Recent trends in the incidence of multiple births and associated mortality

B J BOTTING, I MACDONALD DAVIES, AND A J MACFARLANE

Medical Statistics Division, Office of Population Censuses and Surveys, London, and National Perinatal Epidemiology Unit, Oxford

SUMMARY The overall incidence of multiple births in England and Wales, which had been declining since the early 1950s, started to increase in the early 1980s in all age groups except for women under 20. This followed a rise in the incidence of triplet and higher order multiple births which had started in the late 1970s. Analyses of data for births between 1978 and 1983 showed that while stillbirth, perinatal, neonatal, and post-neonatal mortalities among multiple births fell considerably, they remained consistently higher than those for singleton births. Differences in the distribution of birth weight do not wholly explain these differences. Analyses of certified causes of stillbirth and death are difficult to interpret because a considerable proportion were attributed to 'multiple pregnancy'.

In England and Wales the collection of data about multiple births began in July 1938 when the Population (Statistics) Act came into force. This Act was passed at a time of public concern about falling birth rates to collect additional data about parents so that fertility could be monitored more closely. The rationale for analysing multiple births was firmly set in this context: 'Although fertility is usually measured by the number of children born rather than by the number of maternities experienced, it is necessary to remember that the former is a composite total made up of the number of maternities, which is susceptible to voluntary control and the number of extra children born in multiple maternities which cannot be so readily controlled'.¹

Interest soon moved to multiple births themselves and many analyses of these trends have been published.¹⁻¹¹ Nevertheless, although death rates among multiple birth babies under the age of 1 year were analysed as part of a special study of births in 1949 and 1950,¹² these rates were not analysed routinely until 1975.⁷

In this paper we consider trends and changes in the incidence of multiple births in England and Wales and analyse subsequent mortality among them from 1975–83.

Registration of infant births and deaths

When births are registered in England and Wales

the number of babies delivered and whether each was live or stillborn are recorded. The Office of Population Censuses and Surveys (OPCS) also collects data about twins and triplets for computer analysis, by allocating a code to categorise the genders of the babies in each set, and whether they were live or stillborn. The exception is data about births in 1981, which were not coded because of industrial action by local registrars of births and deaths. Since 1975 the OPCS has routinely linked records of infant deaths (deaths of babies under the age of 1 year) registered in each calendar year to the data collected when the births were registered.¹³ These 'linked records', together with stillbirth records, are amalgamated into a data file that is used to correlate the deaths with information collected when the birth was registered such as the age of the parents, place of delivery, and whether the baby was part of a multiple birth.

This linked file is referred to as the 'death cohort'. From this file a second linked file is produced; this is referred to as the 'birth cohort' and contains all records of deaths of babies born in a given year. This is more useful for the analysis of multiple births as babies within a given set may die in different calendar years even though the deaths occurred before the babies reached the age of 1 year.

Multiple births may not be fully represented in registration data because under the Births and

Fig. 1 Deliveries resulting in multiple births by age of mother in England and Wales for 1935-84.

Deaths Registration Acts in force in England and Wales fetal deaths are not registrable as stillbirths if they occur before 28 completed weeks of gestation, although live births are. Thus if a multiple birth, including both live and dead fetuses, occurs before 28 weeks of gestation only the live births are registered. Despite this an analysis of the 803 sets of twins born in 1975-78 where one twin was stillborn showed an unexpectedly high number of sets where the gestational age of the stillbirth was given as 28 weeks (gestational age is not collected for live births). This suggests that some of the twins may have been born after a shorter gestation, but the age was stated to be 28 weeks on the stillbirth certificate so that both babies could be registered.

Trends in the incidence of multiple births

The proportion of deliveries with multiple births rose from 1938 until the early 1950s, and then fell until the late 1970s. Figure 1 shows that this occurred in births to women in all age groups, although in those aged 40 or over a less regular pattern was seen. The proportion of deliveries resulting in multiple births in 1982-84 was higher than in 1976-80 among deliveries in all age groups except those aged under 20.

