly the implications of the past and the current significance of previously accumulated information." It is upon this precept, provided by Dr. Wegman, that this discussion of research and epidemiology needed to meet new responsibilities in public health will focus.

As new cultural patterns have evolved from old during the course of human history, and as man's environment has been changed by new knowledge and for a great variety of purposes, history records many, subsequently perceived, deleterious effects of such an altered environment. So, with industrialization and urbanization came great plagues which were especially the product of increased crowding and thereby greater pollution of man's immediate environment, water and air, with microparasites and other noxious products of man and his activities.

Considerable time has often elapsed between the time man's environment changed and the time he recognized the deleterious effects of the altered environment. Now we are in the midst of a century characterized by unprecedented rapidity of environmental change, and so it becomes ever more important to quickly discern any deleterious effects of the rapidly changing environment, so that corrective action can be taken before vast or irreparable damage is wrought.

Furthermore, environmentally-induced noncommunicable diseases often develop slowly and almost imperceptibly after long latent periods; and their trend can only be discerned by means of careful measurement utilizing good records and careful analysis.

The old frontier—with its dearth of sanitation and immunization and the resultant easily recognized epidemics of acute microparasitic disease—cholera, typhoid, smallpox, and diphtheria—presented an obvious challenge to early epidemiologists and health officers. Appropriately, they adopted a "six-shooter" approach: a quick conclusion that an epidemic existed, that it was probably due to one or several causes, and thereupon they initiated a flurry of corrective measures—one or more of which likely hit the mark. Not so today. Now epidemiologists and health officers may encounter great difficulty in ascertaining whether an epidemic exists, when it began, where it is, who is afflicted, its course, and, most difficult, its causes and the means for terminating it. The "six-shooter" approach no longer suffices; very precise and long-range marksmanship is now needed—which can only be obtained with a "long rifle"; one constructed by careful analysis of vital records accumulated during many decades. Each community needs a readily available and easily understood record of its mortality experience; yet few, if any, communities have such a document—without which

there is no secure basis for knowing and meeting new responsibilities in public health.

During the last several years the author has been attempting to construct an accurate and useful mortality record for the Seattle-King County community; and some of the methods and findings which have evolved from this study may be of interest to others.

Demography

The first need of anyone interested in analyzing the mortality experience of a community is for accurate population data. Yet how many community epidemiologists or health officers have, within easy reach, a table or series of tables presenting the population of their respective communities by single, five- or ten-year-age groups, sex and year—for at least each year of this century? It is elementary that epidemiologists and health officers should know the population with which they are concerned; for each of the last several census years such data are readily available by single or five-year-age groups; but the author has been impressed with the difficulty one encounters in preparing a table such as the accompanying Demogram (Figure 1) which presents the community population by standard five- or ten-year-age groups and sex for the last 70 years. Until recently, census data were presented by varying age groupings which are inadequate, even for census years, for calculation of age-specific rates for the older population and age-standardized rates for the community. Some assistance may be obtained from state health departments, city and county planning commissions, and from local demographers, but the information supplied is of variable and often inadequate quality, and methodology varies so greatly from one community to another that it is difficult to achieve comparability.

If the Census Bureau and the U. S. Public Health Service collaborated and constructed the most accurate possible Demograms for each major community for at least each year of the 20th century, and published them, perhaps as a supplement to "Public Health Reports," the work of epidemiologists, health officers, and others would be greatly facilitated for many years in the future.

Death Records and Mortality Analysis

During the last several decades there has been rapid improvement in the ways in which mortality records are maintained and analyzed in many of the major communities in the United States. But if one seeks to make a public health "rifle" six or seven decades long, to permit accurate knowledge of trends and emerging public health problems, one encounters great difficulty. In Seattle-King County, deaths were poorly recorded until required by state law in 1907. Results of electronic data processing of deaths by age, sex, and year are only available for the last decade. Annual reports of the health department and other pre-existing mortality analyses provide an incomplete and insecure knowledge of mortality trends because they have been repeatedly affected by changes in classification[1]; and coding of deaths to single causes has obscured the importance and trend of various contributing causes.[2,3]

For the purpose of constructing a useful mortality record for the last seven decades the author, with the part-time assistance of several medical students,* reviewed all death certificates registered in Seattle and King County from 1881 to 1925 and at least every fifth year thereafter. Deaths were tabulated to

* Drs. William Foege, G. G. Randolph, and Max Bader.

Figure 1—Demogram for Every Fifth Year, 1890-1960,* Seattle-King County, Wash.

