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A COMPARISON OF THE DEATH RATES
FROM ASTHMA 1953-67 FOR THE AGE GROUPS
10-14, 15-19, AND 20-24 IN ENGLAND
AND WALES WITH THOSE FOR THE SAME
AGE GROUPS IN SWEDEN

Why have mortality rates for asthma, particularly in the mid-1960s, been higher in England and Wales than in Sweden?

By

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Since *Smith* (6) observed that the annual number of deaths from asthma in England and Wales had increased, preferentially in younger age groups, this fact has been discussed at great length, especially because *Greenberg & Pines* (4) suspected that patients with asthma might be killing themselves by excessive use of sympathomimetic agents containing isoprenaline, orciprenaline or adrenaline.

Doll, Speizer, Heaf & Strang (2) pointed to the possibility that the increased death rate may be due to the use of either corticosteroids or pressurized aerosols or both of these agents that came into use in about 1957. They emphasize, however, that before we attribute the increased mortality to their use, we must determine precisely which patients are dying of asthma. At a symposium in Uppsala recently (1970) no definite answer was given to this important question.

Previously (1) I have studied the asthma mortality in Sweden in the period 1953-57. I have now compared the asthma deaths in England and Wales with the asthma deaths

TABLE
Asthma mortality in Sweden, England and Wales for age

		Period 1953-57		
	Age group	Number of patients dying from asthma	Number of living people in mill. in the age group (sum of 5 years)	Patients dying from asthma per mill. in the age group
Sweden				
Males	10-14	4	1.454	2.75
Males	15-19	1	1.139	0.88
Males	20-24	3	1.088	2.75
Females	10-14	6	1.390	4.32
Females	15-19	3	1.106	2.70
Females	20-24	5	1.085	4.63
Mean males + females				3.0
England and Wales				
Males	10-14	19	7.949	2.39
Males	15-19	26	5.942	4.38
Males	20-24	47	5.824	8.07
Females	10-14	18	7.602	2.37
Females	15-19	45	6.953	6.46
Females	20-24	71	7.018	10.12
Mean males + females				5.6

* The values in this table are reduced according to Registrar general's statistical review of England and Wales 1957. Tables 1-3, page 228. See text.

in Sweden for the 5-year periods 1953-57, 1958-63 and 1963-67.

RESULTS

The figures for asthma deaths are found in Table 1.

Some of the figures in Sweden show no significant change during the 15 year period, others show a small rise (almost significant according to ordinary statistical tests). The asthma

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groups between 10-24 and in 5-year periods from 1953-1967.*

Number of patients dying from asthma	Period 1958-62		Number of patients dying from asthma	Period 1963-67	
	Number of living people in mill. in the age group (sum of 5 years)	Patients dying from asthma per mill. in the age group		Number of living people in mill. in the age group (sum of 5 years)	Patients dying from asthma per mill. in the age group
7	1.573	4.45	10	1.399	7.15
8	1.461	5.48	7	1.585	4.43
5	1.170	4.28	7	1.515	4.62
4	1.497	2.94	9	1.324	7.48
4	1.403	2.86	6	1.517	3.96
5	1.143	4.38	7	1.441	4.86
		4.1			5.4
52	9.241	5.63	179	8.446	21.18
51	7.954	6.28	161	9.103	17.70
74	7.407	10.00	141	7.741	18.88
39	8.826	4.43	129	8.056	16.03
74	7.668	9.64	156	8.966	17.39
79	7.179	11.00	184	8.002	22.99
		7.8			19.0

mortality for males and females together in Sweden for the period 1963-67 (5.4 per mill. of living people) is higher than the corresponding death rate for the period 1953-57 (3.0 per mill.), $P < 0.05$. The difference for Sweden between the period 1958-62 and the 2 other periods (1953-57 and 1963-67) is not significant ($P > 0.05$).

In England there is a striking difference in asthma mortality between the period 1963-67 (19 per mill.) and the period 1958-62 (7.8 per mill.), $P < 0.001$. There is however

in England also a difference between the period 1958-62 (7.8 per mill.) and 1953-57 (5.6 per mill.), $P < 0.001$.