Table 1 shows that trends in the proportion of pregnancies resulting in twins showed a similar pattern, the proportion resulting in triplets had already started to rise in the late 1970s. Numbers of sets of quadruplets had also risen much more

Table 1 Nos and incidence of multiple deliveries in England and Wales during 1938-85

Years	All deliveries	Singleton births	Twins	Triplets	Quadruplets	Quintuplets	Sextuplets
1938-40*	1 546 780	1 528 175	18 451	153	1		
1941-45	3 409 944	3 368 744	40 849	343	8		
1946-50	3 950 343	3 900 340	49 551	444	8		
1951-55	3 412 386	3 368 755	43 225	401	4	1	
1956-60	3 732 859	3 687 188	45 240	427	4		
1961-65	4 267 306	4 217 736	49 116	448	6		
1966-70	4 097 511	4 053 556	43 533	413	6	1	2
1971-75	3 433 182	3 398 786	34 020	353	19	4	
1976-80	3 040 236	3 010 581	29 253	373	24	4	1
1982-85	2 536 895	2 511 092	25 515	332	22	2	2
Rates per 1000 deliveries:							
1938-40		988.0	11.9	0.10†			
1941-45		987.9	12.0	0.10			
1946-50		987.3	12.5	0.11			
1951-55		987.2	12.7	0.12			
1956-60		987.8	12.1	0.11			
1961-65		988.4	11.5	0.11			
1966-70		989.3	10.6	0.10			
1971-75		990.0	9.9	0.11			
1976-80		990.2	9.6	0.13			
1982-85		989.0	10.1	0.14			

*From July 1938 onwards; †triplets and above.
Source: OPCS Birth Statistics Series FM1.

noticeably; while only six sets were born in 1961–65 and a further six in 1966–70, 19 were born in 1971–75 and 24 in 1976–80.

Although the zygosity of multiple births is not recorded at birth registration, in many analyses the numbers of monozygous (identical) twins have been estimated using Weinberg's method, which subtracts the number of different sex pairs from the number of pairs of the same sex.¹⁴ This assumes that the number of different sex, dizygous (non-identical) twins born in a given time period equals the number of same sex dizygous pairs born in the same period. Analyses based on these assumptions suggested that birth rates of dizygotic twins started to fall in England and Wales in the late 1950s and early 1960s, while those of monozygotic twins remained constant. This was still true after allowing for the mothers' ages and parities, and similar trends were observed in several other countries.^{9–11}

The halt in the decline in the overall incidence of twin births in England and Wales in the mid-1970s was commented on in 1983 in a letter to the *Lancet*, which reported similar trends in Scotland and Canada.¹⁵ The reply pointed out that if the analysis

was confined to twins of different sex and allowance was made for mother's age, then there was no sign of a halt in the decline.¹⁶

Figure 2 shows more recent trends in estimated incidence of monozygotic and dizygotic twin births, which suggest that overall, the rate of dizygotic twin births may have levelled off, while the monozygotic rate increased in the late 1970s and early 1980s. Analysis within maternal age groups, however, shows a less clear picture.

Mortality in multiple births

Multiple births tend to be preterm and of low birth weight, which means that multiple birth babies are at increased risk of being stillborn or of dying in the first year of life than singletons.

Figure 3 shows perinatal and infant mortality for births between 1975 and 1983. The ratio of multiple birth perinatal death rates to those for singleton births remained fairly constant over the period, with the rate for multiple births being about five times that of singleton births. The highest excess mortality for multiple births occurred in the neonatal period,

Fig. 2 Birth rates of estimated dizygotic and monozygotic twins by age of mother in England and Wales for 1970–84.

despite the neonatal death rates for multiple births reducing from seven times that of singleton births to under six times between 1975 and 1983. This reduction resulted in the ratio of infant mortality for multiple:singleton births declining from 5.3:1 to 4.3:1. Postneonatal mortality for multiple births expressed as a percentage of singleton births actually increased slightly.

Fig. 3 Perinatal and infant mortality among singleton and multiple births in England and Wales for 1975–83.

