

## 死因名と、第 10 回乳児死因分類 (Causes of death for tabulation of infant mortality in ICD-10)との対応表

### Deaths for 0 year old (0歳児の死亡、乳児死亡)

congenital malformations, deformations and chromosomal abnormalities'	Ba35
'respiratory and cardiovascular disorders specific to the perinatal period'	Ba30
'sudden infant death syndrome'	Ba44
'accidents'	Ba46
'haemorrhagic and haematological disorders of fetus and newborn'	Ba33

# 1. Live births

*--- Number of live births, 1900 - 2000 ---*

'Number of live birth' is the number of babies born in a year and registered as Japanese. Babies born abroad are included.

'Number of live births' was 1.19 million in 2000. It was 1.4 million in 1900 and had increased for a half century (Table 1). It was over 2.6 million a year from 1947 - 49, which is called 'the first baby boom' responding to larger number of marriage after the World War II (Figure 1). It decreased for several years and rather stable for a decade. It was unusually low in 1966 because of the traditional superstitious believing that the women born on this year, 'Hinoeuma,' would have a fiery temper. 'Number of live births' became larger and was over 2 million in 1971 - 74, which is called 'the second baby boom' responding to the childbirth of the first baby boom born. It decreased from 1975 - 90 and was pretty stable around 1.2 million thereafter.

*--- Total fertility rate, 1947 - 2000 ---*

'Total fertility rate' is the estimated number of children a Japanese female bears in her 15 - 49 years of age; it is calculated as summation of 'rate of live births by age of mother' ('live births from mothers of a certain age' over 'female population of a certain age') from 15 through 49 years of age.

Total fertility rate' was 1.36 in 2000. It was over 4 in 1947 - 49, having diminished by half for a decade and was stable around 2.0 - 2.1 from 1957 - 74 with an exception mentioned above in 1966 (Figure 1). It decreased thereafter.

When 'total fertility rate' is around 2.1, the size of the Japanese population is expected to be about the same in the future. However, the smaller index forecasts a future decrease in the population. Many of developed countries have had 'total fertility rates' of less than 2.1 for the latest quarter century (see Figure 2).

## **2. Maternal mortality**

*--- Maternal mortality rate, 1900 - 2000 ---*

'Maternal deaths' are defined as the deaths led by or worsen by pregnancy (O00 – 99, A34, B20 – 24 in International Classification of Disease, 10<sup>th</sup> Revision (ICD-10)), that occurs either during pregnancy or within 42 days after termination of pregnancy. 'Maternal mortality rate' is defined as the number of 'maternal deaths per 100 000 total births (live births plus fetal deaths of 12 weeks or more of pregnancy).' In calculating maternal mortality rate for international comparison, 'live births' could be used instead of 'total births.'

Maternal mortality rate' has declined sharply (Figure 3); 397.8, 329.9, 228.6, 117.5, 19.5 and 6.3 in 1900, 1920, 1940, 1960, 1980 and 2000, respectively (Table 1). The total number of 'maternal deaths' was as little as 78 in 2000; however, the latest 'maternal mortality rate (per 100 000 live births)' was not yet the lowest internationally; Switzerland (3.6), Italy (3.8), Sweden (5.2), Canada (5.3), U.K. (5.4), Germany (6.0), Japan (6.5), New Zealand (7.0), Netherlands (7.8), U.S.A. (8.4), France (9.6) in 1997 or in 1996 for Switzerland and Sweden.

*--- Leading causes of maternal deaths ---*

Main causes of 386 maternal deaths occurred from 1996 - 2000 were 'Indirect obstetric causes' (O98 - 99 in ICD-10); 101 (26%), 'Other direct obstetric causes' (O01 - O07, O20 - O43, O47 - O71, O73 - O87, O89 - O92); 67 (17%), 'Obstetric embolism' (O88); 64 (17%), 'Postpartum haemorrhage' (O72); 49 (13%), 'Placenta praevia and premature separation of placenta' (O44 - 45); 43 (11%), 'Oedema, proteinuria and hypertensive disorders in pregnancy, childbirth, the puerperium' (O10 - 16); 43 (11%) and 'Ectopic pregnancy' (O00); 14 (4%) and Obstetric death of unspecified cause (O95); 5 (1%) (Figure 4).

### **3. Perinatal mortality**

*--- Perinatal mortality rate, 1950 - 2000 ---*

Perinatal deaths' are defined as the sum of 'late fetal deaths' and 'early neonatal deaths.' The latter is the deaths under 1 week of age. The former is defined as fetal deaths of 22 completed weeks or more of pregnancy in the current definition adopted in 1995. 'Perinatal mortality rate' is the number of 'perinatal deaths' per 1 000 total births (live births plus fetal deaths of 22 weeks or more of pregnancy).

In the calculation of 'perinatal mortality rate' defined by ICD-10, all of 'late fetal deaths,' 'early neonatal deaths,' and 'total births' include nothing but the ones with 1 000 gram or heavier at births; however, these indexes have been calculated regardless of birth weight in Japan.

