VITAL STATISTICS OF BIRTH

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Doctors are mostly literate but are commonly innumerate. We are largely ignorant and frightened of the safe and helpful use of figures because we have never been taught to understand them properly. In consequence we often try to dismiss them, believing that they are used during medical debate in a biased fashion to support the arguments of the proponents but are put to one side as non-relevant or non-significant by the opponents. This is a head in the sand attitude as statistics are extremely helpful in providing evidence of changes. Obstetricians are in fact well used to monitoring their activities statistically, having collected and published data long before the current fashion for audit started.

To be useful medical statistics must be
- Collected properly from a prescribed population
- Analysed in a valid fashion so as not to produce bias
- Presented promptly in a digestible, unbiased form.

In the United Kingdom these three criteria have been met by the national statutory handling of data on births, perinatal deaths, and maternal deaths. District registrars refer data centrally to the registrars general of the four kingdoms; checking, analysis, and comment on final data comes from the Office of Population, Censuses and Surveys in London and from equivalent departments in Wales, Scotland, and Northern Ireland. The Scottish system currently gives the most speedy and best produced information.

Birth rates

The number of babies born is counted by two processes, birth registration and birth notification. These are two statutory obligations—registration on parents, notification on professional staff.

Birth rates are often expressed as a ratio of the number of births to the number of people in the existing population, usually gathered from the decennial census.

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\text{Birth rate} = \frac{\text{No of births} \times 1000}{\text{No of people in the population}}
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The birth rate in the United Kingdom in 1988 was 7.3 per 1000.

The denominator in the birth rate formula includes, however, men, who never give birth, and women under 15 and over 44, who are mostly outside the reproductive age group. Hence the denominator does not relate to the numerator very well; an alternative measure is more commonly used in the Western world.

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\text{General fertility rate} = \frac{\text{No of babies born} \times 1000}{\text{No of women in the population aged 15-44}}
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The general fertility rate in the United Kingdom in 1985-7 was 62 per 1000. International comparisons are harder because only countries with good census systems can break down population data to determine the number of women aged 15-44.

For the less numerically minded, completed family size is a user friendly statistic; we can all imagine the size of a family. Unfortunately, these data depend on uncertain estimates and are usually produced some years after the women concerned have passed their reproductive years and completed their family. Obviously, to increase any population the number in a family needs to be more than two. In much of western Europe it is 1.7 to 2.2, whereas in Kenya it is 7.8, showing a rapidly increasing population.
The shifts in population over the years can be shown by demograms that group the population in five or 10 year age bands. Thus the effects of past events can be seen; some idea of the future makeup of a population can also be predicted and future needs in society such as schools, colleges, and the numbers of people in any age group who are available for jobs can be forecast.

Perinatal mortality

Deaths of babies around the time of birth are assessed by three sets of statistics.

1. Stillbirths or late intrauterine deaths occur when a child is delivered after the 28th completed week of pregnancy but shows no signs of life at birth:

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   \text{Stillbirth rate} = \frac{\text{No of babies born dead after 28 weeks} \times 1000}{\text{Total births (live and stillborn)}}
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2. Neonatal death is recorded when babies who are born alive die in the first 28 days of life; early neonatal deaths refer to babies who die in the first seven days. All babies who die in the first year of life are recorded as infant deaths but those who die after the first four weeks are defined as postneonatal deaths.

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   \text{Neonatal death rate} = \frac{\text{No of babies dying between 1-28 days} \times 1000}{\text{No of live births}}
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3. In the past 50 years, perinatal mortality rates have been used to group together all babies whose deaths may have some relation to obstetric events; thus all stillbirths and neonatal deaths in the first week are considered.

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   \text{Perinatal mortality rate} = \frac{\text{Stillbirths + neonatal deaths in the first 7 days} \times 1000}{\text{Total births (live and stillborn)}}
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There is some degree of dissatisfaction with the use of perinatal mortality rates as an index of obstetric performance. Many babies born before 28 weeks of gestation now survive in neonatal units. Others with congenital lethal malformations may be kept alive in such units until the second or third week and so are not included in the perinatal mortality rate. We may return to looking at stillbirth rates (possibly changing definitions of viability to 24 weeks’ gestation in England, Wales, and Scotland) and neonatal death rates as separate statistics.
The perinatal mortality rate has fallen steadily since the second world war. When comparing data from different countries, rates are falling in most of them at about the same rate, though some countries start worse off and stay there. This reflects the influence of socioeconomic factors and patterns of reproduction more than the quality of obstetric facilities. A similar pattern can be seen to a smaller extent in the regions of the United Kingdom.

