

# AN INVESTIGATION OF THE HIGH TWINNING RATE IN THE REPUBLIC OF IRELAND

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The chance of having twins is greater in the Republic of Ireland than in any other country for which national statistics are available (Table I).

However, the live twinning rate in Ireland has fallen from 1 in 66 in 1959 to 1 in 76 maternities in 1970. In the Republic of Ireland the mean live twinning rate for the ten-year period 1959-68 was 14.5 per 1,000 or 1 in 69 maternities, and in Northern Ireland it was 12.4 or 1 in 80 (Table II). In England, Wales, and Scotland, the usual reported rate is about 1 in 90 (Bulmer, 1960). In 1968 the twinning rate in England and Wales, when both twins were alive, was 1 in 100 (Table I).

TABLE I  
TWINNING RATES FOR DIFFERENT COUNTRIES

Continent	Country and Year	Sets of Twins	Twinning Rate per 1,000 Maternities	
Europe	Austria (1968)	1,168	9.3	
	Bulgaria (1964)	870	6.7	
	Czechoslovakia (1963)	2,260	9.7	
	Denmark (1963)	909	11.1	
	England and Wales (1968)	8,184	10.0	
	East Germany (1967)	1,234	4.9	
	Irish Republic (1959)	892	15.1	
	Irish Republic (1968)	821	13.6	
	Northern Ireland (1968)	351	10.8	
	Italy (1965)	5,560	5.6	
	Netherlands (1966)	1,340	5.6	
	Norway (1967)	328	4.9	
	Poland (1966)	5,784	11.0	
	Portugal (1968)	992	5.1	
	Romania (1965)	1,250	4.5	
	Scotland (1968)	1,006	10.6	
	Spain (1967)	6,168	9.2	
	Sweden (1966)	506	4.1	
	Yugoslavia (1964)	2,358	5.9	
	North America	Barbados (1960)	40	5.4
		Canada (1968)	3,500	9.7
El Salvador (1967)		1,410	10.2	
Jamaica (1960)		826	13.0	
Mexico (1968)		12,402	6.1	
Panama (1967)		428	8.5	
United States (1964)		39,477	9.9	
South America	Chile (1966)	2,164	8.1	
	Israel (1963)	514	10.4	
Asia	Japan (1963)	8,794	5.3	
	Singapore (1968)	343	7.3	
Africa	South Africa			
	Asiatic population (1963)	83	5.8	
	Coloured pop. (1963)	573	7.7	
	White pop. (1963)	730	9.8	
	United Arab Republic (1957)	4,460	10.1	
Oceania	Australia (1967)	2,288	10.1	
	New Zealand (1968)	666	10.8	

*Countries where twinning rate is quoted irrespective of whether twins are alive or still-born*

Europe	Albania (1964)	580	8.5
	Belgium (1966)	1,584	10.6
	Finland (1967)	1,034	13.6
	Hungary (1963)	1,284	9.8
Asia	Hong Kong (1964)	487	4.5
	Africa	Namibia (1958)	24

The chance of having twins increases with the mother's age up to the 35-39 age group and then decreases and increases slightly according to the number of previous pregnancies within each age group (Yerushalmy and Sheerar, 1940).

### EFFECT OF MATERNAL AGE ON TWINNING RATE IN IRELAND

The Vital Statistics Section of the Central Statistics Office in Ireland coded single and twin births for 1969 and 1970 by age and parity. In these two years there were 1,652 sets of twins in which both twins were alive (Table II). There was very little difference between the two years and they have therefore been grouped together and the live twin rates by age and parity have been calculated (Table III). These rates can be compared with the rates in England and Wales (Table IV). The twinning rate increases in Ireland, as elsewhere, from a very low rate under the age of 20, 5.8 pairs of twins per 1,000 maternities, to 19.6 pairs of twins per 1,000 in the 35-39 age group, and falls over the age of 40 to 12.8 per 1,000 (40-44, 13.0; 45 and over, 11.0). In each age group over 20 the rates are higher in the Republic of Ireland than in England and Wales.