'Perinatal mortality rate' was 5.8 in 2000. For international comparison or the comparison with older data, the term of 'the late fetal deaths' limits '28 completed weeks or more of pregnancy' instead of '22 weeks or more', and the index calculates 'per 1 000 live births' instead of 'per 1 000 total births.'

This 'perinatal mortality rate' decreased drastically from 46.6 in 1950 to 3.8 in 2000 (Table 1, Figure 5).

*--- Ratio of 'early neonatal deaths' and 'late fetal deaths' in perinatal deaths ---*

Higher ratio of 'late fetal death' to 'early neonatal death' has been characteristic of Japan in comparison with other developed countries, partly because the definition of 'late fetal death' is not identical among countries.

## **4. Infant mortality**

### *--- Neonatal mortality rate, 1900-2000 ---*

Neonatal mortality rate' is defined as infant deaths under 28 days of age per 1 000 live births. It was 1.8 in 2000, which is the lowest level in the world. It was 79.0 in 1900, and 69.0, 38.7, 17.0 and 4.9 in 1920, 1940, 1960 and 1980, respectively (Figure 6).

### *--- Infant mortality rate, 1900-2000 ---*

'Infant mortality rate' is defined as deaths under 1 year of age per 1 000 live births. It was 3.2 in 2000; however, it used to be as high as 155 in 1900 (Figure 6). Though it decreased to 76.7 in 1947 immediately after the World War II, it was still more than double in comparison with the lowest countries (Figure 7). It declined drastically and is the lowest level in the world in 2000. The difference between urban and rural area has become smaller (range 1.9 - 5.0 in 2000).

### *--- Leading causes of death for 0-year old, 1960 - 2000 ---*

Leading causes of death for 0-year old infants were 'congenital malformations, deformations and chromosomal abnormalities' (Ba35 in 'Causes of death for

tabulation of infant mortality in ICD-10); 36.2%, 'respiratory and cardiovascular disorders specific to the perinatal period' (Ba30); 15.7%, 'sudden infant death syndrome' (Ba44); 8.3%, 'accidents' (Ba46); 5.7% and 'haemorrhagic and haematological disorders of fetus and newborn' (Ba33); 5.4% in 2000 (Figure 8).

The leading causes in 1960 were 'other diseases of newborn and premature babies of unknown causes'; 35.1%, 'pneumonia and bronchitis'; 27.9%, 'gastritis, duodenitis enteritis and colitis'; 7.7%, 'congenital anomalies'; 6.2%, and 'birth injury, birth asphyxia and atelectasis'; 5.1% (Figure 8).

*--- Death for 0 - 4 years of age, 1950 - 2000 ---*

Death rate for 0 - 4 years old children was 89.9 per 100 000 population of the same age group in 2000. It was 4 070.2 in 1935, having a marked decrease from 3 401.7 to 1 989.2, 824.7, 375.9, 192.7 and 123.4 in 1947, 1950, 1960, 1970, 1980 and 1990, respectively.

For 1-4 years of age, leading causes of deaths were 'accident' (V01-X59 in ICD-10); 21.4%, 'Congenital malformations, deformations and chromosomal abnormalities' (Q00-Q99); 17.2%, 'Malignant neoplasms' (C00-C97); 8.1%, 'Pneumonia' (J12-J18); 6.2%, and 'Heart diseases' (I01-I02.0, I05-I09, I20-I25, I27, I30-I52); 5.5% (Figure 9).

For the last 50 years, 'death rate for 1-4 years of age' had decreased to 3.3% of the original value, calculating 30.6 (deaths per 100 000) in 2000 divided by

926.8 in 1950. So did 5.3% for 'infant mortality rate,' 6.6% for 'neonatal mortality rate,' and 8.1% for 'perinatal mortality rate.'

## **5. Birthweight**

*--- Tendency of birthweight and problem of low birthweight ---*

Average 'birthweight' was 3.07 kg (boys) and 2.99 kg (girls) in 2000. The values were 3.14 kg (boys) and 3.06 kg (girls) in 1951 and had slightly increased to 3.25 kg (boys) in 1973 and 3.16 kg (girls) in 1974. The average has been slightly decreasing thereafter.

Proportion of 'low birthweight' (less than 2 500 grams) was 7.8% (boys) and 9.5% (girls) in 2000. They were 6.4% (boys) and 8.3% (girls) in 1951, and had decreased to 4.7% (boys) and 5.5% (girls) in 1975. However, the proportion has been increasing thereafter.