TIME	AGE	0-1	1-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89+		TOTAL BY SEX	TOTAL	MEDIAN
1890	M	704	2259	2491	2011	2168	12770	9117	4939	2203	747	266	52		39727	63989	28.0
	F	620	2271	2492	2086	2192	6730	3873	2221	1101	474	169	33		24262		23.7
1895	M	759	2631	3486	2811	3302	15091	13316	8185	3558	1320	476	89		55024	87019	29.6
	F	654	2608	3320	2825	2953	7669	5608	3462	1701	844	300	51		31995		24.7
1900	M	814	3003	4481	3611	4436	17412	17516	11431	4914	1894	686	126		70324	110053	30.8
	F	688	2944	4149	3565	3713	8609	7343	4701	2302	1214	432	69		39729		25.6
1905	M	1465	5728	6908	6215	7788	30508	27029	17948	8791	3431	1245	224		117280	197345	30.0
	F	1387	5480	6579	6162	7310	18819	15366	9980	5168	2592	1047	175		80065		27.0
1910	M	2117	8452	9334	8820	11139	43602	36542	24466	12668	4969	1805	322		164236	284638	29.8
	F	2087	8017	9010	8758	10907	29029	23387	15260	8033	3970	1662	282		120402		27.4
1915	M	2591	10331	12116	10708	11928	40415	41586	28663	17083	7308	2445	490		185664	336955	31.1
	F	2566	9851	11783	10821	12303	33720	29712	20004	11709	5906	2427	489		151291		28.4
1920	M	3065	12210	14898	12594	12718	37229	46629	32860	21499	9647	3085	659		207093	389273	32.3
	F	3046	11685	14556	12884	13699	38409	36036	24749	15385	7842	3192	697		182180		29.2
1925	M	2984	12147	16518	15232	15495	38066	43449	36829	24110	12505	4506	1050		222891	426395	32.5
	F	2897	11674	16102	15295	16319	38813	37950	29385	18894	10678	4416	1081		203504		30.0
1930	M	2903	12084	18137	17869	18272	38904	40262	40800	26723	15364	5927	1443		238688	463517	32.8
	F	2747	11664	17649	17706	18940	39215	39864	34022	22403	13514	5641	1464		224829		31.1
1935	M	2988	12136	16292	17032	18685	39986	40125	39402	31648	18691	8036	2062		247083	484242	34.1
	F	2885	11604	15951	16746	19349	41427	39935	35817	26812	16791	7717	2125		237159		32.6
1940	M	3073	12188	14447	16195	19099	41069	39987	38005	36573	22019	10145	2682		255482	504980	35.4
	F	3024	11544	14254	15787	19759	43640	40006	37613	31222	20068	9794	2787		249498		34.2
1945	M	5469	22174	21831	18557	19441	49698	50152	43795	38092	27033	12158	3410		311810	618986	33.7
	F	5380	21433	21121	17906	19662	52081	50018	42503	35370	25294	12584	3824		307176		33.2
1950	M	7865	32159	29214	20920	19784	58326	60316	49585	39611	32047	14171	4139		368137	732992	32.6
	F	7736	31322	27988	20025	19564	60525	60029	47393	39518	30520	15374	4861		364855		32.5
1955	M	9376	37175	38484	32123	24639	57440	63144	55882	43183	31890	17264	4969		415569	834003	31.4
	F	9004	35996	37400	31111	25701	59345	63531	54487	42660	33080	19554	6565		418434		31.7
1960	M	10887	42190	47755	43326	29494	56555	65973	62179	46756	31733	20357	5799		463004	935013	30.2
	F	10272	40669	46812	42196	31838	58164	67033	61582	45801	35640	23734	8268		472009		30.9

* Populations for April 1 of each year; estimated for older age groups during early decades, and calculated for intercensus years by straight line interpolation.

	YEAR	AGE	0-1	1-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90 +	TOTAL DEATHS BY SEX	TOTAL DEATHS	DEATHS PER 100,000 POP. AT RISK BY SEX	DEATHS PER 100,000 POP. AT RISK TOTAL	AGE-ADJUSTED BY SEX	AGE-ADJUSTED TOTAL	MEDIAN AGE AT DEATH
BY OCCURRENCE	1890	M					1	3	4	10	4	7	1	1		31	47	78.0	73.4	147.2	142.6	48.0
		F				2		3	2	1	3	4	1			16		65.9		128.0		50.0
	1895	M						2	9	4	6	11	9	1		42	74	76.3	85.0	157.6	158.0	60.0
		F	2		2	2	2	3	3	5	4	5	4			32		100.0		158.5		46.0
	1900	M	4	1		1	1	5	29	28	36	33	13	2		153	217	217.6	197.2	332.3	308.2	52.2
		F	1		1		3	5	6	16	7	17	7	1		64		161.1		260.7		50.0
	1905	M	1		3	2	5	4	18	26	39	27	29	6	1	161	251	137.3	127.2	236.4	210.4	55.6
		F	1		2	3	2	9	9	11	21	14	16	2		90		112.4		175.6		53.8
	1910	M	3		4	3	5	17	28	52	79	97	59	27	3	377	611	229.5	214.6	427.3	379.8	59.7
		F	2	2	3	5	7	16	19	41	31	53	39	14	2	234		194.3		320.0		57.1
	1915	M	3	1	3	3	10	11	19	66	104	106	119	35	4	484	828	260.7	245.7	429.6	393.9	62.1
		F		1	2	3	3	16	24	41	64	70	85	32	3	344		227.4		354.9		62.3
	1920	M	2	1	4	4	2	19	23	55	125	154	110	55	9	563	1030	271.8	264.6	402.3	390.0	63.0
		F	1	3	6	7	5	15	25	54	71	113	106	52	9	467		256.3		376.8		64.2
	1925	M	2	1	4	9	2	18	31	71	135	233	221	88	12	827	1405	371.0	329.5	463.8	414.1	66.0
		F	1	6	3	4	6	19	31	43	75	148	153	80	9	578		284.0		360.0		66.8
	1930	M	2		3	9	3	14	40	87	227	309	336	124	9	1163	1970	487.2	425.0	528.5	470.6	66.4
		F	2		1	3	8	14	25	69	99	197	251	125	13	807		358.9		406.7		69.2
	1935	M				1	6	10	27	117	244	366	478	157	24	1430	2414	578.8	498.5	518.4	456.6	68.5
		F		1		1	8	9	28	69	140	219	303	182	24	984		414.9		381.1		70.6
	1940	M	1			1	4	15	34	112	311	471	560	234	28	1771	3035	693.2	601.0	538.5	474.7	68.6
		F			1	3	1	3	22	70	147	298	428	255	36	1264		506.6		405.7		72.0
	1945	M		2	1	1	7	17	40	156	383	598	534	286	43	2068	3445	663.2	556.6	531.3	441.7	67.1
		F		1		3	1	10	34	61	147	302	480	290	48	1377		448.3		347.3		72.7
		M																				
		F																				
BY RESIDENCE	1950	M	1	2	1	1	1	12	48	152	380	633	697	373	65	2366	3909	642.7	553.3	524.0	420.0	69.2
		F		2			1	7	14	60	129	344	505	415	66	1543		422.9		315.4		74.2
	1955	M	2	3	3	1		5	29	155	340	693	813	455	93	2592	4376	623.7	524.7	504.9	397.9	70.8
		F	2			1	2	7	18	67	132	303	594	551	107	1784		426.4		292.7		76.1
	1960	M			1	1	1	7	32	151	357	636	903	556	94	2739	4819	591.6	515.4	480.1	378.6	72.0
		F		1		1	1	7	21	40	129	320	721	655	184	2080		440.7		282.1		77.2

