

relatively small area from which to draw volunteers. Every possible source, therefore, was used to ensure reasonable attendance figures. The North-West Metropolitan Regional Hospital Board undertook to make beds immediately available for cases of pulmonary tuberculosis discovered by the unit.

1. *Doctors' Patients*.—The co-operation of about 120 general practitioners in the borough was obtained by a series of personal interviews. The suggestion that everybody on their lists should have an x-ray report was in many cases accepted, which resulted in a regular service for patients with and without symptoms. Despite this liberal policy, our discovery rate of pulmonary tuberculosis requiring treatment in this group (16 per 1,000) compares on the whole with the finding of Sutherland (1952), 28 per thousand; of Nash *et al.* (1953), 20 per thousand; and of Barr and Ritchie (1955), 22 per thousand.

2. *Individual Volunteers*.—The propaganda measures directed towards this group during the first two years of the survey were confined to Islington and comprised the house-to-house distribution of leaflets, slides in cinemas, posters, announcements in the local press, displays in shop windows, mobile booking offices in the streets during the summer months, and talks to clubs and meetings. For six months two canvassers were employed for house-to-house visiting—but this was found to be of little value. Spot inquiries during the first year showed, however, that by far the largest number of individual volunteers came on personal recommendation. The high yield of pulmonary tuberculosis in this group underlines the importance of the measures taken to attract individual volunteers to the unit.

3. *Social Class V*.—The finding of a high incidence of chronic infectious tuberculosis in this group is of especial interest, and, if true of areas with a similar social structure to Islington, provides a pointer to the direction in which further efforts should be made. It has been accepted for a long time that the respiratory tuberculosis mortality rate is higher in Social Class V than in Social Class III (or higher classes)—at the 1930–2 occupational mortality investigation the excess was 25% (Registrar-General, 1938), and at the 1950 investigation the excess was 46% (Registrar-General, 1954). It is now clear that this excess is not attributable to higher case fatality but to the higher incidence of undiscovered disease. The overall yield of pulmonary tuberculosis in Social Class V may not always have exceeded that in other social groups, but could have been over-emphasized by a decrease of the disease in those groups which for years have made more use of x-ray facilities.

4. *Antenatal Examinations*.—These have not proved a profitable source of case finding in this survey. The discrepancy in the incidence of pulmonary tuberculosis between this group and women of the same age in other groups is of interest and may warrant further investigations.

5. *Mobile and Static M.M.R.*—In comparing the relative values of mobile and static M.M.R. in a continuous anti-tuberculosis campaign, their differences in scope and mode of operation should be borne in mind. Table XI lists some of these differences.

Mobile M.M.R. forms thus an important *protective* service for the organized groups of the working population, while static M.M.R., owing to its wider range of coverage and persistence of tenure, can contribute to a substantial reduction of the disease in areas in which pulmonary tuberculosis is a serious problem. For the same reason static

mass radiography is capable of playing an important part in the detection of cancer of the lung.

Summary

During three years of operation a static M.M.R. unit based on the Metropolitan Borough of Islington x-rayed 87,261 adults, of whom 86% were first entrants. Over half were residents of Islington, forming about 21% of the adult population of the borough.

Figures for the prevalence of pulmonary tuberculosis requiring treatment are given by age, sex, source, and social groups.

The overall incidence of pulmonary tuberculosis was 7.7 per 1,000: for Islington residents, men 13.2, women 8.0; for non-Islington residents, 6.3 and 3.7 respectively. The highest yields came from doctors' patients and individual volunteers. The disease, particularly the chronic infectious type in those over 45 years of age, was more prevalent in men of Social Class V and in the retired.

It was found that 62% of male cases and 37% of female cases were sputum-positive.

A total of 115 cases of cancer of the lung were discovered. Prevalence appeared to be higher in Social Class V.

The methods of work and the implications of the results are discussed.