Perhaps the increased mortality of multiple births in the neonatal period can be accounted for by differences in birth weight.¹⁷ Information on birth weight in England and Wales has been collected by OPCS only since 1975. Initially, many data were missing but the position has steadily improved. By 1983 over 99% of live births, 98% of stillbirths, and 96% of infant deaths had the birth weight recorded.

Just over half the multiple birth babies born between 1982 and 1984 weighed less than 2500 g, compared with 6% of singleton births. Table 2 shows births and perinatal deaths in these years tabulated by birth weight. Within each 500 g grouping under 2500 g babies born in a multiple birth had significantly lower perinatal mortality than singletons ($p<0.0001$), using the standard normal deviate. For babies weighing 2500–3499 g, the difference between the two rates for singletons and multiple births was no greater than would be expected by chance ($p<0.05$). In the two groups with the heaviest birth weight mortality was much higher for multiple births than for singleton births, but the rates for multiple births were based on only small numbers of deaths.

In general, mortality declined sharply as birth weight increased, the high proportion of low birth-weight babies in multiple births leading to higher overall perinatal mortality than for singletons. Nevertheless, standardising to singleton birth weight specific rates, shows that only 74% of the expected perinatal deaths actually occurred. This was due to the reduced mortality of multiple birth babies weighing under 2500 g compared with that of singletons. Thus in England and Wales the increased perinatal mortality associated with multiple births was not simply a consequence of their birth weight.

Table 2 Perinatal deaths by birth weight for single and multiple births in England and Wales for 1982–84 combined

Type	Birth weight (g)								
	All	Under 1500	1500–1999	2000–2499	2500–2999	3000–3499	3500–3999	4000 and over	Not stated
Perinatal deaths:									
Singleton	18 323	6102	2367	2448	2492	2115	1072	469	1258
Multiple	1738	1051	245	151	93	22	15	3	158
Total births:									
Singleton	1 864 683	15 697	20 162	75 979	335 963	716 064	511 141	160 874	28 803
Multiple	38 413	3206	5116	11 187	12 499	4848	725	45	787
Rates/1000 total births:									
Singleton	9.8	388.7	117.4	32.2	7.4	3.0	2.1	2.9	43.7
Multiple	45.2	327.8	47.9	13.5	7.4	4.5	20.7	66.7	200.8
Expected No of perinatal deaths to multiple births*:									
	2350.0	1246.2	600.6	360.2	92.5	14.5	1.5	0.1	34.4
Ratio of observed to expected ×100:									
	74.0	84.3	40.8	41.9	100.5	151.7	1000.0	3000.0	459.3

*Using singleton rates as standard.
Source: OPCS Monitors. Series DH3.

Table 3 shows the overall mortality for 1975 to 1983 for multiple births according to type. As expected, the rates for triplets and higher order births were higher than those for twins. Those for quadruplets and higher order births are based on very small numbers of births (41 sets of quadruplets, four sets of quintuplets, and two sets of sextuplets) and thus should be assessed with extreme caution.

Twins

In 1983 twins accounted for 1% of deliveries and 2% of births, but 9% of perinatal deaths. This represents a perinatal mortality of 46.8 per 1000 multiple births compared with one of 9.6 per 1000 singleton births. During 1975–83 there were notable decreases in stillbirth, perinatal, neonatal, and infant mortality in twins, with falls of 32, 47, 51, and 44% respectively, but little change in their postneonatal mortality.

The 1958 British Perinatal Mortality Survey showed that preterm delivery was a major factor associated with deaths in twins.¹⁸ Table 4 shows the underlying causes of death between 1979 and 1984, according to the ninth revision of the *International*

Classification of Diseases (ICD).¹⁹ Unfortunately, many of the deaths were attributed to 'multiple pregnancy'. This accounted for 27% of stillbirths, 25% of perinatal deaths, and 21% of neonatal deaths. The most commonly attributed causes of stillbirth were complications of placenta and cord. A cause of perinatal death often mentioned was respiratory distress syndrome; this was also the most commonly given cause of neonatal death. This pattern was also reflected in deaths of twins between 1975 and 1978 when the underlying cause was selected using the eighth revision of the *International Classification of Diseases*.