Figure 2—Cardiovascular Disease Mortalogram (includes deaths caused by coronary disease, strokes, renal disease, etc.) for Every Fifth Year, 1890-1960, Seattle-King County, Wash.

major or antecedent causes roughly in accord with current international standards.[1]

Many persons think of death records as something inherently dull and uninteresting; but it was impressive to see the deep, active, and lasting interest in death records developed by the medical students who participated in this study.

There is a wonderful history contained in old death records; a mute eloquence of earlier days: of storm-swept Puget Sound and falling Douglas Fir; of avalanche and cave-in; of the rush for gold in Alaska and the accompanying misery of diphtheria, meningitis, syphilis, and murder. The records bear witness that people die in many, many ways: of "execution by irate citizens"; of "lockjaw from a firecracker"; of "natural decay"; or by "lighting fuse of dynamite placed on head." The dead measured the quality of the water and milk, and tested each new means of transportation. As they recorded changing ways of dying they documented our changing ways of living. Few historical incidents escaped their mark.

To make the record as complete as possible, daily newspapers, from 1876 on, were reviewed with the assistance of University of Washington students (P.H. 420, Fall Quarter, 1960, and Spring Quarter, 1961). Many fascinating accounts of early epidemics and the struggle to attain good water supplies,[4] good housing, and so forth permit students and teacher alike to gain much better perspective of disease trends and the difficulties which had to be overcome to create an effective public health organization and the modern community.

Grid Analysis of Epidemiologic Data

After tabulating deaths by cause, age, sex, and time, considerable effort was devoted to analysis and presentation of the data. The author had long been dissatisfied with the fragmentary and incomplete methods ordinarily used to convey epidemiological and mortality data. To gain really adequate knowledge of changing disease and mortality patterns for a community one needs not only knowledge of the crude and age-standardized rates, but also rather complete knowledge of the numerical distribution pattern of deaths according to cause, time period, age, and sex. After some experimentation it was found that one could present all the needed data—the deaths by age, sex, and time; the total deaths by sex and for sexes combined; the crude and age-standardized mortality rates by sex and for sexes combined; and the median age of the deaths—upon an 8½ x 11 inch form. The lines on this Mortalogram (Figure 2) have been fitted to the typewriter so that data can be entered readily for as many as 20 time periods. The presentation of the numerical data by means of a grid, arranged by time, age, and sex for a given cause permits one to discern major trends at a glance; the use of the 8½ x 11 inch form facilitates recording, storage, transfer, presentation and publication of the data.

Supplementary Demograms or an age-specific rate grid in addition to total crude and age-standardized rates enable one to refine and confirm the apparent trends.

Is there not a great need for a standard means of conveying more complete data from one public health worker to another?

With the use of a standard method such as the Mortalogram, communication between public health workers would be facilitated: e.g., "Would you please send a Demogram, and Mortalograms for tuberculosis and lung cancer, for Topeka for each year, 1941 to 1960?"

Similarly, there is a need to present combined morbidity and mortality data

in such a way that the reader can view the numerical distribution pattern by age, sex, cause and time, and thus evaluate how the author's experience compares with his own—a comparison which is usually impossible at present because of the fragmentary and diverse ways in which the data are presented. Such standardization of presentation of morbidity-mortality data would be particularly useful in analyzing results of therapy in various institutions or with various therapeutic regimens.

It is the author's belief that Numerical Distribution Patterns and Age-Sex-Specific Rate Patterns, as revealed by standard grids, provide the most sensitive and secure means of detecting differences and trends. Routine presentation of all the essential data by a standard method such as these grids would diminish the likelihood that a worker would select and present only those portions of the data which supported his hypothesis or argument.

Scientific literature overflows with articles wherein the author presents selected fragments of the data, and conclusions buttressed with the statement that a difference in the selected data is "statistically significant."

A useful rule of the thumb in reading scientific literature is that when an author claims to have proved something because a numerical difference is "statistically significant"; he has not. Scientific proof depends upon a "chain of evidence"—in which important links are: the integrity and skill of the investigators, the design of the study, the care with which the data were collected and handled, the magnitude of the numerical differences observed, and so forth. Statistical tests of the significance of a selected numerical difference can occasionally be of value in testing the strength of one "link" in the "chain of evidence." If such tests show that the numerical difference "link" is weak, then the entire "chain of evidence" is necessarily weak; but even if the numerical difference "link" is strong, the "chain" may yet be weak.