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MORTALITY FROM FOG IN LONDON, JANUARY, 1956

BY

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There was some fog in the London area on January 3, 1956. This became thick on the morning of January 4 and persisted until the morning of January 6, when it began to disperse. Fog was widespread throughout much of the rest of the country at the same time, and in some places continued longer. In London the fog was thick enough to cause very severe disruption of traffic, particularly on the evening of January 5. Newspapers carried headlines about "killer smog," described the widespread investigations that were being conducted during the fog into the degree of atmospheric pollution that was taking place, and reminded readers that the previous severe London fog, in December, 1952, had caused several thousand deaths in the London area.

Following the fog of December, 1952, a period of some weeks had to elapse before the mortality returns could be analysed and the total number of deaths due to the fog could be estimated—about 4,000 deaths in the Greater London area (Logan, 1953; Ministry of Health, 1954). After a similar delay it is now possible to give a corresponding estimate for the January fog of this year—about 1,000 deaths in the Greater London area.

The number of deaths occurring each day from December 25, 1955, to January 19, 1956, in the London Administrative County are shown in Table I and Fig. 1.

TABLE XI

	Mobile	Static
Source of examinee ..	Mainly organized groups	All sources
Social structure of examinee	Mainly Class III	All social classes, including the retired
Field of operation ..	Industrial areas	Dormitory areas
Proportion of first examinations	Low	High
Yield of P.T.	Declining	Persistently high

TABLE I.—Deaths by Day of Occurrence and from Selected Causes. December 25, 1955, to January 19, 1956. London Administrative County

	All Causes	Influenza	Pneumonia	Bronchitis		All Causes	Influenza	Pneumonia	Bronchitis
Dec. 25	117		8	13	Jan. 7	186	1	21	30
" 26	127		7	9	" 8	156		12	40
" 27	119		10	12	" 9	184	1	13	35
" 28	143	1	16	15	" 10	169	1	14	33
" 29	126		11	15	" 11	139		13	23
" 30	145	1	15	19	" 12	154	2	12	27
" 31	128		11	16	" 13	161	1	12	25
Jan. 1	136	1	9	17	" 14	184	2	20	19
" 2	127		7	10	" 15	129		11	24
" 3	145		10	29	" 16	149	1	11	17
" 4	168		17	27	" 17	139	2	12	20
" 5	199	1	13	24	" 18	148	1	12	17
" 6	181		13	37	" 19	130	1	6	19

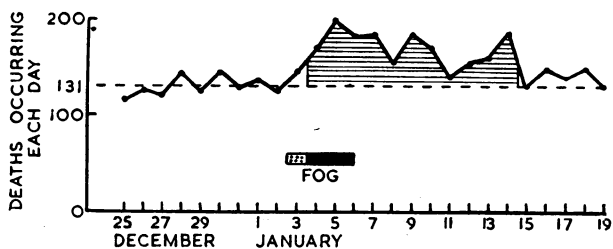


FIG. 1.—Deaths (all causes) occurring each day in London Administrative County from December 25, 1955, to January 19, 1956. Shaded area represents deaths in excess of 131 per day during period January 4 to 14.

The London Administrative County, with a population of 3,295,000, is the central portion of Greater London, which has a total population of 8,290,000 and comprises an area of some 15 miles radius around Charing Cross. The portion of Greater London outside the London Administrative County is called the "Outer Ring" (population 4,995,000).

The average number of deaths a day from December 25 to January 3 was 131. If this average had been maintained during and after the fog a total of 1,441 might have been expected between January 4 and 14, but in fact there was an abrupt rise in mortality, and deaths totalled 1,881. This represents an excess over expectation of 440 for the Administrative County area.

An alternative method of estimating the excess mortality is to compare numbers of deaths registered during the first two weeks of January with those in the last two weeks of December. Deaths registered in the London Administrative County in weeks ended January 7 and 14 numbered 2,268, compared with 1,814 in weeks ended December 24 and 31, an excess of 454. A similar comparison of deaths in the first two weeks of 1956 with the average of corresponding weeks for the period 1948-54, excluding "flu" years 1951 and 1953, shows an excess in 1956 of 422 deaths. The estimates based on registrations for London Administrative County agree, therefore, with that based on daily occurrences.