For the low birthweight newborns, the lighter the birthweight was, the higher the risk of mortality would be (Figure 10). When 'early neonatal (under 1 week) death rate' per 1 000 live births was calculated by birthweight; for baby boys, 527.8, 129.0, 37.0, 16.9, 3.1, 0.7, 0.4, 0.4 and 1.0 for 'under 500g,' '500 - 999g,' '1 000 - 1 499g,' '1 500 - 1 999g,' '2 000 - 2 499g,' '2 500 - 2 999g,' '3 000 - 3 499g,' '3 500 - 3 999g,' and '4 000g or heavier,' respectively in 2000. The values for baby girls are 430.0, 105.8, 32.8, 16.8,



2.1, 0.5, 0.3, 0.3 and 0.4, respectively.

As medical care for neonates has improved remarkably, the prognosis for 'very low birthweight' infants (less than 1 500 grams) is still rather poor. 38% of 'early neonatal deaths' (574 deaths out of 1 519) occurred among 'very low birthweight babies in 2000.

## **6. Period of Gestation at Birth**

94% of live births were 'term delivery' (born in 37-41 weeks of pregnancy) in 2000. Post-term delivery (born in 42 weeks or over) has decreased drastically from 4.4% of all live births in 1980 to 0.8% in 2000, though pre-term delivery (born in 36 weeks or before) has increased from 4.1% in 1980 to 5.4% in 2000.

In the case of multiples, the ratio of preterm delivery was widely increased from 29.4% in 1980 to 50.5% in 2000. It was considered mainly because of increase of infertility treatments, the existence of intrauterine growth restriction, improving in neonatal medical technology and facilities, and the decline of stillbirth rate.

## **7. Place of Birth**

Proportion of hospitalized among all live births was 99.8% in 2000 (Figure 11). However, it was only 4.6% and the rest were mostly born at home in 1950. Proportion of hospitalized was 50.1%, 96.1%, 99.5% and 99.9% in 1960, 1970, 1980 and 1990, respectively. In order to reduce maternal and perinatal deaths, efforts have been made to promote deliveries in medical facilities (hospitals, clinics or maternity home).

## **8. Maternal and child health handbook**

A 'maternal and child health handbook' consists of two parts; one is information and another is a set of systematic recording forms for a mother to keep from the very beginning of her pregnancy till her new child to be 7 years of age. The handbook is given to a pregnant woman for free when she reports her pregnancy to the local government. She is expected to bring this handbook along to all medical examinations of both herself and her new child. Some information is to be completed by doctors or other health professionals and the other is to be filled in by herself.

This handbook has been utilized as a tool in the promotion of maternal and child health. It serves as a reference to guide doctors, public health nurses and other health professionals in their work with the mother and her child. The mother is expected to acquire essential knowledge from the handbook and to use it as a basic reference to keep herself in a good condition and to check up the health and growth of her child. This handbook has been used by

the great majority of mothers since 1948.

The first part of the handbook has 15 sections. Their titles are 1) Certificate of birth registration, 2) Pregnancy health reference (medical history), 3) Woman's occupation and home situation, 4) Course of pregnancy, 5) Record of delivery & mother's postpartum condition, 6) Weight gain and loss during pregnancy and after childbirth, 7) Dentist's report on mother's teeth during pregnancy and after childbirth, 8) Parenting class record, 9) Your baby's development & health check-up for your baby, 10) Height and weight growth curve for infants, 11) Immunization record, 12) Record of childhood diseases, and 13) Dental check-ups, education and preventive care.

The second has 17 sections of information. Some furnish us essential education; otherwise provided by a book on maternal and child care. Others give information of the services and organizations available in the local area for medical, psychological, financial or childcare problems.

There are eight versions of foreign languages available as of March 2003; those are English, Chinese, Hangeul, Indonesian, Tagalog, Portuguese, Spanish and Thai versions.

There is a guidebook in each language instead of having information sections of the Japanese version translated and included in the foreign version, since priority of information needed is different between the Japanese and the foreigners in Japan. Common problems foreigners may have in Japan are not always the same as the ordinal Japanese face with, partly because medical

system and service available in Japan may be unfamiliar to the foreigners, also, manners and customs in the area of maternal and child care might not be identical.

## **9. National plan of the early 21<sup>st</sup> century for the health of mothers and children 2001 to 2010; ‘Healthy parents and children 21’**

There are four topics in the plan and each has goals.

The first topic is “Reinforcement health measures during adolescence and promotion of health education” and the main goals are (1) a reduction in teenage suicide rate and (2) a reduction in teenage sexually transmitted diseases rate.

The second one is “To ensure a safe and comfortable pregnancy / childbirth and assistance for infertility” and three main goals are (1) reduction by one-half in mortality rate of pregnant / delivering women, (2) establishment of medical networks for around the delivery date across 47 prefectures, and (3) establishment of fertility consultation centers in each of 47 prefectures.

The third is “Environmental systems to maintain and improve pediatric health maintenance and medical standards” and three main goals are (1) to maintain the best level in the world in perinatal death rate, (2) reduction by one-half in

the infant SIDS mortality rate, and (3) reduction by one-half in the mortality rate among toddlers.