It is perhaps best to present the data as fully as possible by a standard method and thereby permit the reader to evaluate the significance of a specified difference according to its total numerical context and his familiarity with similar data from comparable studies.

Charting of Epidemiologic Data

In addition to the above mentioned use of grids for presentation of numerical data, it is desirable that such data be charted. Charting has been greatly facilitated during recent years by development of easy-to-use pens, improved lettering guides, and pressure-sensitive tapes (Figure 3). With the use of these materials and 8½ x 11 inch drawing paper, most public health workers could quickly prepare charts which would be valuable for presentation of data and trends to government officials, fellow workers, students, and the public. Such charts are easily carried in notebooks and can be used for presentation of data and trends to individuals, to seminar groups, and as visual aids for television interviews.

Many public health workers are much less effective than they could be because they have not developed means of easily and effectively communicating their knowledge of data and trends to others.

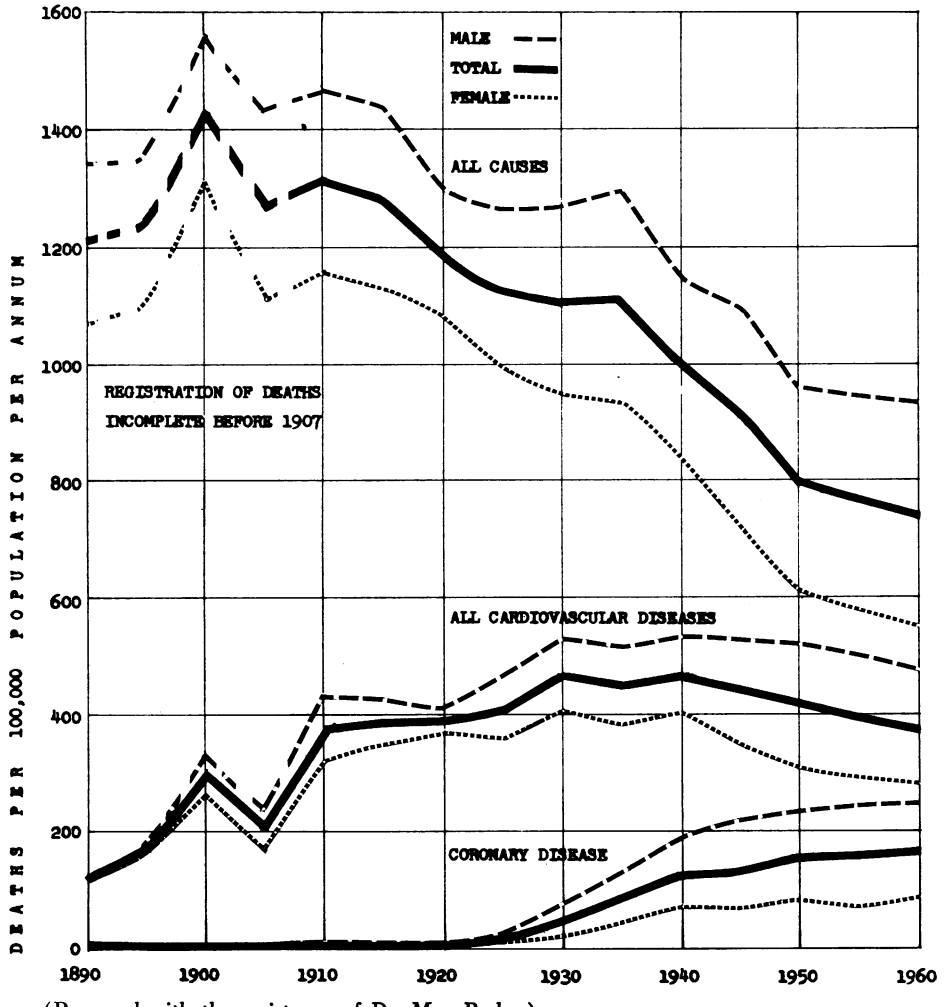
Historical Trends of Several Diseases in Seattle

During the last seven decades striking changes have occurred in mortality patterns in Seattle.

Communicable Diseases

In the year 1907, perhaps largely because of great immigration and

Figure 3—Age-Adjusted Mortality Rates for All Causes, All Cardiovascular Diseases, and Coronary Disease, Seattle-King County, Wash., 1890-1960



(Prepared with the assistance of Dr. Max Bader.)

crowding, communicable diseases terrorized the community. Upon a great base of tuberculosis, several other diseases struck with unprecedented fury. From February to midsummer of that year, 222 residents (93 per 100,000 population) succumbed to bacterial meningitis (Figure 4). And even before the meningitis epidemic had ceased, nature and man combined to produce the community's largest typhoid epidemic (Figure 5). Rapid population growth and drought made excessive demands upon the municipal water supply, and in July, 1907, the potable Cedar River water was deliberately augmented with contaminated, unchlorinated Lake Washington water. Within an incubation period every hospital in Seattle was overflowing with typhoid patients as reported by the Seattle Times on August 19, 1907:

"Twenty applications have been made to the Seattle General Hospital for accommodations for persons afflicted with typhoid fever, and have been rejected since Saturday last, according to information received from authorities at that institution, which has already thirty-five patients so afflicted. The other hospitals are rejecting patients each day. The Pacific Hospital has eighteen patients suffering from typhoid fever, Providence, twenty-five, Wayside Emergency, twenty-three, and Minor, fifteen, making a grand total of 116. This does not, however, include patients who are being treated at some of the smaller sanatoriums. It is said that while conditions in this respect are extraordinary, they are not alarming."

