

DEATHS FROM ASTHMA IN ENGLAND AND WALES*

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It is known and accepted that asthma is a very common condition, and from a survey of the illnesses of the adult population of England and Wales (1944-7) by Stocks (1949) it has been estimated that asthma occurs in one in every 110 of the adult population, or, more correctly, in 904 per 100,000 of the adult population.

The frequency of death from status asthmaticus in this common condition is, however, uncertain, and opinions differ. Witts (1936) has written: "When status asthmaticus persists for two days, the risk of sudden death should be seriously considered. Experience of a large clinic at which several hundred patients are in regular attendance suggests that one or two of these patients may be expected to die of asthma each year." Coope (1948) writes: "The prognosis of the acute attack is usually good. It is sometimes said that no one ever dies of asthma, but this is not entirely true." Young and Beaumont (1950) in Price's textbook of medicine write: "... Although in a severe attack of asthma the aspect of the patient may be so alarming that a fatal issue appears imminent, death rarely occurs." From the United States we read:

"Traditionally, asthma is a disease causing prolonged and recurrent disability, but not death. . . . Many physicians of wide experience in the field have expressed the opinion that death from asthma is the result of mistreatment or even of the medication rather than the disease itself. For example, a recent textbook states that 'death in uncomplicated asthma is rare unless morphine has been used.' . . . In considering fatalities from asthma it is at once apparent that the prognosis is very different in asthma due to demonstrable external allergens and in so-called 'intrinsic' asthma. . . . Patients with 'intrinsic' asthma, possibly resulting from infection, are more apt to develop symptoms in middle age and may succumb within ten years" (Sherman, 1952).

From Canada Walton, Penner, and Wilt (1951) have written: "... It does not appear to be sufficiently widely appreciated that bronchial asthma is a disease which may be fatal in itself." McCracken

(1950) from my clinic at Cardiff, in a follow-up of 80 patients over a period of 10 to 12 years, found that 10% had died, 5% due to asthma, in status asthmaticus. Unger (1945), in a follow-up of 45 patients over a period of one to 13 years, found that asthma was the sole or main cause of death in just under 5%.

A study of the Registrar-General's reports for England and Wales (1950, 1951) shows that in 12 years, 1938-49, 35,173 deaths were attributed to asthma, an average of 2,931 each year. Calculations show that for these years, 1938-49, asthma accounts for 0.6% of all deaths in England and Wales.

Asthma deaths expressed as death rates per 100,000 of the living population, 1930-49, are set out in Table I, and it can be seen that the average figure is 7.07. It is of interest that these figures are considerably higher than the corresponding figures in the United States, where for both 1930-4 and 1935-9 the figures were 1.6 per 100,000, and for 1940-2 1.7 per 100,000 (Derbes and Engelhardt, 1946). Possibly our cold, wet climate plays a part in our higher mortality rate, for the prevalence of asthma in the United States is not so dissimilar to that obtained in England and Wales (Williams, 1952).

TABLE I
DEATH RATES FOR ASTHMA IN ENGLAND AND WALES
(DEATHS PER 100,000 OF THE POPULATION) COMPILED
FROM THE REGISTRAR-GENERAL'S REPORTS

Year	Males	Females	Total Males and Females
1930-2 ..	8.80	6.86	7.79
1933-8 ..	7.83	6.15	6.96
1939 ..	7.92	5.90	6.86
1940 ..	11.58	8.54	10.01
1941 ..	8.01	6.12	7.03
1942 ..	6.53	5.28	5.88
1943 ..	7.54	6.18	6.83
1944 ..	7.04	5.45	6.22
1945 ..	7.72	5.99	6.82
1946 ..	7.89	5.97	6.90
1947 ..	8.03	6.43	7.20
1948 ..	6.72	5.64	6.17
1949 ..	8.12	6.30	7.20
1930-49 ..	7.49	6.22	7.07

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The Registrar-General's figures for asthma, giving seven deaths per 100,000 of the living population when applied to the Cardiff district with a population of 300,000, would give us an estimated 21 deaths each year. During 1951 I took more than the usual care to ascertain the number of deaths from asthma occurring among my clinic patients, where a few hundred patients are in regular attendance. During 1951 11 deaths (Table II) from