The fourth is “to promote the gentle development of children and reduce anxiety concerning child-raising” and two main goals are (1) reduction in rate of mothers without self-confidence in their child-raising skills, and (2) increase in the rate of breastfeeding mothers one month after infant’s birth.

Table 1 Vital Statistics of Japan, 1900 - 2000

Year	Number		Rate										Maternal mortality ratio***	
	Population	Live births	Deaths	Crude birth rate per 1 000 population	Total fertility rate	Perinatal mortality rate* per 1 000 total births	(Reference)		Neonatal mortality rate per 1 000 live births	Infant mortality rate per 1 000 live births	Death for 1-4 years of age per 100 000 population	per 100 000		
							Perinatal mortality rate** per 1 000 live births	Early neonatal mortality rate per 1 000 live births				total births	live births	
1900	43 847 000	1 420 534	910 744	32.4				79.0	155.0		397.8	436.5		
1910	49 184 000	1 712 857	1 064 234	34.8				74.1	161.2		333.0	363.6		
1920	55 963 053	2 025 564	1 422 096	36.2				69.0	165.7		329.9	353.4		
1930	64 450 005	2 085 101	1 170 867	32.4				49.9	124.1		257.9	272.5		
1940	71 933 000	2 115 867	1 186 595	29.4				38.7	90.0		228.6	239.6		
1947	78 101 473	2 678 792	1 138 238	34.3	4.54			31.4	76.7		160.1	167.5		
1950	83 199 637	2 337 507	904 876	28.1	3.65	46.6	15.1	27.4	60.1	926.8	161.2	176.1		
1955	89 275 529	1 730 692	693 523	19.4	2.37	43.9	13.1	22.3	39.8	405.9	161.7	178.8		
1960	93 418 501	1 606 041	706 599	17.2	2.00	41.4	10.6	17.0	30.7		117.5	130.6		
1965	98 274 961	1 823 697	700 438	18.6	2.14	30.1	8.2	11.7	18.5	138.2	80.4	87.6		
1970	103 119 447	1 934 239	712 962	18.8	2.13	21.7	6.6	8.7	13.1		48.7	52.1		
1975	111 251 507	1 901 440	702 275	17.1	1.91	16.0	5.4	6.8	10.0	84.4	27.3	28.7		
1980	116 320 358	1 576 889	722 801	13.6	1.75	11.7	3.9	4.9	7.5		19.5	20.5		
1985	120 265 700	1 431 577	752 283	11.9	1.76	8.0	2.6	3.4	5.5	48.8	15.1	15.8		
1990	122 721 397	1 221 585	820 305	10.0	1.54	5.7	1.9	2.6	4.6	45.0	8.2	8.6		
1995	124 298 947	1 187 064	922 139	9.6	1.42	4.7	1.5	2.2	4.3	41.7	6.9	7.2		
2000	125 612 633	1 190 547	961 653	9.5	1.36	5.8	1.3	1.8	3.2	30.6	6.3	6.6		

\* Perinatal mortality rate =  $\frac{\text{Perinatal deaths in a year (Fetal deaths of 22 weeks or more of pregnancy + Early neonatal deaths)}}{\text{Total births (Live births + Fetal deaths of 22 weeks or more of pregnancy)}}$  \* 1 000

\*\* (Reference) Perinatal mortality rate =  $\frac{\text{Perinatal deaths in a year (Fetal deaths of 28 weeks or more of pregnancy + Early neonatal deaths)}}{\text{Live births}}$  \* 1 000

\*\*\* Maternal mortality ratio =  $\frac{\text{Maternal deaths in a year}}{\text{Total births (Live births + Fetal deaths of 12 weeks or more of pregnancy)}}$  \* 100 000

In calculating maternal mortality ratio for international comparison, 'live births' could be used instead of 'total births'.

Maternal deaths, in the years before 1979, refer to the sum of deaths caused by 'abortion (B40)' and 'other complications of pregnancy, child birth and the puerperium and delivery without mention of complication (B41)'. From 1979 to 1994, maternal deaths refer to the sum of 'direct obstetric death (Abridged list number 79)' and 'indirect obstetric death (Abridged list number 80)'. From 1995, sum of direct and indirect obstetric deaths, obstetric deaths if unknown origin, and obstetric tetanus and human immunodeficiency virus disease of pregnancy or until 42 days after the end of pregnancy.