By year's end, 101 residents had died of typhoid, with an additional 137 deaths ascribed to cholera infantum, diarrhea, dysentery, colitis or enteritis.[4] Even then the community could not rest. In October, bubonic plague claimed three lives and thereupon a great drive was waged against rats, garbage, and harborage.

Fortunately, the epidemic difficulties

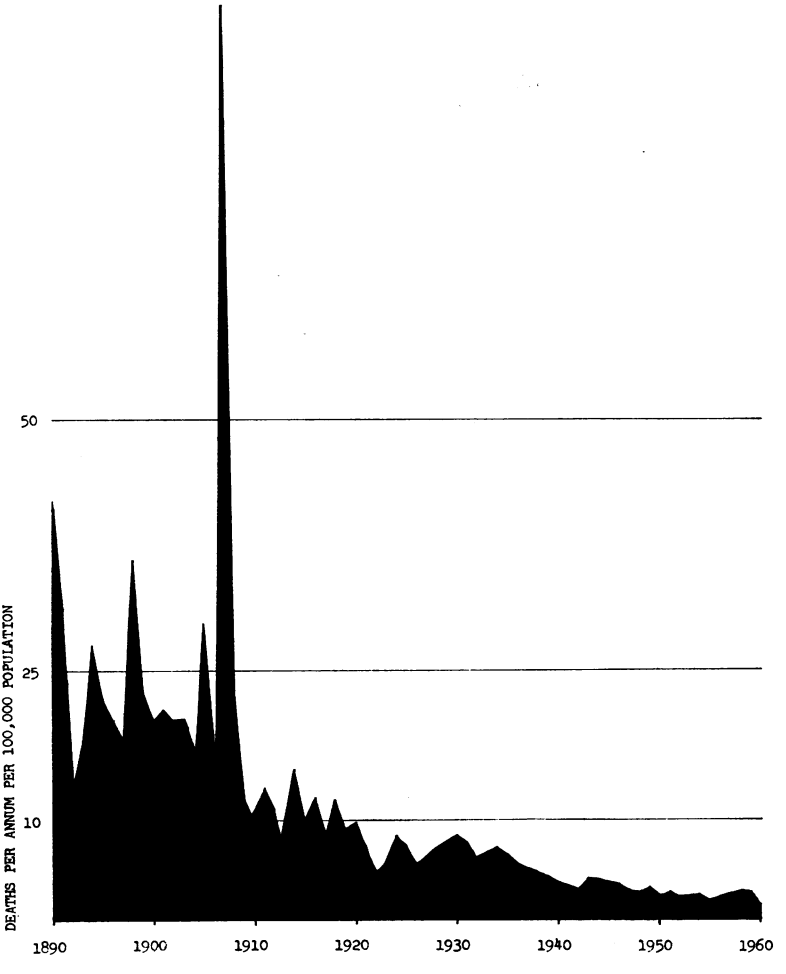


Figure 4—Bacterial Meningitis Mortality per Annum, Seattle-King County, Wash., 1890-1960

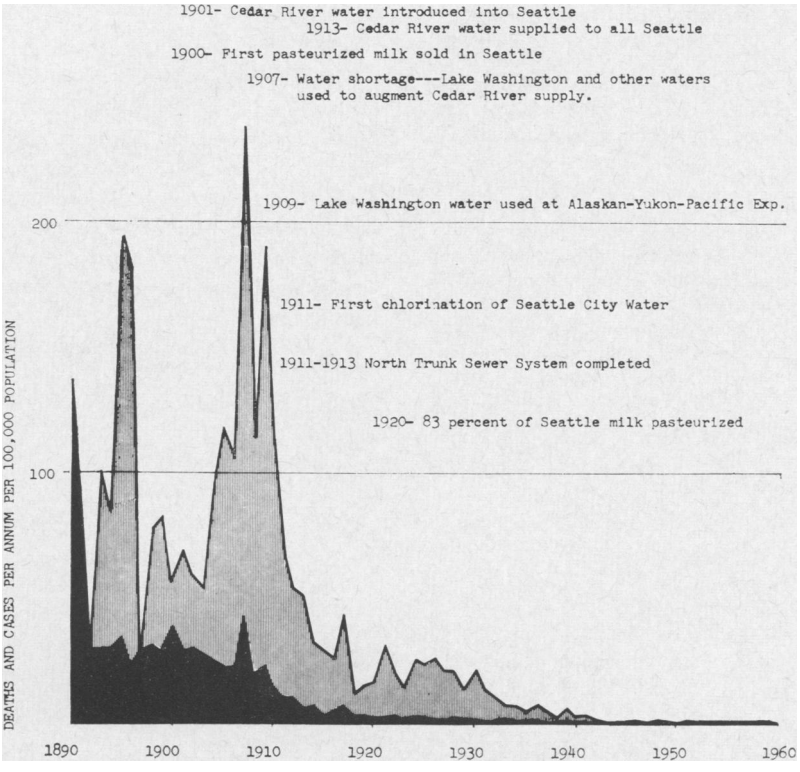


Figure 5—Typhoid Fever per Annum, Seattle-King County, Wash., 1890-1960

of 1907 produced fundamental improvements in the community's defenses against disease: a Department of Health under the direction of a full-time health officer was created; hospitals were required by law to keep records of the name, age, sex, color, place of birth, place of residence, etc., for all patients admitted; and a statute was enacted requiring registration of all deaths and burials.

Since then, communicable diseases have lost much of their power:

1. TUBERCULOSIS, a leading cause of death in 1910 when it claimed the lives of 205 males and 110 females in Seattle (half of whom were less than 30 years of age), caused only 30 deaths during 1960—none of whom were less than 30 years of age.