Inspection of individual death certificates for all twins born in 1978 showed that the allocation of underlying cause of death in the neonatal period between multiple pregnancy and respiratory distress syndrome was somewhat arbitrary. It seemed to depend on whether multiple pregnancy was mentioned among the causes of death and, if it was not, whether the various deaths in a multiple birth were recognised as such. This was more likely to have happened if the deaths had been registered on the same occasion. If twins died in the post-neonatal

Table 3 Mortality for singleton and multiple births in England and Wales for 1975–83 (excluding 1981)

Type of birth	Stillbirth ^a	Perinatal ^a	Neonatal ^a	Postneonatal ^a	Infant ^a	No of births (live and still)
Singleton	7.7	13.8	7.4	4.3	11.7	4 845 382
Twin	25.4	63.2	43.9	9.1	52.9	95 312
Triplet	47.5	164.5	135.0	12.7	147.7	1812
Quadruplet	30.5	219.5	207.5	12.6	220.1	164
Quintuplet	—	200.0	200.0	—	200.0	20
Sextuplet	—	416.7	500.0	—	500.0	12

^aRates per 1000 total births; ^brates per 1000 live births.

Source: OPCS series FM1 and DH3 Annual Reference Volumes.

Table 4 Mortality among twins by age and cause in England and Wales for 1979–84 (excluding 1981)

Diseases	Cause of death	Age at death				
		Stillbirth	Perinatal	Neonatal	Postneonatal	Infant
001–999	All causes	1359	3151	2127	538	2665
460–519	Respiratory conditions	—	8	24	123	147
740–759	Congenital anomalies	139	301	219	76	295
760–779	Perinatal conditions	1220	2816	1829	56	1885
760	Maternal conditions	114	124	10	—	10
761	Maternal complications in pregnancy	397	846	453	9	462
761.5	Multiple pregnancy	361	801	444	9	453
762	Complications of placenta and cord	467	508	42	—	42
764–5	Slow fetal growth, fetal malnutrition, and immaturity	25	126	113	2	115
768	Intrauterine hypoxia and birth asphyxia	121	224	118	4	122
769	Respiratory distress syndrome	—	469	573	11	584
770	Other respiratory conditions	3	179	200	12	212
REM760–779	Other perinatal conditions	93	313	320	18	338
798	Sudden death, cause unknown	—	—	7	193	200

Source: Unpublished OPCS data.

period the commonly cited causes of death were the same as for singletons: respiratory conditions, sudden infant deaths, and congenital anomalies.

OPCS does not collect information on zygosity, but it is possible to compare the mortality of pairs of twins of the same and different sexes. Apart from postneonatal mortality in girls, the mortality based on deaths in 1982–84 of twins of the same sex was higher than for twins of the corresponding sex born in pairs of mixed gender.

Triplets

Between 1975–83 (excluding 1981) 5% of babies in registered triplet sets were stillborn. Over the same period 15% of liveborn triplets died in the first year of life, 83% of those dying in the first week of life. This represents a risk of stillbirth double that of twins and six times that of singletons. Brown and Daw²⁰ reported that in 1971–75 in England and Wales the stillbirth rate for triplets was four times that of singleton births. Between 1975–83, the increased risk of infant mortality for babies born in a triplet delivery was three times that of twins and 19 times that of singletons. During the period of highest risk, the first week of life, a liveborn triplet was 20 times more likely to die than a singleton, and three times more likely to die than a twin. Although postneonatal mortality is higher among triplets than among singletons, the numbers are small, with only 22 postneonatal deaths of triplets in the eight years under consideration.

Triplet mortality fluctuated throughout the period 1975–83, probably because of various factors, including the sex and zygosity of sets, gestational age, birth weight, and availability of facilities for the care of very small babies. As an average of only 75 sets of triplets were born each year, these factors are likely to have fluctuated annually.

As with twins, zygosity of triplets is not recorded at birth registration, but the sex combination of the sets is known. Those triplet sets which contain both males and females must have at least one dizygous

pairing. Triplets can be monozygotic, dizygotic, or trizygotic, and sets containing both sexes must be either dizygotic or trizygotic.