TABLE II
DETAILS OF ASTHMA DEATHS IN THE CARDIFF DISTRICT, 1951

No.	Sex	Age at Death (Yrs.)	Age at Onset (Yrs.)	Duration of Asthma	Necropsy	Place of Death
1	F	59	17	42 years	Yes	Church Hospital
2	M	67	34	33 "	"	"
3	F	60	48	12 "	"	"
4	M	58	50	8 "	No	"
5	M	63	50	13 "	"	"
6	F	30	25	5 "	Yes	At home (coroner's inquest)
7	F	8	5	3 "	No	At home
8	F	59	50	9 "	"	"
9	M	48	32	16 "	"	"
10	F	38	?	Lifelong	"	"
11	F	28	16	12 years	"	"
12	F	1½	6 mths	Other Patients 1 year	Yes	Hospital
13	M	65	?	Many years	"	"

asthma occurred among these patients, in four of whom a necropsy was performed, and in each of these four cases the characteristic widespread plugging of the bronchi with thick, gelatinous material was found. This is the characteristic finding *post mortem* in cases of death from status asthmaticus (Mallory, 1946; Walzer and Frost, 1952). It is of interest that only five of these patients died in hospital, in a district where for some years I have been urging that status asthmaticus is a medical emergency requiring hospital treatment. During 1951 two of my colleagues in Cardiff each had a death from asthma, confirmed *post mortem*. Thirteen known confirmed deaths from asthma in one year as against an estimated 21 deaths supports the general validity of the Registrar-General's figures. These figures show that death from asthma in England and Wales is not just a rare occurrence.

I now have records of 41 of my patients who have died in status asthmaticus, in 21 of whom the diagnosis was confirmed *post mortem*. Table III analyses into sex and age at death these 41 patients. It can be seen that 90% of all deaths occurred in patients over the age of 30 years. That this pre-

TABLE III
AGE AND SEX DISTRIBUTION OF 41 ASTHMA DEATHS

Age	Male	Female	Total	Percentage
0-9 years ..	0	1	1	
10-19 ..	0	1	1	
20-29 ..	0	3	3	
30-39 ..	2	5	7	90
40-49 ..	4	6	10	
50-59 ..	6	4	10	
60-69 ..	3	6	9	
Totals ..	15	26	41	

ponderance of deaths in patients over 30 years is not due to the age of the patients attending my clinics is supported by the finding that of 500 patients attending the clinics, selected at random, 65.6% were under the age of 30 years.

I have collected from the literature 140 cases of death from status asthmaticus, all proved *post mortem* by the finding of plugs in the bronchi (Huber and Koessler, 1922; Wright, 1930; Clarke, 1930; Fisher and Beck, 1931; Murphy and Case, 1930; Coca, Walzer, and Thommen, 1931; Macdonald, 1932; Michael and Rowe, 1935; Bubert and Warner, 1935; Fowler, 1937; Wiseman, 1937; Lamson and Butt, 1937; Thieme and Sheldon, 1938; Craige, 1941; Bases and Kurtin, 1942; Chafee, Ross, and Gunn, 1942; Rackemann, 1944; Unger, 1945; Gay, 1946; Winer, Beakey, and Segal, 1950; McCracken, 1950; Walton and others, 1951; Walzer and Frost, 1952). Table IV

TABLE IV
136 DEATHS FROM STATUS ASTHMATICUS

Age	Male	Female	Total	Percentage
0-9 ..	4	4	8	
10-19 ..	0	5	5	
20-29 ..	6	6	12	
30-39 ..	5	10	15	82
40-49 ..	16	17	33	
50-59 ..	23	9	32	
60-69 ..	11	17	28	
70+ ..	2	1	3	
Total ..	67	69	136	

shows an analysis of 136 of these cases, and it is found that 82% of these deaths occurred in asthmatics over the age of 30 years.

Table V shows a similar analysis of the Registrar-General's figures for 1949, and here we find that 96% occurred in persons over 30 years.