For the Greater London area the number of deaths occurring each day has not been tabulated, but an estimate of the excess mortality immediately following the fog can be made from numbers of deaths registered. These numbered 4,916 during weeks ended January 7 and 14, compared with 3,942 during the two previous weeks, an excess of 974, and compared with an annual average of 3,934 in corresponding weeks of 1948-54 (excluding 1951 and 1953), an excess of 982.

While there was, as usual, some reduction in temperature during the fog period (Table II) this was not severe, and was probably insufficient, by itself, to cause much

additional mortality. There was no epidemic influenza prevalent in London at the time. It may be concluded, therefore, that the majority of the additional deaths, amounting to almost 1,000, in the Greater London area between January 4 and 14 were caused by the fog.

Age Distribution of Deaths

In Table III the deaths registered in London Administrative County at various ages in the first two weeks of January are compared with those registered in the last two weeks of December. The increase was relatively greatest (67%) among newborn children, but in numbers of deaths by far the greatest increase was among elderly persons—an increase of 358 deaths (30%), compared with a total increase (all ages) of 454.

Causes of Death

Tables IV and V compare the increase in deaths from a number of causes during the fog period. Bronchitis was principally involved, and registered deaths from this cause rose from 169 to 377, an increase of 123%, between the last two weeks of December and the first two weeks of January. Between the period December 25 to January 3 and the period January 4 to 13 bronchitis deaths occurring increased from 155 to 301, or by 94%. Table VI indicates that the increase in deaths from bronchitis was mainly at advanced ages.

TABLE II.—Mean Daily Average Temperature and Daily Average Atmospheric Pollution (by Owen's Smoke Filter) at Kew (West London) from January 1 to 14, 1956

	Temperature		Atmospheric Pollution mg./cub. metre		Temperature		Atmospheric Pollution mg./cub. metre
	°F.	°C.			°F.	°C.	
Jan. 1	45.5	7.5	?	Jan. 8	34.9	1.6	0.144
" 2	42.6	5.9	?	" 9	33.3	0.7	0.199
" 3	37.4	3.0	?	" 10	39.4	4.1	0.141
" 4	35.2	1.8	0.960	" 11	43.5	6.4	0.131
" 5	33.3	0.7	1.229	" 12	42.1	5.6	0.247
" 6	36.1	2.3	0.408	" 13	37.0	2.8	0.313
" 7	36.3	2.4	0.330	" 14	43.3	6.3	0.137

TABLE III.—Deaths, all Causes, by Age, Registered in London Administrative County, During Weeks Ended December 24 and 31, 1955, and January 7 and 14, 1956

	All Ages	Weeks		Years		
		0-3	4-51	1-44	45-64	65+
Weeks ended Dec. 24 and 31	1,814	27	13	126	458	1,190
Weeks ended Jan. 7 and 14	2,268	45	18	114	543	1,548
Increase	25%	67%	38%	-10%	19%	30%

TABLE IV.—Deaths from Selected Causes, Registered in London Administrative County, During Weeks Ended December 24 and 31, 1955, and Weeks Ended January 7 and 14, 1956

	All Causes	Cancer of Lung	Vascular Lesions of C.N.S.	Coronary Heart Disease	Myocardial Degeneration	Influenza	Pneumonia	Bronchitis
Weeks ended Dec. 24 and 31	1,814	91	184	254	135	6	150	169
Weeks ended Jan. 7 and 14	2,268	97	190	298	168	8	174	377
Increase	25%	7%	3%	17%	24%	33%	16%	123%

TABLE V.—Deaths Occurring in London Administrative County During December 25 to January 3 and During January 4 to 13 from Bronchitis and Pneumonia

	Bronchitis	Pneumonia
Dec. 25-Jan. 3	155	104
Jan. 4-13	301	140
Increase	94%	35%

Geographical Distribution

Deaths occurring in each of the Metropolitan Boroughs during the two ten-day periods December 25, 1955, to January 3, 1956, and January 4 to 13 are compared in Table VII and Fig. 2. Two boroughs—Holborn and Stoke Newington—had reduced mortality in the second period, in Camberwell the total was unchanged, but in all the others an increase took place, the largest, relatively, being in Hampstead (87%), Chelsea (86%), Westminster (84%), and Deptford (80%).