Table 5 shows that mortality was higher in sets of the same sex (three boys or three girls) than in sets of mixed gender. Although 287 of the 604 sets of triplets were identical sex sets, 52 of the 86 stillbirths were in identical sex sets. The Table also shows that among boys mortality was generally higher; but postneonatal mortality was based on a total of only nine male and 13 female deaths. Of the 1812 triplets born in England and Wales in 1975–83, 911 were girls; hence the number of male and female infants was about the same, and female triplets seemed to have a better chance of survival.

When mortality among triplets from 1979–84 was analysed according to underlying cause of death a pattern similar to that for twins was found; 43% of stillbirths, 40% of perinatal deaths, and 34% of neonatal deaths were attributed to 'multiple pregnancy'. Other commonly attributed causes of stillbirth were complications of placenta and cord, and respiratory distress syndrome was often given as a cause of neonatal death. The death certificates of triplets born in 1978 again showed a degree of arbitrariness in the allocation of the underlying cause of death between multiple pregnancy and respiratory distress syndrome.

Between 1975–83 an average of 69% of triplet sets survived the first year of life. There was, however, a fall in the proportion of triplet sets with one or more stillbirth or infant deaths; 76% of triplets born in 1983 survived after the first year of life, compared with 62% of triplets born in 1975. This was due largely to a reduction in the number of sets in which all the babies died; the number of sets in which one or two died remained fairly constant.

The higher perinatal mortality among triplets may be due to immaturity, but this does not explain the differences in mortality when analysed by birth order. Table 6 shows mortality among triplets by birth order and sex combination within the set. Although this information is not available from the

Table 5 *Mortality among triplets by age, sex, and sex combination of set in England and Wales for 1975–83 (excluding 1981)*

Sex Combination	Stillbirth		Perinatal		Neonatal		Postneonatal		Infant	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All	46.5	48.4	175.2	154.9	147.7	123.6	10.5	15.0	158.1	138.6
3 male	64.0	—	203.1	—	162.7	—	14.2	—	176.9	—
2 male+1 female	22.9	7.6	145.0	106.9	136.7	107.7	3.9	23.1	140.1	130.8
1 male+2 female	37.4	53.5	149.7	141.7	127.7	110.2	11.1	16.9	138.8	127.1
3 female	—	56.8	—	182.7	—	141.4	—	10.5	—	151.8

Source: Unpublished OPCS data.

Table 6 Mortality among triplets by birth order and sex combination of set in England and Wales for 1975–83 (excluding 1981)

Sex combination	Sets registered	Stillbirths or infant deaths (No where all babies in set died)	Birth order			
			First	Second	Third	Not known
All	604	341 (174)	84	99	108	50
3 male	152	103 (57)	26	30	30	17
2 male+1 female	128	60 (36)	16	18	21	5
1 male+2 female	189	97 (36)	22	26	30	19
3 female	135	81 (45)	20	25	27	9

Source: Unpublished OPCS data.

files held on computer, it was possible to do the analysis manually because of the small numbers. Unfortunately, the birth order may not be clear for sets in which there were stillbirths: for some sets, with both live and stillbirths, the birth order of the stillbirth can be deduced from the certificate. For each sex combination, the first born had a better chance of survival than the second child, who in turn had a better (in one case equal) chance of survival than the third.

Quadruplet and higher order births

There were 41 sets of quadruplets registered, among which there were five stillbirths and 35 infant deaths, giving perinatal and infant mortality of about 1/5. In 27 sets (66%) all the babies survived, and in seven sets (17%) all the babies died.

Four sets of quintuplets and two sets of sextuplets had also been registered. In one quintuplet set comprising four boys and a girl and one set of three boys and two girls, all the babies survived the first year. The two other sets of quintuplets comprised two boys and three girls; in one set one girl died during the first week, in the other only the two heaviest babies (one boy and one girl) survived. Of the two sets of sextuplets, one set (three boys and three girls born prematurely) all died within one week of birth. The other set (six girls) survived the first year.

Discussion

Trends in the incidence of multiple births. Figs. 1 and 2 suggest that parity may explain the trends shown. The OPCS records data about parity only for legitimate births, however, and restricts its definition to births by the mother's present or any previous husband. The considerable increase in the number of births outside marriage renders such data unreliable. It is, however, worth considering other explanations advanced for the trends observed.