There is a measure of agreement in my series of deaths (90% occurring in the over-thirties), the literature deaths (82%), and the Registrar-General's figures (96%), that the large majority of deaths from asthma occur in asthmatics over the

TABLE V
ASTHMA DEATHS IN ENGLAND AND WALES ANALYSED
BY AGE GROUPS FROM THE REGISTRAR-GENERAL'S
REPORT, 1949

Age Groups	Males	Females	Total	Percentage
0-	3	4	7	
1-	5	11	16	
5-	6	1	7	
10-	4	4	8	
15-	9	13	22	
20-	16	17	33	
25-	15	20	35	
30-	27	29	56	
35-	39	58	97	
40-	70	96	166	
45-	112	95	207	
50-	177	138	315	
55-	219	161	380	
60-	258	165	423	
65-	280	191	471	
70-	225	192	417	
75-	130	132	262	
80-	66	72	138	
85 and over ..	20	26	46	
Totals ..	1,681	1,425	3,106	

asthma for less than five years. Of these 51 cases, 14 had died within one year and 30 within two years of the onset of their asthma. These figures emphasize, what many physicians have pointed out, that there is a group of asthmatics starting asthma for the first time in middle age who soon develop attacks of severe status asthmaticus from which they die within a few years (Rackemann, 1944; Bullen, 1952; Sherman, 1952). In these literature deaths, which may possibly be biased in favour of the short-term dramatic cases, the majority, 53%, had had their asthma for over five years, 33% over 10 years, and 18% for over 20 years.

An analysis of the 34 of my patients who died over the age of 30 years shows that 81% had had their asthma for over five years, 66% for over 10 years, and 54% for over 20 years. The majority of these deaths, therefore, occurred in long-standing chronic asthmatics, and, I would add, chronic asthmatics who had been subject to previous attacks of severe status asthmaticus irrespective of the age of onset.

Reading the case notes in the literature and reviewing my own cases have confirmed my clinical impression that the asthmatic especially at risk is the one who is subject to attacks of status asthmaticus, for the chances are that one day such a patient will die in an attack.

Fig. 1 shows deaths from asthma and bronchitis graphed yearly from 1939 to 1949. The correlation between the two over 11 years is obviously very close indeed. It can be seen that 1940 was an exceptionally bad year for both asthma and bronchitis deaths. In this year there was also a marked increase in deaths from

age of 30 years. It is the middle-aged and elderly asthmatic who is especially at risk.

In the literature of 110 cases that died after the age of 30 years, 46% (51 cases) had had their