The difference in asthma mortality between England and Sweden for the period 1963-67 is striking. In England and Wales 19 individuals per million died from asthma, in Sweden only 5-6 per million. The difference cannot be random. The mortality rate for England and Wales is higher than for Sweden also for the period 1953-57. The difference 5.6-3.0 is significant, $P < 0.01$. The difference between England and Wales and Sweden for the period 1963-67 ($19.0 - 5.4 = 13.6$) is much greater than the difference for the period 1953-57 ($5.6 - 3.0 = 2.6$), $P < 0.001$.

From the beginning of 1958 in England and Wales statistics of cause of death have been compiled in accordance with the Seventh (1955) Revision of the International Statistical Classification of Diseases, Injuries and Cause of Death. The principal change resulting from this revision of the International Classification of Diseases is that for estimating numbers of asthma deaths in the years 1949 to 1957 in England and Wales a comparability factor of 0.71 (= a reduction of 29 per cent) has to be used. This is due to the fact that from 1958, if bronchitis is mentioned in the diagnosis, and asthma is not indicated as allergic, the case is transferred to "Bronchitis" and not to "Asthma" (p. 226-228 Registrar general's statistical Review of England and Wales 1957, Tables p. 1-3).

For the period 1953-57, therefore, the values used in Table 1 are reduced by 29 per cent, which is done for the period 1949-57 in Registrar general's Review of England and Wales in Reveiws later than 1957.

DISCUSSION

A slight rise in asthma mortality has taken place in Sweden according to this investigation. This is in agreement with the findings of *Graff-Lonnevig & Kraepelien* (3). The large difference between the figures from England and Wales and

those from Sweden are difficult to explain. In England, aerosols dispensing two different doses (1.0 resp. 0.2 mg) have been on the market. According to *Innman & Adelstein* (5), pressurized aerosols of the strong type have accounted for about one third and those of the weak type for about two thirds of isoprenaline sales in England. In Sweden only pressurized aerosols of the weak type (dispensing isoprenaline in doses of 0.2 mg or lower) have been available.

This fact could be a possible explanation of the higher mortality rate in England and Wales than in Sweden. After 1968, according to *Innman & Adelstein* (5), the mortality rate decreased in England and Wales, and at the same time the consumption of strong and weak pressurized aerosols diminished. Both preparations show the same pattern, their use falling by some 30 per cent in 1968 compared with that in 1967.

The facts mentioned, however, do not exclude the possibility that the "weak" preparations have little influence on the changes in asthma death rate compared with the "strong" preparations.

Speizer, Doll, Heaf & Strang (7) investigated death certificates in the period 1 October 1966 to 31 March 1967 for all deaths in England and Wales in which asthma was described as the underlying cause. Bronchodilators were inhaled by at least 150 out of 174 patients. Isoprenaline was used much more commonly for inhalation than any other sympathomimetic drug. The use was known from inquiries to treating doctors under a trade name in 108 out of 150 cases. The authors, however, do not state how often isoprenaline was used in doses of 0.2 mg or less, and how often in doses of more than 0.2 mg. It would obviously lead to a much clearer understanding of these problems if this English investigation could be completed with an investigation on the question, how often did patients who died from asthma use isoprenaline in pressurized aerosols of the concentrated type?

SUMMARY

A slight rise in asthma mortality has taken place in Sweden during the 15 year period 1953-67. As far as the age groups 10-24 are concerned, however, the essential question is why the rise in mortality is so much higher in England and Wales than it is in Sweden. One possibility is that pressurized aerosols dispensing doses of isoprenaline larger than 0.2 mg per dose have not been on sale in Sweden, while 1/3 of the isoprenaline used in pressurized aerosols in England and Wales has been of the "strong" type. It would help greatly in the further discussion if the mentioned English investigations on asthma deaths 1966-67 could be followed up with information about the extent to which the patients dying from asthma in England used sympathomimetic agents as pressurized aerosols of the concentrated type.

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