An editorial in the *British Medical Journal* in 1976 on the 'worldwide decline in dizygotic twinning', commented that, 'it is disquieting that something should have affected the human reproductive system for 15 years without anyone having any evidence of what it is'.²¹ Several explanations were suggested, one of which was the use of oral contraceptives, but this was dismissed on the grounds that in many countries the decline had preceded the introduction of oral contraceptives.

A recent study of 4428 women delivering at five large hospitals in Connecticut, United States of America, found an increased rate of twins among women conceiving within two months of stopping oral contraception.²² A postal survey in the United States of America confirmed this finding.²³ Other research, however, suggests the opposite. A case control study in France compared women having singleton and twin births and found significant negative associations between the incidence of dizygous twins and the previous use of oral contraceptives.^{24 25} Similar results from other studies were cited. In contrast, a study in Nottinghamshire failed to show any association, either positive or negative, between the incidence of twins and recent use of oral contraceptives.²⁶

A second explanation for the decline in the incidence of dizygotic twins came in a series of papers by W H James, who suggested that an environmental agent might have played a part—perhaps a pesticide, or stilboestrol used in cattle feed.^{9–11} He also dismissed the suggestion that the decline in the incidence of dizygotic twins might be a consequence of increased rates of spontaneous abortions. It is difficult to compare time trends in the absence of any consistent or complete series of routinely collected data about trends in spontaneous abortion.⁷ A cross sectional study comparing the rates of twin births and spontaneous abortion in 22 towns of the South Moravia region of Czechoslovakia showed that those with higher numbers of spontaneous abortions had lower numbers of twin

births,²⁷ although there may have been variations in the notifications of spontaneous abortion.⁵

Different explanations have been advanced for the recent increase in triplet and higher order births and these may also apply to the upturn in the rate of twin births. Induction of ovulation using fertility drugs increases the risks of multiple births.^{26 28 29} There is a need for better monitoring of infertility treatment,³⁰ and techniques are being developed for the selective termination of some of the fetuses in a multiple pregnancy.³¹ In addition, in vitro fertilisation techniques entailing the implantation of more than one embryo can lead to multiple pregnancy, but, such pregnancies may not yet be common enough to increase perceptibly the proportion of multiple births. The association between the incidence of multiple births and mothers' ages and parities and the problems in assessing the effect of parity has been alluded to.³² Racial differences can also play a part; studies in the United States and Africa have shown that multiple births are more common among black, than among white and Asian women.³³⁻³⁷ Rates are particularly high in some parts of Africa. Such comparisons are not possible in England and Wales where parents' countries of birth are recorded but not their ethnic origin. Thus the probably growing numbers of births to black women of Afro-Caribbean descent who were themselves born in the United Kingdom cannot be analysed.

A study of multiple births in Scotland during 1962-64 suggested that the number of births of dizygotic twins was associated with social class, being highest among women with husbands in partly skilled or unskilled manual occupations.³⁸ It was suggested that different social class patterns of fertility may have been responsible. The OPCS is currently analysing more recent trends in social class differences in twins of the same and different sexes.

Mortality in multiple births. Mortality patterns similar to those shown in table 2 can be seen in the mortality of single and twin births in the 1958 British Perinatal Mortality Survey,¹⁸ and in a study of births from 1950-60 in New York state.³⁹ In both cases the problems of comparing mortality by birth weight from two populations with different birth weight distributions have to be borne in mind.⁴⁰ In addition, in table 2, mortality for multiple birth babies weighing 3500 g or more was based on only 18 deaths in a three year period, and these may well have been babies with exceptional problems.

In the 1958 survey mortality was also analysed by gestational age, and it was shown to be higher for single births at 28 to 32 weeks' gestation and for twins at 39 weeks and above. It is not possible to repeat this analysis using more recent data, as

gestational age is not recorded at the registration of live births in England and Wales. Data from the 1958 survey showed that the relation between birth weight and gestational age was different for singleton and multiple births.