Grouping the Metropolitan Boroughs arbitrarily into five sectors of the County (Table VIII) suggests that the mortality increased most in the western (39%) and southern

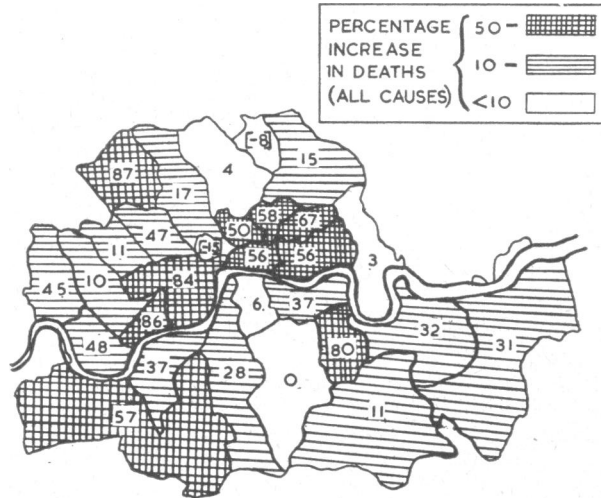


FIG. 2.—Percentage increase in deaths occurring during January 4-13, 1956, over those during December 25, 1955, to January 3, 1956. Metropolitan Boroughs of London Administrative County.

TABLE VI.—Deaths from Bronchitis at Various Ages, Registered in London Administrative County, During Weeks Ended December 24 and 31, 1955, and Weeks Ended January 7 and 14, 1956

Weeks ended	All Ages	0-	1-44	45-64	65+
Dec. 24 and 31	169	3	3	54	109
Jan. 7 and 14	377	3	7	83	284
Increase ..	123%	—	133%	54%	161%

TABLE VII.—Deaths Occurring in the Metropolitan Boroughs of London Administrative County During December 25, 1955, to January 3 and During January 4 to 13, 1956. (The Letters After Each Borough Indicate the Group to which it has been Assigned in Tables VIII and IX)

	Dec. 25- Jan. 3	Jan. 4-13	% Increase
Battersea (S)	60	82	37
Bermondsey (SE)	19	26	37
Bethnal Green (NE) (C)	15	25	67
Camberwell (SE)	81	81	—
Chelsea (W) (C)	28	52	86
City of Westminster (W) (C)	37	68	84
Deptford (SE)	10	18	80
Finsbury (N) (C)	8	12	50
Fulham (W)	31	46	48
Greenwich (SE)	59	78	32
Hackney (NE)	74	85	15
Hammersmith (W)	40	58	45
Hampstead (N)	30	56	87
Holborn (N) (C)	26	22	-15
Islington (N)	91	95	4
Kensington (W)	69	76	10
Lambeth (S)	99	127	28
Lewisham (SE)	75	83	11
London, City of (NE) (C)	9	14	56
Paddington (W)	53	59	11
Poplar (NE)	39	40	3
St. Marylebone (N)	45	66	47
St. Pancras (N)	60	70	17
Shoreditch (N) (C)	19	30	58
Southwark (SE)	47	50	6
Stepney (NE) (C)	48	75	56
Stoke Newington (N)	13	12	-8
Wandsworth (S)	92	144	57
Woolwich (SE)	36	47	31
Total	1,313	1,697	29

boroughs (41%) and least in the south-eastern boroughs (17%). The percentage increase in eight selected central boroughs (Table IX) was 57%, compared with 25% in the combined remaining boroughs.

The increase in mortality in the towns comprising the Outer Ring of Greater London can be estimated here only on the basis of deaths registered in the last two weeks of December and the first two weeks of January (Table X). The increase was relatively greatest in the towns of the north-eastern (35%) and western groups (32%) and, as with the Administrative county, was least in the south-eastern sector, where in fact an increase of only two deaths was registered (Table XI).