During the years 1969-70 the twinning rate in the Republic of Ireland was 13.4 per 1,000, or 1 in 74 pregnancies. The twinning rate is highest in Connaught (15.9 per 1,000 maternities, 1969) and lowest in Leinster (13.1 per 1,000 maternities,

Prepared from 1969 U.N. Demographic Yearbook  
In countries where medical services are less advanced the twinning rates should be treated with some caution,

TWINNING RATE IN THE REPUBLIC OF IRELAND

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TABLE II

NUMBER OF MULTIPLE BIRTHS IN REPUBLIC OF IRELAND AND NORTHERN IRELAND 1959-68 AND TWINNING RATE PER 1,000 PREGNANCIES

Year	Live Births	Maternities Resulting in Live Issue	Twins	Triplets	Quadruplets	Twinning Rate per 1,000 Pregnancies
<i>Republic of Ireland</i>						
1959	60,188	59,268	892	14	—	15·1 (1 in 66)
1960	60,735	59,817	896	11	—	15·0 (1 in 67)
1961	59,825	58,902	911	6	—	15·5 (1 in 65)
1962	61,782	60,826	926	12	2	15·2 (1 in 66)
1963	63,246	62,264	960	21	—	15·6 (1 in 65)
1964	64,072	63,177	873	11	—	13·8 (1 in 72)
1965	63,525	62,648	850	12	1	13·6 (1 in 74)
1966	62,215	61,339	858	9	—	14·0 (1 in 71)
1967	61,307	60,457	836	7	—	13·8 (1 in 72)
1968	61,004	60,165	821	9	—	13·6 (1 in 73)
<b>Total 1959/68</b>	<b>617,899</b>	<b>608,863</b>	<b>8,823</b>	<b>102</b>	<b>3</b>	<b>14·5 (1 in 69)</b>
<b>Average 1959/68</b>	<b>61,790</b>	<b>60,886</b>	<b>882</b>	<b>10</b>	<b>—</b>	<b>14·5 (1 in 69)</b>
1969		62,064	849			13·7 (1 in 73)
1970		60,837	803			13·2 (1 in 76)
<b>Average 1969/70</b>		<b>61,450</b>	<b>826</b>			<b>13·4 (1 in 74)</b>
<i>Northern Ireland</i>						
1959/63		158,520	2,172			13·7 (1 in 73)
1964/68		165,839	1,864			11·2 (1 in 89)
<b>Average 1959/68</b>		<b>32,436</b>	<b>404</b>			<b>12·4 (1 in 80)</b>

TABLE III

LIVE TWIN MATERNITY RATES BY AGE AND PARITY:  
REPUBLIC OF IRELAND AVERAGE 1969/70

Parity	Age at Maternity							Total
	Under 20	20-24	25-29	30-34	35-39	40+	Unknown	
0	6·3	8·0	12·3	17·5	16·4	8·5	8·1	10·4
1	4·6	8·1	11·0	14·2	18·3	13·5	—	11·1
2	—	11·6	12·7	16·1	16·9	5·1	—	13·8
3	—	10·3	12·9	15·4	18·4	6·0	—	14·4
4	—	7·3	14·3	19·7	16·7	12·2	—	16·5
5+	—	11·2	15·3	19·3	23·1	15·6	—	19·4
<b>All parities</b>	<b>5·8</b>	<b>8·5</b>	<b>12·3</b>	<b>16·8</b>	<b>19·6</b>	<b>12·8</b>	<b>6·4</b>	<b>13·4</b>
<b>Total twin maternities</b>	<b>23</b>	<b>236</b>	<b>443</b>	<b>478</b>	<b>371</b>	<b>97</b>	<b>4</b>	<b>1,652</b>
<b>Total maternities</b>	<b>3,953</b>	<b>27,623</b>	<b>35,883</b>	<b>28,369</b>	<b>18,898</b>	<b>7,550</b>	<b>625</b>	<b>122,901</b>