2. DIPHTHERIA, which attained its maximum mortality rate in 1898 coincident with the Alaskan Gold Rush, has only occurred once during the last four years.

3. WATER-BORNE OUTBREAKS OF TYPHOID FEVER were common until 1909 when the community finally acquired an adequate supply of potable water. Since then typhoid occurrence has dwindled and in 1960 no cases were reported.[4]

4. EPIDEMIC POLIOMYELITIS was not recognized in Seattle before cessation of water-borne outbreaks of typhoid (Figure 6)[5]; and when one recalls the global historical epidemiology of these two diseases, one can at least hypothesize that in earlier years contaminated municipal water supplies may have provided effective immunization against

numerous enteroviruses to those youngsters who survived its deadly bacteria.

Noncommunicable Diseases

Two diseases, virtually unknown 60 years ago, have become formidable causes of death:

1. CORONARY HEART DISEASE — Few deaths were ascribed to coronary disease or angina pectoris during the first two decades of this century (Figures 7, 8); but from 1925 to 1940, coronary disease was recognized as an important cause of death. Since then, as it has continued to increase and as other causes of death have decreased, coronary disease has become the foremost cause of death. In 1960, this disease claimed 2,039 lives in Seattle—about one-fourth of all deaths and one-half of all deaths ascribed to cardiovascular-renal diseases (Figure 3). But during the last two decades there has been a marked slackening in the rate of increase of mortality from this cause (Figures 3, 7, 8), mainly due to the leveling-off of coronary disease mortality among younger males. During the last decade in Seattle there has been no increase in mortality rates for men and women under the age of 50 years from coronary heart disease.

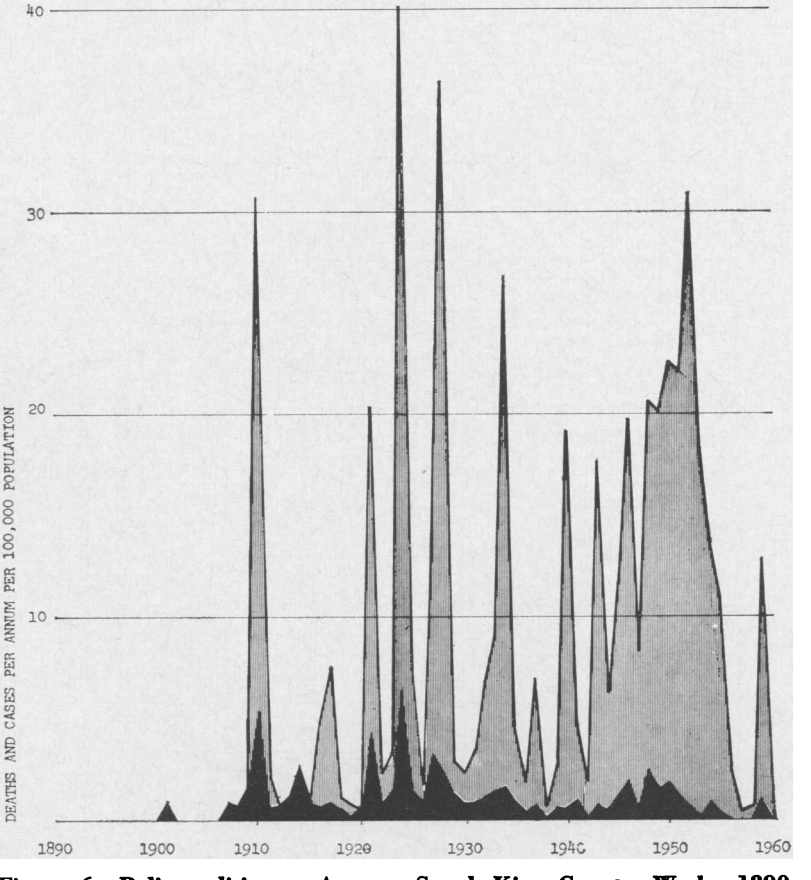


Figure 6—Poliomyelitis per Annum, Seattle-King County, Wash., 1890-1960

YEAR	AGE	0-1	1-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90 +	TOTAL DEATHS BY SEX	TOTAL DEATHS	DEATHS PER 100,000 POP. AT RISK				MEDIAN AGE AT DEATH
																	BY SEX	TOTAL	AGE-ADJUSTED BY SEX	AGE-ADJUSTED TOTAL	
1910	M							1		2	4	3	1		11	15	6.7	5.3	15.1	10.9	67.5
	F									1	1	1	1		4		3.3		7.1		70.0
1915	M									4	5	2	1		12	16	6.5	4.7	10.7	8.2	64.0
	F										3		1		4		2.6		4.9		66.7
1920	M								5	3	8	3			19	28	9.2	7.2	11.9	9.3	62.5
	F								2	2	3	2			9		4.9		6.7		63.3
1925	M						1	1	10	13	18	7	3		53	72	23.8	16.9	25.5	19.6	61.1
	F							1	2		8	7	1		19		9.3		11.6		68.8
1930	M						1	2	24	51	58	28	5	1	170	214	71.2	46.2	70.3	46.1	61.2
	F								5	8	11	17	3		44		19.6		21.8		68.2
1935	M							4	42	78	113	93	20	3	353	468	142.8	96.6	124.4	86.6	64.6
	F							1	7	14	33	43	16	1	115		48.5		44.9		70.5
1940	M							11	55	153	205	179	36	7	646	883	252.8	174.8	193.2	134.0	65.1
	F							1	12	34	71	85	32	2	237		95.0		75.5		70.0
1945	M							15	91	198	279	191	43	3	820	1065	263.0	172.0	210.2	136.9	63.8
	F						2	3	13	35	77	88	27		245		79.8		62.8		66.9
1950	M						1	19	94	218	342	288	101	9	1072	1469	291.2	200.4	239.7	160.9	66.0
	F							3	18	37	119	153	61	7	397		108.8		83.0		71.4
1955	M							15	114	225	402	318	123	25	1222	1663	294.0	199.4	246.2	161.1	66.4
	F							2	20	41	106	173	86	13	441		105.4		76.0		73.0
1960	M						1	17	104	256	383	409	178	20	1368	2039	295.5	218.1	250.4	172.5	68.0
	F							4	10	48	126	271	181	31	671		142.2		93.8		75.4