TABLE VIII.—Deaths Occurring in Groups of London Metropolitan Boroughs (see Table VII) During December 25, 1955, to January 3 and January 4 to 13, 1956

	Dec. 25- Jan. 3	Jan. 4-13	% Increase
West	258	359	39
South	251	353	41
South-East	327	383	17
North-East	185	239	29
North	292	363	24
Total, London Administrative County	1,313	1,697	29

TABLE IX.—Deaths Occurring in a Selected Group of Eight Central Metropolitan Boroughs (see Table VII—Boroughs Marked C), of London Administrative County During December 25, 1955, to January 3 and January 4 to 13, 1956

	Dec. 25- Jan. 3	Jan. 4-13	% Increase
Selected group of Central Metropolitan Boroughs	190	298	57
Remainder of London Administrative County	1,123	1,399	25

TABLE X.—Deaths Registered in Great Towns of Outer Ring of Greater London During Weeks Ended December 24 and 31, 1955, and Weeks Ended January 7 and 14, 1956. (The Letters After Each Town Indicate the Group to which it has been Assigned in Table XI)

	Weeks Ended Dec. 24 and 31	Weeks Ended Jan. 7 and 14	% Increase
Acton (W)	25	40	60
Barking (NE)	14	19	36
Beckenham (SE)	38	31	-18
Bexley (SE)	18	20	11
Brentford and Ch. (W)	18	20	11
Bromley (SE)	22	32	45
Carshalton (S)	41	53	29
Chigwell (NE)	7	14	100
Chislehurst and S. (SE)	32	28	-12
Coulsdon and P. (S)	37	37	—
Croydon (S)	146	185	27
Dagenham (NE)	25	33	32
Ealing (W)	47	78	66
East Ham (NE)	37	46	24
Edmonton (N)	55	95	73
Enfield (N)	74	75	1
Epsom and Ewell (S)	48	66	38
Esher (S)	27	24	-11
Finchley (N)	14	23	64
Harrow (W)	50	60	20
Hayes and H. (W)	12	15	25
Hendon (N)	87	99	14
Heston and I. (W)	94	112	19
Hornsey (N)	23	30	30
Ilford (NE)	81	109	35
Leyton (NE)	114	146	28
Merton and Morden (S)	26	30	15
Mitcham (S)	17	22	29
Orpington (SE)	73	74	1
Ruislip N. (W)	23	36	57
Southall (W)	27	21	-22
Southgate (N)	37	40	8
Surbiton (S)	22	24	9
Sutton and Cheam (S)	33	42	27
Tottenham (N)	49	57	16
Twickenham (W)	33	44	33
Uxbridge (W)	53	70	32
Walthamstow (NE)	29	40	38
Wanstead and W. (NE)	32	44	38
Wembley (W)	21	28	33
West Ham (NE)	55	82	49
Willesden (W)	92	123	34
Wimbledon (S)	21	34	62
Wood Green (N)	7	13	86
Total	1,833	2,314	26

Outside Greater London, where fog was also widespread, the corresponding increase in deaths in the Great Towns of England and Wales was from 8,443 to 9,141, an increase of only 8%.

Morbidity

Although this paper is concerned with the effects of the London fog on mortality, two tables have been added to show certain concomitant morbidity trends in other statistics routinely published in the Registrar-General's Weekly Returns. Weekly notifications of pneumonia are shown in Table XII and National Insurance claims for sickness benefit in Table XIII. During weeks ended January 10 and 17

TABLE XI.—Deaths Registered in Five Groups (see Table X) of Great Towns in the Outer Ring of Greater London. Weeks Ended December 24 and 31, 1955, and January 7 and 14, 1956

	Weeks Ended Dec. 24 and 31	Weeks Ended Jan. 7 and 14	% Increase
West	492	647	32
South	418	517	24
South-East	183	185	1
North-East	394	533	35
North	346	432	25