TABLE IV  
LIVE TWIN MATERNITY RATES BY AGE AND PARITY: ENGLAND AND WALES 1968

No. of Previous Liveborn Children	Age at Maternity						All Ages
	Under 20	20-24	25-29	30-34	35-39	40+	
0	5.9	7.4	8.9	12.3	14.9	12.6	8.0
1	6.4	8.8	10.3	12.7	14.2	8.3	10.0
2	9.7	10.3	11.7	13.3	12.8	6.6	11.7
3	—	8.9	13.0	12.8	16.9	9.5	13.0
4	—	6.2	10.7	13.8	18.3	9.5	13.3
5+	—	8.2	13.3	18.0	17.4	11.9	16.1
All parities	6.0	8.2	10.5	13.3	15.4	9.7	10.1
Total twin maternities	363	2,235	2,397	1,573	832	151	7,551
Total maternities	60,266	271,583	229,123	118,696	54,193	15,605	749,466

Rates are based on the numbers of legitimate twin maternities (where both children were born alive) per 1,000 legitimate live births. The total number of twin maternities (where both children were born alive) was 8,184.

1969). The age distribution of pregnancies in Ireland is different from that in England and Wales and in other countries because, owing to the late average age at marriage and larger average family size, there are relatively more pregnancies over the age of 30.

In the Republic of Ireland in 1969-70 there were 1,652 sets of twins, where both children were born alive, out of 122,901 maternities (Table III). If Ireland had had the twinning rates of England and Wales (Table IV) in each age parity group we would have 'expected' 1,423 sets of twins; 229 sets of twins are, therefore, accounted for by the higher twinning rates in Ireland (1,652-1,423).

The Irish mothers had more children at older ages than the English mothers. If the Irish mothers had had the 122,901 maternities in the same age, parity distribution, and rates as the English mothers, 1,238 sets of twins would have been 'expected'; 185 sets of twins are, therefore, accounted for by the higher age and, to a very small extent, higher parity of the Irish mothers (1,423-1,238).

The higher Irish twinning rates are, therefore, due in approximately equal parts to the higher twinning rates in Ireland than in England and Wales and to the higher proportion of babies that are born to Irish mothers in the later age groups. In the Republic of Ireland, 40.4% of births occur in women aged 30-39 compared with 22.4% in England and Wales (1968) (Table V). The median age of brides at first marriage has fallen in Ireland from 27.0 in 1946 to 23.9 in 1968. The age at marriage was higher in rural than in urban areas (Table VI). The fall in the age of marriage for grooms is greater than for brides, so there is on average less difference in age between husband and wife. The average size of the Irish family is also falling, but in Ireland families are still considerably bigger than in England

TABLE V  
PERCENTAGE DISTRIBUTION OF BIRTHS BY AGE OF MOTHER AT MATERNITY IN IRELAND AND ENGLAND AND WALES, 1956 AND 1968

Age	Ireland		England and Wales	
	1956	1968	1956	1968
Under 20	1.8	2.9	5.4	10.0
20-24	13.4	21.2	29.1	36.1
25-29	26.0	28.6	31.8	29.4
30-34	28.8	23.7	20.4	15.3
35-39	21.4	16.7	10.1	7.1
40-44	8.1	6.3	2.9	1.9
45 and over	0.5	0.6	0.2	0.1
All ages	100.0	100.0	100.0	100.0
Average age	31.6	30.1	28.0	26.0

and Wales. The lower socio-economic groups have families that are 50% greater in size than the highest socio-economic group—self-employed professional workers. This difference in size of family between socio-economic group is much less in England and Wales (Table VII).

Ireland has fewer live births to mothers in the younger age groups than most other catholic countries. Spain also has proportionately few births to mothers under the age of 30, 55% (1967) compared with the Republic of Ireland 52% (1968) (Table VIII), although the reported live twinning rate in Spain is low, 9.2 per 1,000 maternities in 1967 (Table I). Medical services and the survival of twins differ, of course, from country to country, which is why Ireland can best be compared with England and Wales.