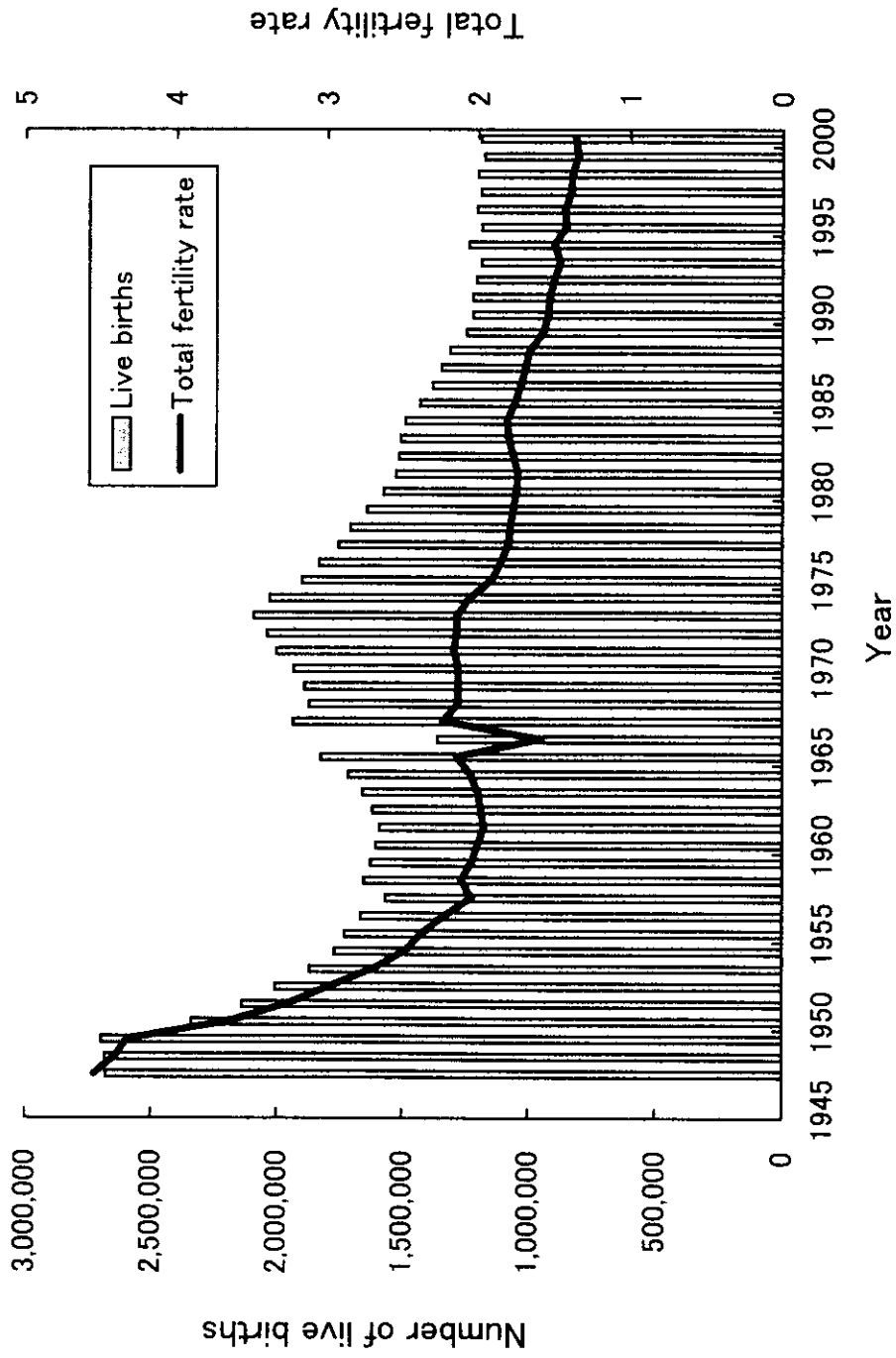


Figure 1. Live births and total fertility rates in Japan, 1947 – 2000

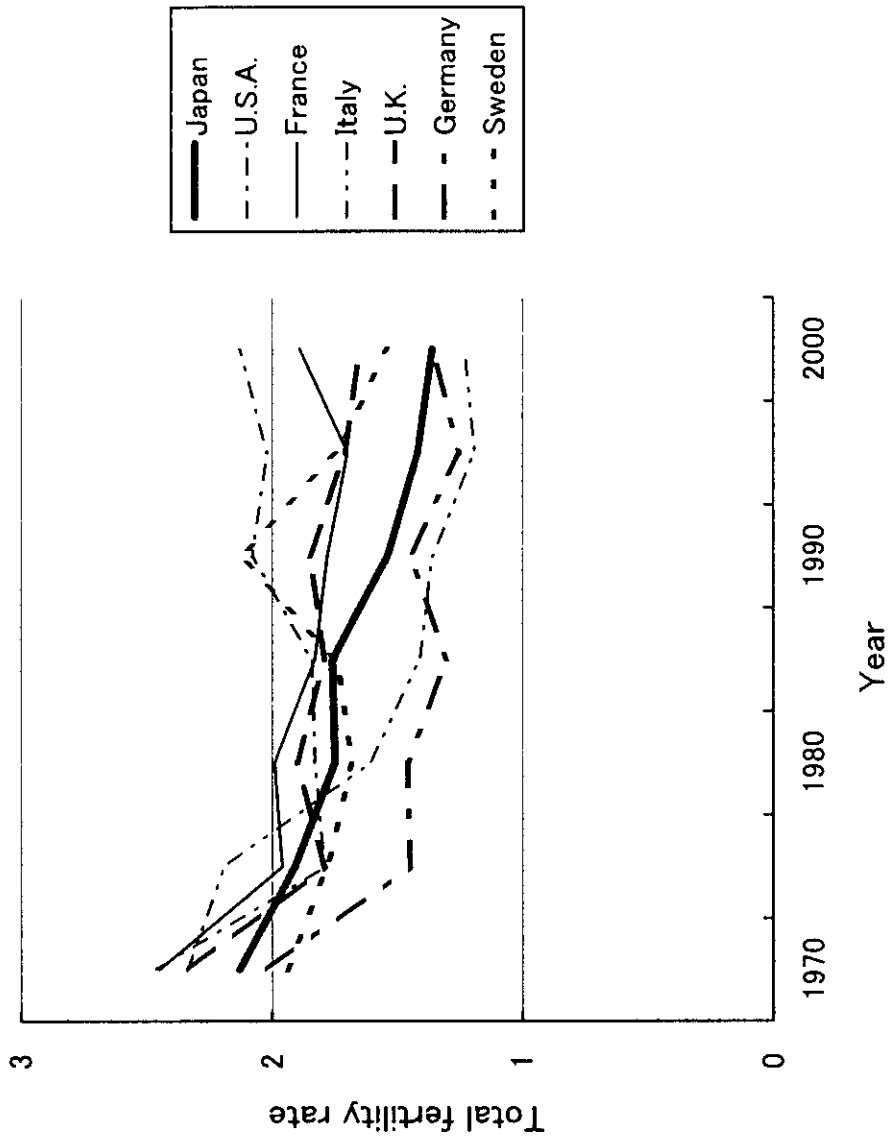