TABLE XII.—Notifications of Pneumonia in London Administrative County and in Remainder of England and Wales from Week Ended December 24, 1955, to January 28, 1956

Week ended:	Dec. 24	Dec. 31	Jan. 7	Jan. 14	Jan. 21	Jan. 28
London	69	60	81	83	77	60
Remainder of Eng- land and Wales	465	592	769	814	719	776

TABLE XIII.—Ministry of Pensions and National Insurance New Claims for Benefit on Account of Incapacity in Successive Two-weekly Periods

Weeks Ended	London Ad. C. and Middlesex	Remainder of London and South-Eastern Region	Remainder of England and Wales
Dec. 13 and 20	32,800	22,900	185,600
.. 27 and Jan. 3	34,600	23,500	213,800
Jan. 10 and 17	59,400	39,800	302,300
.. 24 and 31	50,100	34,500	281,100
Increase between Dec. 27 and Jan. 3 and Jan. 10 and 17	72%	69%	41%

claims in London and Middlesex were 24,800 more than in the previous two weeks (which included Christmas), a relative increase of 72%. In the rest of the south-eastern region the corresponding increase was 69%, but in the remainder of England and Wales it was 41%.

Discussion

Three recently reported fog incidents have led to an increase in mortality in the London area: in November, 1948 (Logan, 1949); in December, 1952 (Logan, 1953; Ministry of Health, 1954; Committee on Air Pollution, 1953, 1954); and now January, 1956. After the fog of December, 1952, a scrutiny was made, in the General Register Office, of London mortality records during the previous 115 years to see whether there had been any previous major increase in mortality associated with periods of severe fog. Five previous incidents were discovered—in December, 1873, January, 1880, February, 1882, December, 1891, and December, 1892. In the face of the apparent infrequency of such incidents throughout much of the nineteenth and the first half of the twentieth century, the fact that three incidents have occurred during the past eight winters is disquieting. It suggests the possibility either that the atmospheric pollution associated with London fogs has recently become more toxic, particularly to the very young, the infirm, and the elderly, or that there has been an increase in the number of

persons who are specially vulnerable to its effects. The 4,000 deaths in December, 1952, made a deep impression on the public imagination. These further 1,000 deaths last January are a stern reminder that this major public health problem has not yet been solved.

Summary

Dense fog during January 4 to 6, 1956, caused almost 1,000 additional deaths in Greater London.

The distribution of these deaths by age, cause, and geographical area is described.

This is the third major fog mortality incident in London since 1948.

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EFFECT OF DURATION OF ANAESTHESIA ON APNOEA NEONATORUM AFTER CAESAREAN SECTION

BY

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In cases of caesarean section, many authorities (Clifford, 1940; Gillies, 1950; Lull and Hingson, 1948; Ten Teachers, 1955; *Queen Charlotte's Textbook of Obstetrics*, 1952; Wylie, 1953) have emphasized the importance of delivering the child as soon after the induction of anaesthesia as possible, thereby minimizing the amount of anaesthetic agents passing to the foetus and there interfering with the normal onset of respiration. We had gained the impression in clinical practice that the often unseemly haste was not justified. Therefore infants delivered by caesarean section were investigated with special emphasis upon the relationship between the duration of the anaesthesia to which they might have been exposed and the delay in the onset of respiration.

Method

One hundred and two infants, the product of 100 consecutive caesarean sections performed on mothers anaesthetized by one or other of us over a period of six months, were studied. Indications for the sections were varied, and are listed in Tables I and II.

TABLE I.—Indications for Caesarean Sections

Indication	No. of Cases	Code for Table II
Incoordinate uterine action	11	A
Pre-eclamptic toxæmia	11	B
Disproportion or obstructed labour	35	C
Placenta praevia	8	D
Elective	18	E
Eclampsia	2	F
Oblique lie	1	G
Diabetic elective	3	H
Foetal distress	6	I
Prolapsed cord	5	J
Strong labour in previous rupture of uterus	1	K
Carcinoma of cervix	1	L