The proportion of triplets among all deliveries is approximately the square of the proportion of twins among all pregnancies. The triplet rates show the same relationship by age and parity as twin rates (Zeleny, 1921). Between 1959 and 1968

TABLE VI  
MEDIAN AGE OF BRIDES AND GROOMS AT FIRST MARRIAGE,  
IRELAND 1946 AND 1957/68

Year	1946*			1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
	Urban	Rural	Total												
Brides	25·8	28·0	27·0	25·9	25·7	25·4	25·3	25·1	24·9	24·6	24·5	24·2	24·0	24·0	23·9
Grooms	29·2	33·6	31·8	29·4	29·2	28·9	28·6	28·3	27·9	27·7	27·4	27·0	26·9	26·6	26·3

\*All marriages, including remarriages. Based on the 14,338 usable returns from the 1946 Census. The total number of marriages in the preceding 12 months was 17,859.

TABLE VII  
FIGURES RELATING TO NUMBER OF CHILDREN PER 100  
MARRIAGES OF 20-24 YEARS' DURATION: WIVES AT  
TIME OF MARRIAGE 20-24 YEARS: OFFICIAL CENSUS  
RETURNS

Social Group	Irish 1946 Average	Irish 1961		English 1961 Average	
		Average	Catholic		Other
Professional workers, self-employed	387	382	437	265	238
Professional workers, employees	501	435	460	249	204
Employers and managers	427	386	429	267	194*
Farmers, relatives, farm managers	591	581	596	404	247*
Agricultural workers, fishermen	609	573	577	428	260
Skilled manual workers	574	524	533	328	219
Semi-skilled manual workers	629	548	551	332	229
Unskilled manual workers	629	608	610	420	256

\* Mean figures of two subgroups

we would have 'expected' approximately 128 sets of triplets in Ireland; 102 sets were registered (Table II). Other studies have also shown that the 'expected' number, derived on this basis from the number of twins, is usually slightly higher than the actual number of sets of triplets (Zeleny, 1921).

#### EFFECT OF PARITY ON TWINNING IN IRELAND

It has been reported elsewhere that in each age group there is a higher rate of twinning for high

parity (Yerushalmy and Sheerar, 1940). In Ireland the difference is not marked, but if mothers who have had no previous pregnancies are compared with those who have had more than five previous pregnancies, the twinning rate is slightly higher in each age group in those mothers who have had five or more children.

In order to study the effect of parity within each five-year age group the number of twins that would occur if there was no increase with parity can be calculated by using the twinning rate in each age group for nil parity. In Ireland, if the twinning rates in each age group were those of nil parity, that is of the first baby, the number of twins would be reduced from 1,652 to 1,563 (1969-70), a reduction of 5·3%, and in England and Wales the number of legitimate twins would be reduced from 7,551 to 6,869 (1968), a reduction of 9·0%. It must also be remembered that within each five-year age group there will also be a correlation between parity and age, and, therefore, within each age group there will be a weak and spurious correlation between parity and the twinning rate. In both Ireland and England and Wales there is, therefore, a small increase in the twinning rates with increased parity within each age group, but this increase in the twinning rate within each age group with higher parity is partly spurious and in any case it makes only a small contribution to the total twinning rate.

TABLE VIII  
DISTRIBUTION OF LIVE BIRTHS BY MOTHER'S AGE AT MATERNITY (% IN AGE GROUP)

	All Ages	Mother's Age							Unknown
		15-19	20-24	25-29	30-34	35-39	40-44	45-49	
Ireland, 1968	100	2·9	21·1	28·4	23·6	16·6	6·3	0·5	0·5
Italy, 1967	100	9·0	21·1	32·2	21·4	11·5	3·5	0·3	1·0
Portugal, 1967	100	5·7	25·6	27·6	20·8	13·6	5·7	0·5	0·4
Spain, 1968	100	2·6	22·3	30·1	24·1	14·7	4·7	0·4	1·0
Yugoslavia, 1967	100	12·8	31·6	27·6	16·7	8·2	2·3	0·4	0·2
France, 1967	100	6·4	33·3	27·7	18·6	9·9	3·0	0·2	0·9
Fed. Rep. Germany, 1967	100	6·5	26·8	35·2	20·2	8·5	2·6	0·2	—

Data source: U.N. Demographic Yearbook (1969), Table 14.