Figure 2. Total fertility rates of Japan and other countries, 1970 – 2000



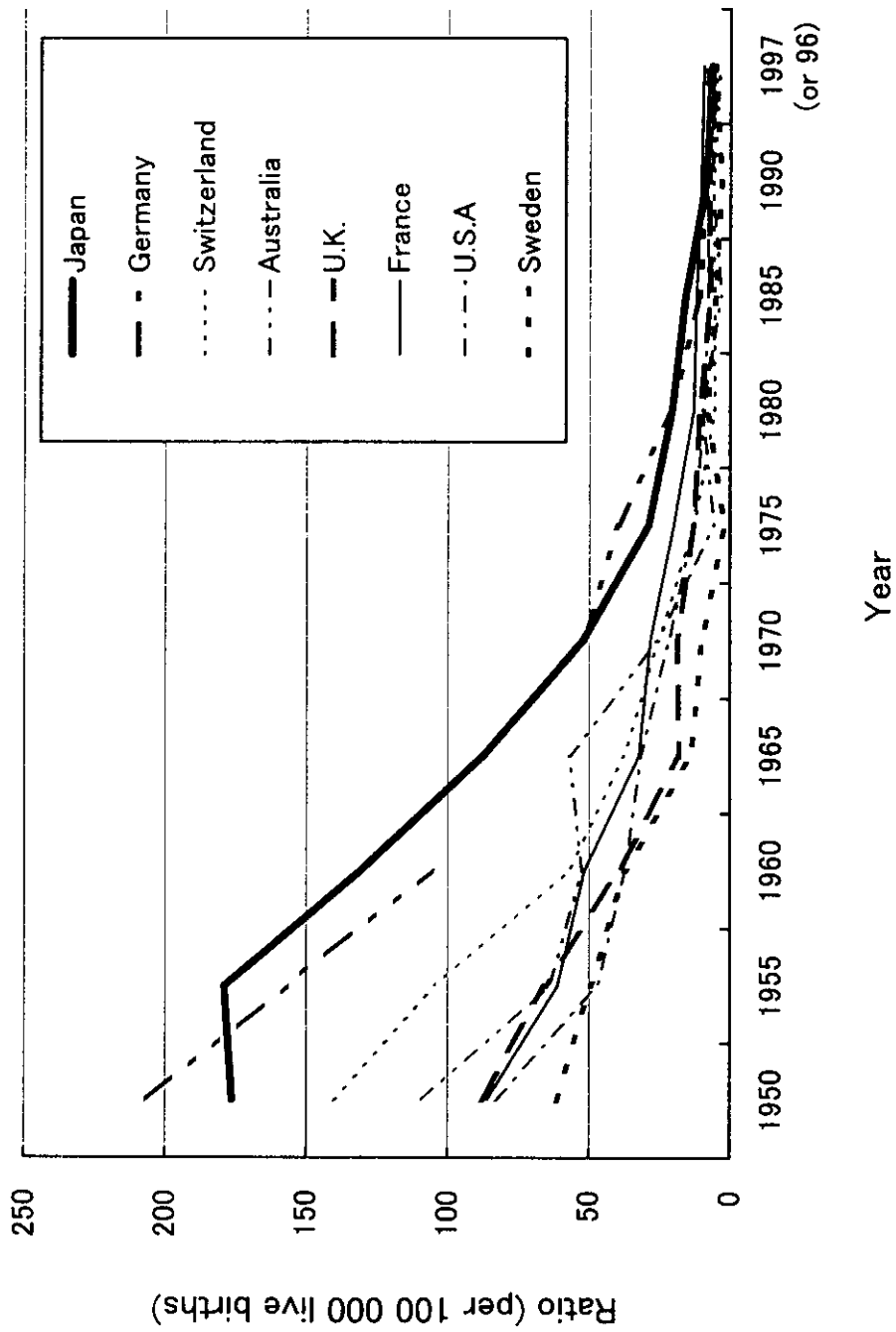


Figure 3. Maternal mortality ratios of Japan and