The three main causes of perinatal mortality in the United Kingdom are low birth weight, hypoxia, and congenital abnormalities. Low birth weight is currently one of the biggest problems in the Western world (see article in this series on small for gestational age). Hypoxia is mostly a problem of labour and to some extent is improved by monitoring women at high risk. Congenital abnormalities are detected at prenatal examination (see the two articles on detection and management of congenital abnormalities) but the real cure of this problem would be to prevent malformations rather than to detect them and then abort the fetus.

Perinatal mortality rates are not a good measure of obstetric or midwifery performance. In a developed society they are a mixed measure of a country’s educational, social, nutritional, and public health systems as well as of obstetric acute medicine.

**Maternal mortality**

Maternal deaths are rare in the Western world but this is not so everywhere: in some parts of Africa a woman has a chance as high as one in 25 of dying during one of her pregnancies.

Maternal death usually refers to a woman dying in pregnancy, childbirth, or within 42 days of the end of pregnancy. In many countries, including the United Kingdom, it includes deaths after an abortion or an ectopic pregnancy but in some countries it does not. The definition in Britain used to include deaths up to one year but in the past few years it has come in line with World Health Organisation recommendations.

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\text{Maternal death rate} = \frac{\text{Deaths in pregnancy, childbirth, and 6 weeks afterwards} \times 1000}{\text{Total maternities}}
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Maternal death rates in the United Kingdom did not reduce in this century as swiftly as did the rates of perinatal death. Until the mid-1930s maternal mortality was the same as it had been in Victorian times. With the development of chemotherapy and antibiotics the rates reduced; to this was added the improvements brought by a proper blood transfusion service catalysed by the second world war. The founding of the colleges of obstetrics (1929) and midwives (1933) organised professional training and standards, and the unification of the antenatal and delivery services in the new NHS helped further. As the maternal death rate is so low, it is hard to see the continued improvement but when the data are plotted on a log scale reduction is still obvious.
International statistics on maternal mortality are less easy to present in a comparable way as different countries have different exclusions. In general, however, maternal mortality is an index of medical and midwifery care. Maternal death rates by region and by country within the United Kingdom also vary but differently from perinatal mortality rates.

In Britain the Confidential Enquiry into Maternal Deaths has been set up to provide information about maternal deaths. A complete case history of each maternal death is obtained and published triennially by the Department of Health, keeping all information confidential. From now on the reports are to be published from the whole United Kingdom rather than separately for the four kingdoms.

Currently the maternal mortality in the United Kingdom is reported to be 7-6 per 100,000 (1985-7); principal causes of maternal death in England and Wales are hypertension and pulmonary embolism. To reduce the toll of hypertension the inquiry committee recommends that in each region there should be one or two hospitals with staff skilled at looking after pregnant hypertensive mothers and their fetuses. Women with severe degrees of this condition should be electively transferred to these centres by the in-utero transfer service. Pulmonary embolism commonly follows popliteal or pelvic vein thrombosis, which should be watched for, particularly in the puerperium after an operative delivery. An active policy of anticoagulation on suspicion could reduce this cause of death.

Other major killers in the past were infection and haemorrhage; currently these are much reduced. It must give satisfaction to those who fought for the Abortion Act of 1967 to find that in the last two triennia reported by the confidential inquiry committee (1982-4 and 1985-7) there was not a single death from illegal abortion in England and Wales.

**Conclusions**

Too many doctors think of vital statistics in terms of Disraeli’s, “Lies, damn lies and statistics.” Perhaps they should look at statistics in the same way as did Richard Ascher:

“When something can be expressed in a numerical way, it is an aid to more precise and accurate thinking.”

Most of the data on death rates in England and Wales are derived from the office of Population Censuses and Surveys. The data on maternal mortality come from the confidential inquiries into maternal deaths.

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