## TWINNING RATES AT DUBLIN MATERNITY HOSPITALS

The Masters of the Coombe, the National Maternity, and the Rotunda Hospitals in Dublin co-operated with this study by providing statistics of twin births and of deliveries of 28 weeks and over. The average live twinning rate for these three hospitals for 1968-69 was 15.4 per 1,000 or 1 in 65 pregnancies (Table IX). The twinning rate in the hospitals is falling and is remarkably consistent between the hospitals. The twinning rate at Galway Regional Hospital is 17.7 per 1,000, or 1 in 56 pregnancies (Mooney, 1970).

In the Dublin hospitals the chance of having twins also increases with the age of the mother up the 35-39 age group and then falls after the age of 40 (Table X). The chance of having twins is higher in the Dublin maternity hospitals than in the general population, 1 in 65 maternities with 1 in 73 (1968-69), perhaps because mothers who have twins are more likely to be admitted to a Dublin maternity hospital, both from Dublin city and from country areas, than mothers with single pregnancies. The percentage in the 30-39 age group admitted to maternity hospitals is much the same as in the general population. In the National Maternity and Rotunda Hospitals the proportion of twins where one twin was dead-born was 43 out of 964 twin births (1963-67), or 4.5%.

## IDENTICAL AND NON-IDENTICAL TWINS

A statistical method developed by Weinberg makes it possible to find out approximately how many twins in a twin-population are monozygotic and how many are dizygotic (Weinberg, 1909).

TABLE IX

## TWINNING IN THREE DUBLIN MATERNITY HOSPITALS

Hospital	Total Deliveries after 28 Weeks	Twin Births	Twin Incidence % and per 1,000 Deliveries	Rate
1968				
Rotunda	5,340	79	1.5 (14.8)	1 in 68
Coombe	5,596	88	1.6 (15.7)	1 in 64
National	4,751	84	1.8 (17.7)	1 in 57
Total	15,687	251	1.6 (16.0)	1 in 62
1969				
Rotunda	5,299	84	1.6 (15.9)	1 in 63
Coombe	5,507	70	1.3 (12.7)	1 in 79
National	5,360	86	1.6 (16.0)	1 in 62
Total	16,166	240	1.5 (14.8)	1 in 67
Total 1968/69	31,853	491	1.5 (15.4)	1 in 65

If the sex ratio is taken as 1:1, the number of like-sex dizygotic twin pairs would be expected to be the same as the observed number of unlike-sex twins. The number of monozygotic twins is then obtained by subtracting the number of dizygotic from the total of all twins.

Applying Weinberg's method to the Irish twinning population in 1969-70, there were 1,652 sets of twins, of whom 610 sets were of unlike sex and 1,042 were of like sex (Table XI). If the likelihood of births being male or female is taken as a 1:1 ratio, then the number of dizygotic twins should be  $610 \times 2$ , or 1,220 sets of dizygotic twins. If there

TABLE X  
TWINNING RATE BY AGE OF MOTHER IN DUBLIN MATERNITY HOSPITALS, 1963/69

Age of Mother	National Maternity Hospital			Rotunda Maternity Hospital			National and Rotunda Hospitals		
	All Births	Twin Births	Rate per 1,000	All Births	Twin Births	Rate per 1,000	All Births	Twin Births	Rate per 1,000
Under 20	1,337	7	5.2 (1 in 190)	2,057	18	8.8 (1 in 114)	3,394	25	7.4 (1 in 138)
20-24	8,079	106	13.1 (1 in 75)	8,682	102	11.7 (1 in 85)	16,761	208	12.4 (1 in 81)
25-29	9,907	171	17.3 (1 in 57)	11,633	176	15.1 (1 in 66)	21,540	347	16.1 (1 in 62)
30-34	7,607	201	26.4 (1 in 37)	7,912	182	23.0 (1 in 43)	15,519	383	24.7 (1 in 41)
35-39	5,560	121	21.8 (1 in 45)	4,683	143	30.5 (1 in 33)	10,243	264	25.8 (1 in 39)
40+	2,662	61	22.9 (1 in 43)	1,841	43	23.4 (1 in 43)	4,503	104	23.1 (1 in 43)
All ages	35,152	667	19.0 (1 in 52)	36,808	664	18.0 (1 in 55)	71,960	1,331	18.5 (1 in 54)

Includes twin births in which one or both twins were dead-born.

