Journal of Medical Genetics, 1981, **18**, 299–300

Cystic fibrosis and the month of birth

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SUMMARY A bimodal birth distribution and seasonal trend has been previously reported in cystic fibrosis. The present study of 412 cases in Manchester and Bristol does not confirm the presence of a seasonal trend or any cyclic variation, and in general the trends in the present study are the reverse of those in the previous reports.

It is difficult to understand why an autosomal recessive disease should show a seasonal trend. Nevertheless, in cystic fibrosis this has been suggested several times.[1–4] The most recent study[2] has reported a peak of cystic fibrosis births in February and August, the birth frequencies being bimodally distributed.

Cystic fibrosis appears to be the first single gene disorder for which a seasonal birth pattern has been described, and in this study we have sought to verify this curious finding.

Material and methods

Only proved cases of cystic fibrosis were included, using the criteria suggested by Anderson and Goodchild.[5] A few atypical cases, such as children with normal sweat sodium levels, were excluded.

Cases seen at Booth Hall Children's Hospital, Manchester, the Royal Manchester Children's Hospital, and the Bristol Royal Hospital for Sick Children were studied. Ascertainment was by (1) hospital diagnostic indices; (2) necropsy diagnostic indices; and (3) bacteriology laboratory records. We attempted to obtain complete ascertainment, though for early years this was impossible. Cases who died were included.

Results

We traced 412 patients. The results for the year of birth are shown in table 1 and those for the month of birth in table 2. A comparison of winter and summer births is given in table 3.

On the null hypothesis that the same number of cases should be born in each calendar month, $\chi^2_{11} = 17{\cdot}50$ (not significant).

Received for publication 9 September 1980

On the null hypothesis that the proportion of cases born in each calendar month should be the same as the distribution of live births by month in England and Wales over the period of study, adjusted in proportion to the number of cases in each year, $\chi^2_{11} = 17{\cdot}8$ (not significant).

TABLE 1 *Year of birth in 412 cases of cystic fibrosis*

1944	1	1963	18
1945	1	1964	21
1946	0	1965	12
1947	0	1966	15
1948	2	1967	23
1949	0	1968	15
1950	0	1969	24
1951	1	1970	27
1952	1	1971	32
1953	2	1972	29
1954	4	1973	22
1955	0	1974	21
1956	6	1975	16
1957	1	1976	24
1958	8	1977	18
1959	6	1978	14
1960	10	1979	17
1961	8		
1962	13	Total	412

TABLE 2 *Cystic fibrosis: month of birth*

	Holland[1]	*Melbourne, Australia*[4]	*England and Wales*[2]	*Manchester and Bristol (present series)*
January	30	22	75	41
February	32	24	78	27
March	34	26	94	46
April	21	33	82	29
May	28	36	77	28
June	26	21	73	33
July	21	30	77	34
August	23	33	79	29
September	26	30	80	38
October	25	37	78	23
November	19	28	65	40
December	27	22	65	44
Total	312	342	923	412
Total ÷ 12	26	28·5	76·9	34·3

TABLE 3 *Cystic fibrosis: winter vs summer births*

	Holland[1]	Melbourne, Australia[4]	England and Wales[2]	Manchester and Bristol (present series)
Winter births				
January-March, October-December	167	159	455	221
Summer births				
April-September	145	183	468	191
Ratio	1·15	0·87	0·97	1·16

There was a small excess of winter births (221 to 191) which was not statistically significant (χ^2 values were calculated for deviations from the distribution that would be expected if there were no seasonal variation).

Discussion

We have been unable to confirm the presence of a seasonal trend in the births of persons with cystic fibrosis. Nor have we found a peak of births in February and August. Indeed, the monthly trends of the present study are in the reverse direction to those in the previous study[2] in 9 out of 12 months. Furthermore, no cyclical variation is evident from our data, and any consistency in the higher than average figures for births in January to March and September to December is considerably reduced by two very low figures for February and October.

Other series have been collected in different ways, and one series[2] comprised only deaths from cystic fibrosis. Whether fatal cases of cystic fibrosis can be regarded as representative of the total population of patients with this disease must be questionable. It seems most likely that the previous results were the result of sampling variation or chance. In one other study[6] no seasonal variation was found, but this has been discounted[4] on the grounds that the study was made before sweat tests had been introduced, and by implication, therefore, that the series included cases of other disorders. In another previous study,[4] it was only when the monthly figures for births of unaffected sibs were added to the figures for births of cases of cystic fibrosis that the modes agreed with the previously reported Dutch figures.[1]

Finally, a small excess of winter births was noted in this series as in the Dutch study,[1] though the opposite trend was present in the Australian[4] and previous British[2] series.

We are grateful to the many paediatricians who kindly provided access to their records, and to Dr R F Williams, Dr V Schwarz, and Mrs V A Smith for their help. Mrs C Webb kindly typed the manuscript

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