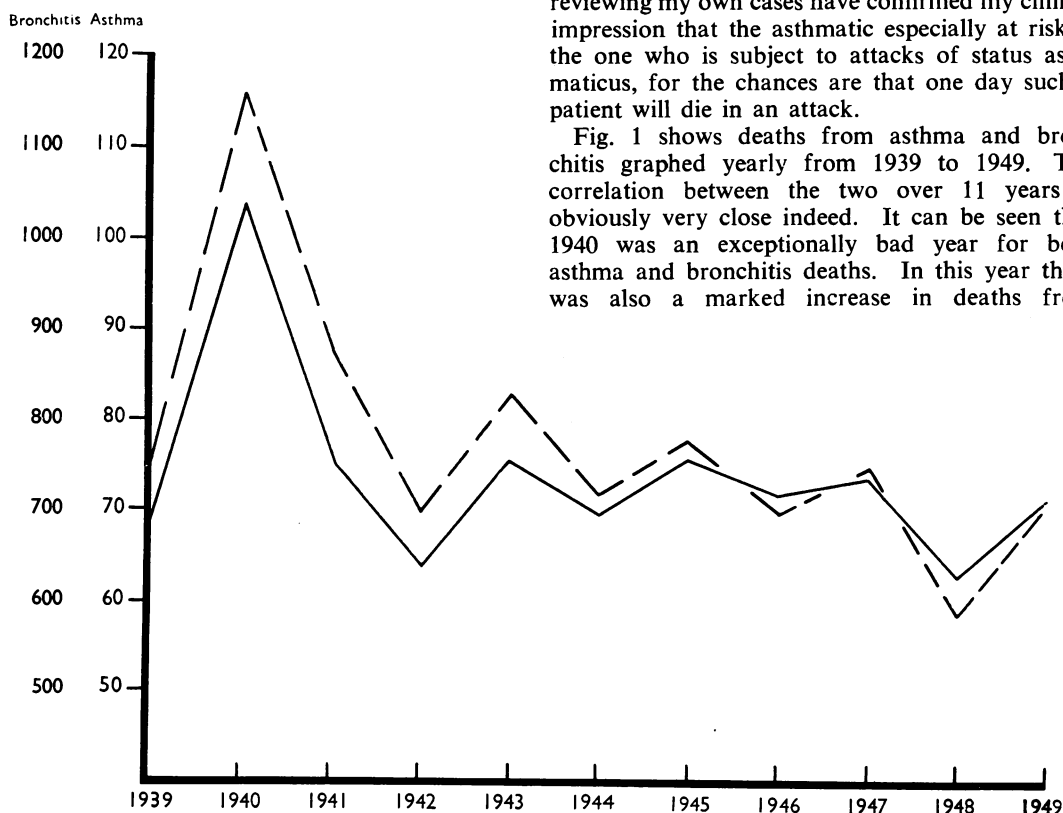


FIG. 1.—Deaths from asthma and from bronchitis 1939-49. Continuous line = asthma; broken line = bronchitis.

influenza and from cerebrospinal meningitis. The winter was a hard one, and it was our first winter of "blackout" with its consequent bad ventilation. It appears very likely that the increased tendency to infection which occurred amongst the adult population in 1940 played a definite part in the increased asthma deaths in that year.

TABLE VI
ASTHMA DEATHS IN ENGLAND AND WALES BY MONTHS OF OCCURRENCE FROM THE REGISTRAR-GENERAL'S REPORT, 1949

Months	Male	Female	Total
January ..	226	153	379
February ..	231	162	393
March ..	217	204	421
April ..	130	118	248
May ..	99	97	196
June ..	83	99	182
July ..	83	83	166
August ..	82	94	176
September ..	80	72	152
October ..	81	83	164
November ..	183	133	316
December ..	181	137	318

Table VI shows asthma deaths for 1949 analysed into their months of occurrence, and it can be seen that there is a seasonal variation. The number of deaths is less in the summer months and is greatest in the winter months. Very similar results are found in other years (Registrar-General's *Statistical Review*, 1948). These figures and the graph give support to my clinical impression of the outstanding importance of "colds" precipitating deaths from status asthmaticus. Infection appears to me to play a dominant part in the aetiology of these deaths from status asthmaticus. I would support the viewpoint that infective asthma, the so-called bacterial or "intrinsic" type, is far more dangerous to life than the asthma resulting from specific sensitivity to foods or inhalants (Bullen, 1952).

The early use of sulphonamides or antibiotics in chest infections in asthmatics should be encouraged, and antibiotics should be given in status asthmaticus whether the bronchial obstruction is treated by the usual therapy, adrenaline and aminophylline, or by cortisone. Morphine is a dangerous drug in status asthmaticus. Bronchoscopy in status asthmaticus has its advocates, but my experience, limited to one case, has not been a happy one. In chronic intractable asthma, bronchoscopy may well have a place in investigation and possibly in therapy, but in status asthmaticus it is difficult to see how it can remove the sticky plugs in the small bronchi and bronchioles.

In conclusion I would suggest that we should no longer teach our students, nor delude ourselves,

that patients never, or rarely, die from asthma, but that we indicate that those asthmatics liable to severe status asthmaticus, the very large majority of whom will be over 30 years of age, the very large majority of whom, perhaps all, are infective in type, are especially at risk.

SUMMARY

The Registrar-General's figures of deaths from asthma are presented and analysed. One hundred and forty cases of death from status asthmaticus, confirmed *post mortem*, and 41 of the author's cases dying of status asthmaticus, in 21 of which this diagnosis was confirmed *post mortem*, have been collected. Analyses of the above indicate that asthma carries a definite mortality rate from status asthmaticus in this country, and that the asthmatic especially at risk is the one liable to status asthmaticus. Deaths from status asthmaticus occur predominantly in asthmatics over the age of 30 years and usually in those with chronic asthma. It is suggested that infection plays a dominant part in the aetiology of deaths from status asthmaticus.

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