TABLE XI

CALCULATED NUMBERS OF MONOZYGOTIC AND DIZYGOTIC TWINS IN IRELAND AND TWINNING RATES IN EACH AGE GROUP, 1969/70

Type of Twinning	Age at Maternity							Total
	Under 20	20-24	25-29	30-34	35-39	40+	Unknown	
Like sex	14	160	299	288	223	55	3	1,042
Unlike sex	9	76	144	190	148	42	1	610
Total	23	236	443	478	371	97	4	1,652
<i>Number</i>								
Monozygotic	5	84	155	98	75	13	2	432
Dizygotic	18	152	288	380	296	84	2	1,220
Total	23	236	443	478	371	97	4	1,652
<i>Rates</i>								
Monozygotic	(1.3)	3.0	4.3	3.5	4.0	(1.7)	(3.2)	3.5
Dizygotic	4.6	5.5	8.0	13.4	15.7	11.1	(3.2)	10.0
Total	5.8	8.5	12.3	16.8	19.6	12.8	(6.4)	13.4

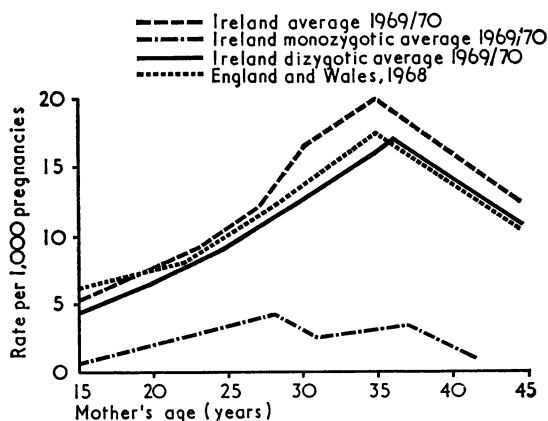
The rates in brackets are based on less than 15 twin pairs.

were 1,220 dizygotic twins then there must have been 1,652—1,220, or 432 sets of monozygotic twins, i.e., 26% of twin sets were monozygotic and 74% dizygotic. A more complex formula can be used to take account of the slightly more frequent male than female births but the difference is small.

It can be seen from Table XI and the Figure that the increase in twinning with the age of the mother in Ireland, as elsewhere, is due to the increase of dizygotic twins. Monozygotic twin rates vary a little about the rate of 3.5 per 1,000 maternities due to the small numbers. A monozygotic rate of about 3.5 per 1,000 maternities is the usual rate found in other countries.

The observation that multiple births follow the injection of pituitary gonadotropins suggests that the release of two or more eggs from the ovary is due to an increased release of gonadotropins from the pituitary. The effect of an increasing pituitary hormone level could account for the increased risk of dizygotic twinning up to the age of 35-39, and would also account for the mechanism whereby certain women are genetically more inclined to produce twins (Weinberg, 1909; Milham, 1964; Wyshak and White, 1965).

In the United States, dizygotic twinning in each age group is more common among the Negro population than among the white population (Heuser, 1964). A study of twinning in a rural community in western Nigeria has shown a rate of 48 per 1,000 maternities and is the highest rate on record (Nylander, 1970). Dizygotic twinning rates are low among the oriental people, for instance the Japanese (Komai and Fukuoka, 1936). It is perhaps



FIGURE—Twinning rates in Ireland and England and Wales.

significant that breast cancer is uncommon among the Japanese and oriental people and the breast is also under the influence of the pituitary gonadotropin hormone (Segi and Kurihara, 1962).

#### CONCLUSION

The twinning rate in the Republic of Ireland is higher than in other countries of Europe, although the rate is falling. The high twinning rate in the Republic of Ireland compared with England and Wales is due in approximately equal parts to a higher twinning rate at each age group in Ireland than in England and Wales and to the relatively large numbers of children born to older mothers. The higher proportion of pregnancies among older mothers in Ireland is due to the late average age of marriage and the high fertility after marriage.

In Ireland the average age of marriage is becoming lower and women are having, on average, smaller families, so we can expect that the twinning rate will go on falling as a higher proportion of maternities occur at an earlier age.

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