other countries, 1950 – 1997

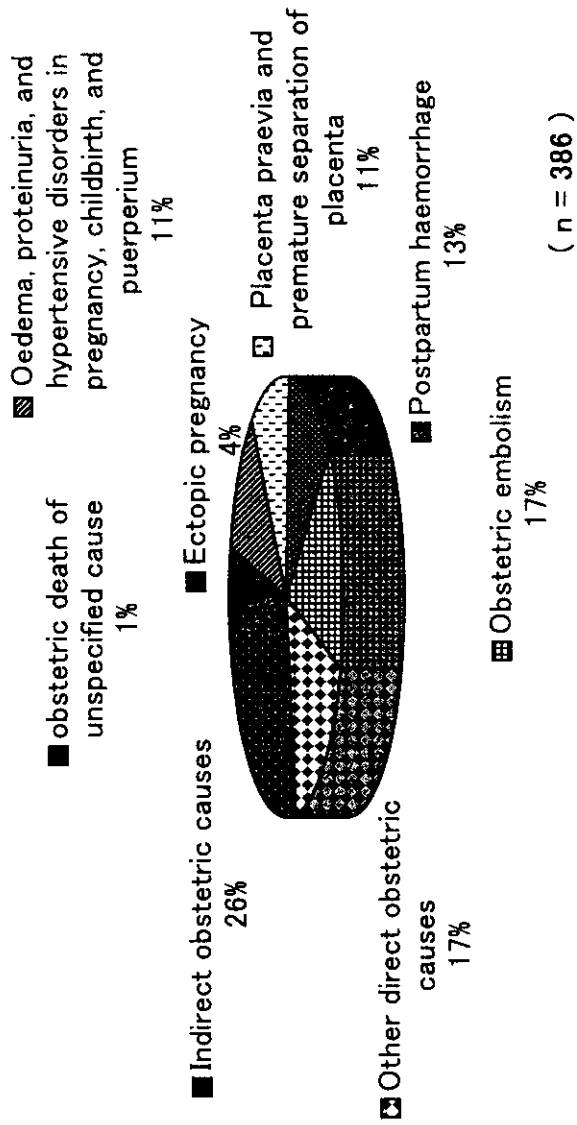


Figure 4. Leading causes of maternal deaths in Japan, pooled data from 1996 through 2000