Figure 7—Coronary Disease Mortalogram (includes deaths ascribed to coronary disease and angina) for Every Fifth Year, 1910-1960, Seattle-King County, Wash.

2. LUNG CANCER—The first death ascribed to lung cancer in Seattle was that of a 70-year-old man in 1900.[6] Since 1930, total mortality ascribed to this cause has increased rapidly (Figures 9, 10), due to the increased mortality of older males from this disease. However, no sustained increase in the age-standardized female mortality rate from lung cancer has occurred since 1935. The rate for Seattle males, on the other hand, increased steadily by about 50 per cent every five years from 1935 to 1955, and by 23 per cent from 1955 to 1960. The slackening rate of increase of the total male lung cancer mortality rate, which is the result of the leveling-off of mortality rates among younger males during the last decade, suggests that the twentieth century lung cancer epidemic is nearing its crest, or at least a plateau.

It is suggested that if a plateau in the lung cancer epidemic is attained before 1975, and maintained, it would probably largely be the ultimate expression of cigarette smoking upon males born after 1900, who acquired the habit in

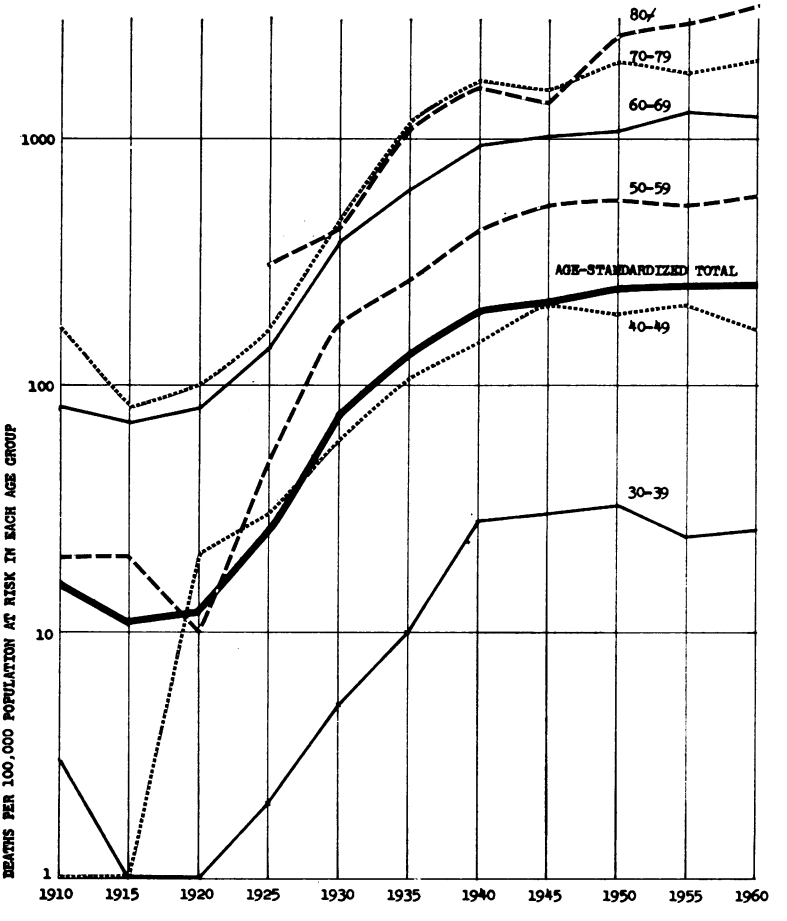


Figure 8—Coronary Disease Mortality Rates for Males by Age for Every Fifth Year, 1910-1960, Seattle-King County, Wash.

YEAR	AGE	0-1	1-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90 +	TOTAL DEATHS BY SEX	TOTAL DEATHS	DEATHS PER 100,000 POP. AT RISK				MEDIAN AGE AT DEATH
																	BY SEX	TOTAL	AGE-ADJUSTED BY SEX	AGE-ADJUSTED TOTAL	
1900	M											1			1	1	1.4	.9	4.5	2.8	
	F																				
1905	M																				
	F																				
1910	M										1				1	2	.6	.7	1.3	1.2	
	F									1					1		.8		1.2		
1915	M										1				1	2	.5	.6	.9	.8	
	F									1					1		.7		.8		
1920	M									1					1	1	.5	.2	.5	.3	
	F																				
1925	M									1					1	2	.4	.5	.4	.6	
	F												1		1		.5		.8		
1930	M										1	1			2	6	.8	1.3	.9	1.2	
	F								1		2	1			4		1.8		2.0		
1935	M								2	6	5	1			14	24	5.7	5.0	4.7	4.2	58
	F									7	3				10		4.2		3.8		
1940	M							2	3	11	8	2	1		27	38	10.5	7.5	8.0	5.9	60
	F								2	1	6	2			11		4.4		3.4		
1945	M								8	17	16	7			48	63	15.4	10.2	12.4	8.2	60
	F							2	1	3	6	1	2		15		4.9		3.8		
1950	M							3	9	20	32	19	1		84	106	22.8	14.4	18.9	11.8	64
	F							1	3		8	8	2		22		6.0		4.8		
1955	M							3	8	47	49	34	3		144	163	34.6	19.5	30.0	16.4	64
	F							1	1	4	3	8	1	1	19		4.5		3.6		
1960	M						1	5	7	40	83	43	12		191	218	40.8	23.3	36.8	19.9	65
	F							2	3	1	11	4	6		27		5.8		4.3		