Twins. The higher mortality among twins born in pairs of the same sex compared with those born in mixed sets may be due to differences in zygosity. Monochorionic monozygous twins are in close proximity in the uterus and may suffer because of their communicating placental circulation; dichorionic monozygous pairs and dizygous pairs may have adjacent implantation sites. Babies born in mixed set pairs will necessarily be dizygous, while those born in single sexed sets will be a mixture of dizygous and monozygous.

Another analysis of mortality among twins in the 1958 British Perinatal Mortality Survey compared the mortality of first and second twins.¹⁸ It showed that at all weights, except 2001-2500 g, the mortality was higher among second twins. It has not been possible to do a similar analysis using more recent data as the OPCS records the time of birth only for live multiple births.

As the OPCS does not collect data on gestation for live births we cannot examine certified causes of death at different gestation times. Nevertheless, the results shown in table 4 are compatible with Laursen's findings that neonatal deaths among twins born before 36 weeks' gestation were nearly all attributable to respiratory failure, whereas for those born at or after 36 weeks' gestation, most stillbirths were attributable to intrauterine placental insufficiency.⁴¹

Triplets. The higher mortality of second and third triplets may be due to their less favourable position in the uterus during labour, rendering them more liable to direct trauma from the contracting uterus during delivery.⁴² Another factor is the reduction of uterine capacity following delivery of the first triplet, which might alter the blood flow in the placenta and thus cause anoxia in the remaining babies. This could be aggravated by the cumulative effect of prolonged anaesthesia.

As with twins, the higher mortality among sets of the same sex suggests that mortality among triplets is highest in monozygous sets. The higher mortality among boys was also reported by Daw.⁴³ His finding that girls predominated in triplet births, however, may well have arisen from the fact that his analysis was based on a relatively small number of sets of triplets.

Conclusions. There is no firm evidence for or against

any of the hypotheses about the decrease in the incidence of multiple births between the early 1950s and the late 1970s, or the more recent increase. The correlation between the introduction of drugs to treat infertility and the rise in triplet and higher order births is compatible with the suggestion that these drugs, and more recently in vitro fertilisation, may have played a part. Furthermore, the absence of any increases in the overall incidence of multiple births in women under the age of 20 lends further support to this. Unfortunately, it is difficult to pursue this further because of the dearth of national information about the extent and outcome of treatment for infertility.^{7 30 44}

In an attempt to compensate for this deficiency we plan to collect some information about the extent of investigations and treatment for infertility among parents of triplet and higher order births and matched samples of singleton and twin births for the years 1979–80 and 1982–85. This is being done as part of a wider study of the medical and social problems associated with triplet and higher order births.

To make better assessments of trends in mortality several improvements could be made within the existing system. Firstly, a more complete picture would be obtained if mortality could be calculated according to birth order within a multiple birth. The OPCS could only do this if the manual recording of time of birth at registration of multiple live births was extended to stillbirths, and if these data were included on the computer record for live and stillbirths.

Secondly, the accuracy of the information about cause of death recorded on certificates could be improved. New forms of certificate were introduced in January 1986 for certifying stillbirths and neonatal deaths in England and Wales, which will provide scope for providing fuller and more detailed information. In particular, we hope that the custom of attributing stillbirths and deaths to 'multiple pregnancy' will be replaced by more precise indications of the conditions leading to death.

Finally, fuller analyses would be possible if, as the World Health Organisation recommends,¹⁹ gestational age of livebirths were recorded at registration. Alternatively, this information could be obtained in the future if the data currently collected at birth registration were to be linked to the maternity data collected through the new system being set up, following the recommendations of the Steering Group on Health Services Information.⁴⁵

While these fuller data would be useful to indicate the way forward; the data presented in this paper show an encouraging picture of declining perinatal and infant mortality among babies born in multiple

births. There are, however, no routinely collected data about disability or childhood illness among children born in a multiple birth. These will be investigated in the Study of Triplet and Higher Order Births.

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Correspondence to Mrs B Botting, Medical Statistics Division, Office of Population Censuses and Surveys, St Catherine's House, 10 Kingsway, London WC2B 6JP.

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