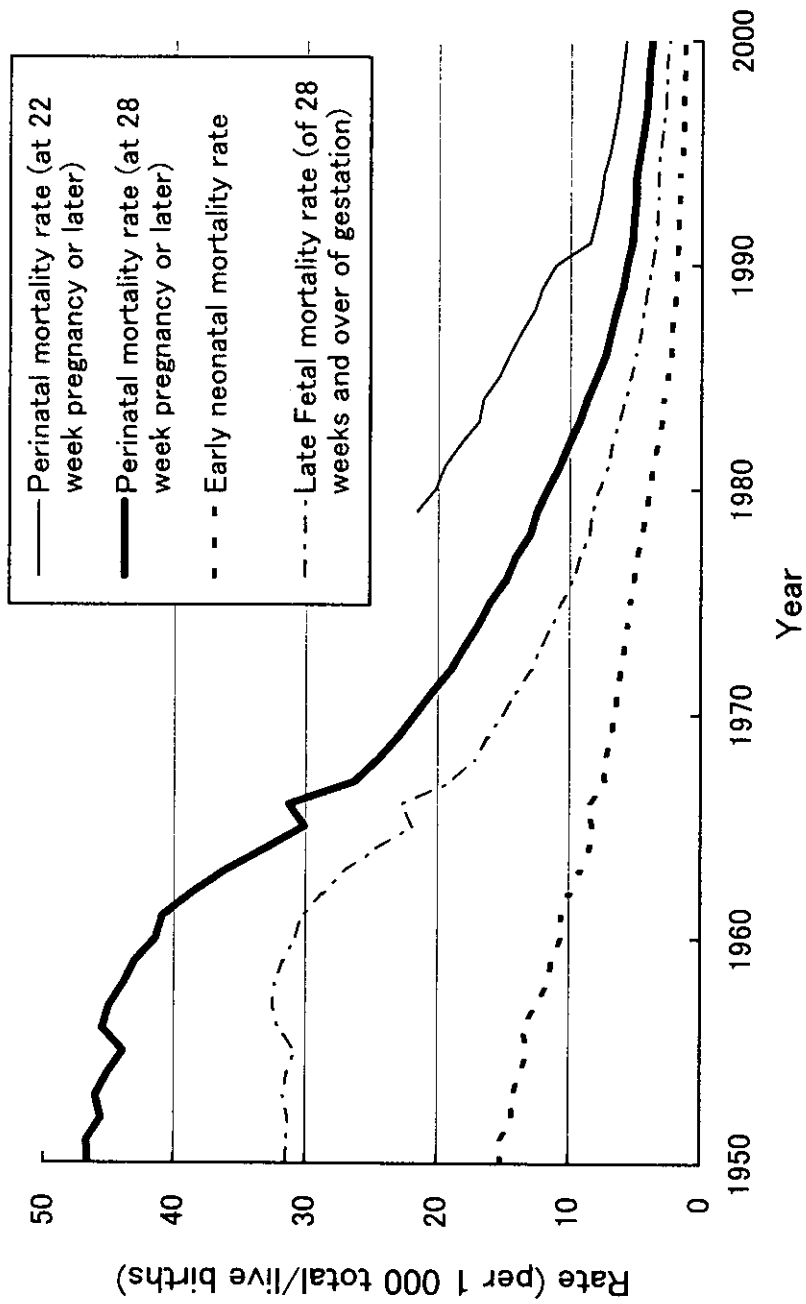
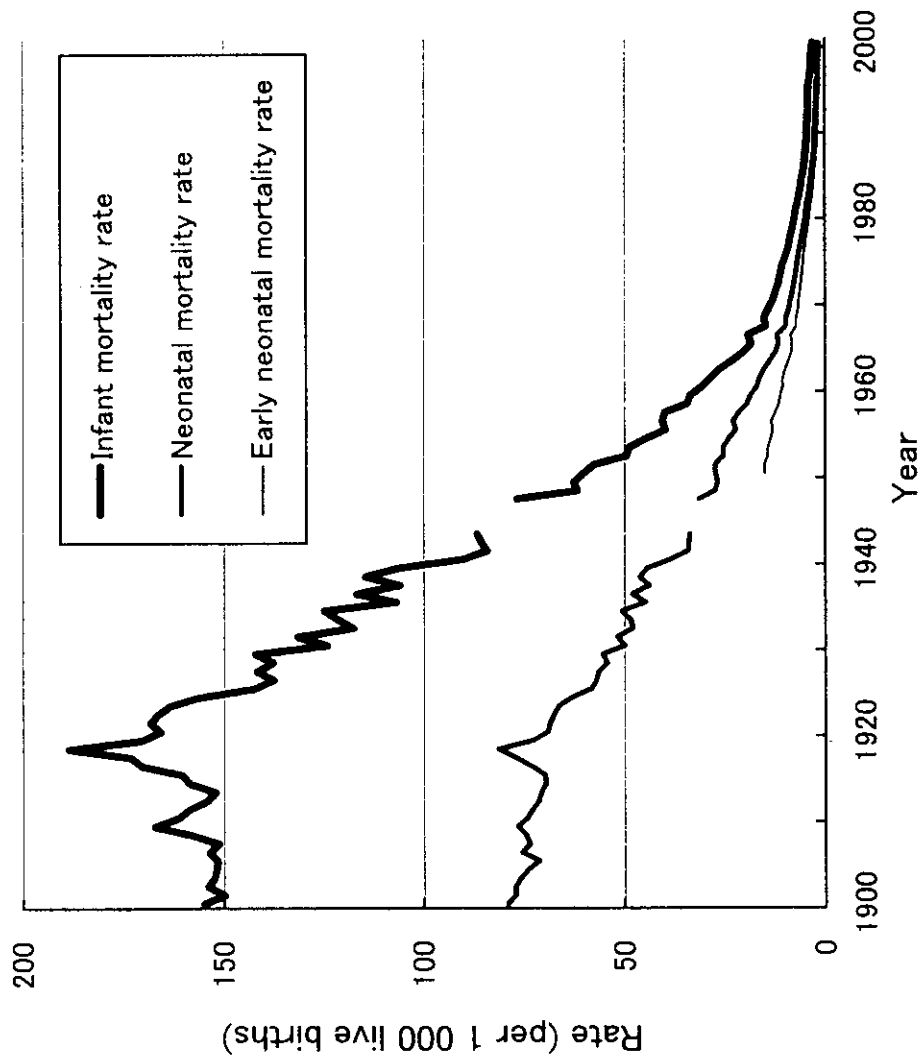


Figure 5. Perinatal mortality rates and their components in Japan, 1950 – 2000



**Figure 6. Infant mortality rates and their components in Japan, 1900 – 2000**