Figure 9—Lung Cancer Mortalogram, Mortality by Age and Sex for Every Fifth Year, 1900-1960, Seattle-King County, Wash.

youth, smoked most of their lives, and achieved maximum lung cancer mortality rates during their last several decades of life.

If, on the other hand, a peak in the lung cancer epidemic were attained, with subsequent decreasing mortality rates despite continued or increased exposure to causative agents such as cigarette smoking and, possibly, urban air pollution, it would indicate that a large proportion of the current older human male population is unusually susceptible to this disease because of one or more earlier experiences, for example, possibly the 1918-1920 influenza pandemic

Conclusion

As we "Organize for New Responsibilities in Public Health," the first order of business is to know thoroughly what has gone before. Each local health department should construct for its community a thorough record of its mortality experience and thereby produce the "long rifle" needed for effective aim of public health resources at the most important and emerging public health problems.

ACKNOWLEDGMENTS—The author wishes to thank Drs. W. F. Foege, G. C. Randolph, Max Bader, and S. P. Lehman for their vital contributions to this study.

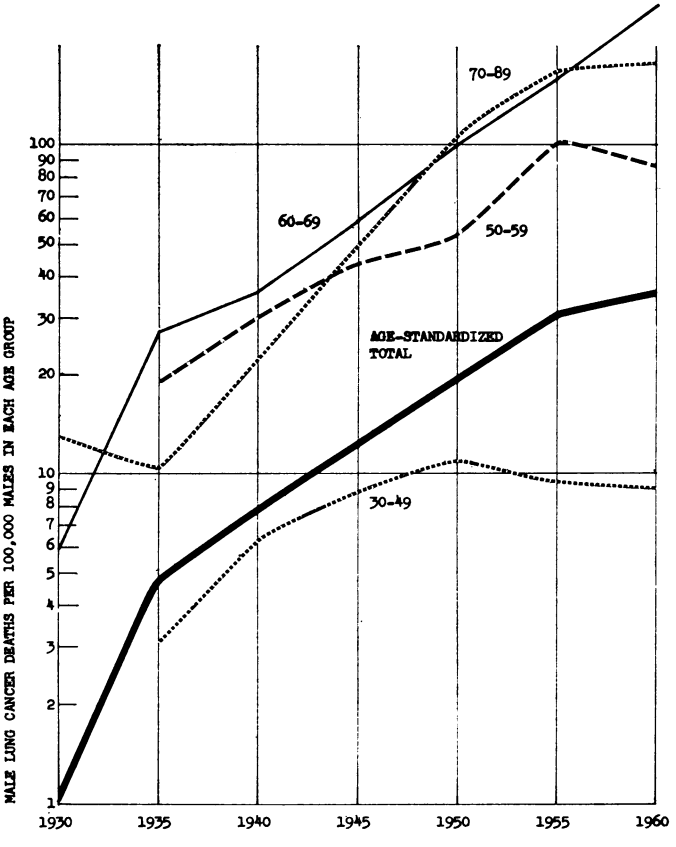


Figure 10—Lung Cancer Mortality Rates for Males by Age for Every Fifth Year, 1930-1960, Seattle-King County, Wash.

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Dr. Ravenholt is epidemiologic consultant, Europe, Division of Foreign Quarantine, U. S. Public Health Service, American Embassy, Paris, France. He was formerly director, Division of Epidemiology and Communicable Disease Control, Seattle-King County Health Department, Seattle, Wash.

These papers were presented before the Association Symposium (Part I) of the American Public Health Association at the Eighty-Ninth Annual Meeting in Detroit, Mich., November 13, 1961.

Kimble Methodology Award, 1962

Nominations for the Tenth Kimble Methodology Research Award are being accepted until June 1, 1962. This award, which gives recognition to the application of scientific knowledge to the public health laboratory, was established by the Kimble Glass Company of Toledo, Ohio, and is sponsored by the Conference of State and Provincial Public Health Laboratory Directors. The cash award of $1,000 and silver plaque will be presented at the Annual Meeting of the conference to be held in Miami Beach, Fla., in October, 1962, in connection with the 90th Annual Meeting of the APHA.

To be considered for nomination the candidate's work should be either a fundamental contribution which serves as a baseline for development of diagnostic methods which fall within the province of the public health laboratory, or the adaptation of such a contribution. Nominees must be from the United States, its territories, or Canada. Nominations must be accompanied by six reprints with six summaries and bibliography (if reprints are not available, six summaries with bibliography) and a statement which justifies the recommendations of the study.

Nominators (including authors and co-authors) must not sign documentary evidence, but must send a letter of transmittal.

Nominations received after June 1, 1962, will be considered for nominations in 1963. Further details from and nominations to George F. Forster, Illinois Health Department, 1800 West Fillmore Street, Chicago, Ill.