

III Explanation on major ratios and terms used in health and welfare statistics

(Population structure)

$$(1) \text{ Youth population index} = \frac{\text{Youth population}}{\text{Productive-age population}} \times 100$$

$$(2) \text{ Aging population index} = \frac{\text{Aging population}}{\text{Productive-age population}} \times 100$$

$$(3) \text{ Dependent population index} = \frac{\text{Youth population} + \text{Aged population}}{\text{Productive-age population}} \times 100$$

$$(4) \text{ Aging index} = \frac{\text{Aging population}}{\text{Youth population}} \times 100$$

Note: Youth population
Age 0~14
Productive-age population
Age 15~64
Aging population
Age 65 or older

(Vital Statistics)

<Comprehensive List>

$$(1) \text{ Live birth rate} = \frac{\text{Number of live births in a year}}{\text{Japanese population on October 1}} \times 1,000$$

$$(2) \text{ Death rate} = \frac{\text{Number of deaths in a year}}{\text{Japanese population on October 1}} \times 1,000$$

$$(3) \text{ Infant mortality rate} = \frac{\text{Number of infant deaths in a year}}{\text{Number of live births in a year}} \times 1,000$$

$$(4) \text{ Neonatal mortality rate} = \frac{\text{Number of neonatal deaths in a year}}{\text{Number of live births in a year}} \times 1,000$$

$$(5) \text{ Natural change rate} = \frac{\text{Number of natural changes in a year} - (\text{Number of live births in a year} - \text{Number of deaths in a year})}{\text{Japanese population on October 1}} \times 1,000$$

$$(6) \text{ Foetal death rate (Total, spontaneous, artificial)} = \frac{\text{Number of natural changes in a year} - (\text{Foetal death after 12 completed weeks of gestation (Total, spontaneous, artificial)})}{\text{Total number of births in a year} - (\text{Number of live births in a year} + \text{Number of foetal deaths in a year})} \times 1,000$$

$$(7) \text{ Perinatal mortality rate} = \frac{\text{Number of perinatal deaths in a year} - (\text{Number of deaths in and after the 22nd week of pregnancy} + \text{Number of early neonatal deaths (number of deaths within less than 1 week (7 days) after birth)})}{\text{Number of live births in a year} + \text{Number of foetal deaths after 22 completed weeks of gestation}} \times 1,000$$

$$(8) \text{ Foetal death rate after 22 completed weeks of gestation (Total, spontaneous, artificial)} = \frac{\text{Number of foetal deaths after 22 completed weeks of gestation (Total, spontaneous, artificial)}}{\text{Number of live births in a year} + \text{Number of foetal deaths after 22 completed weeks of gestation}} \times 1,000$$

$$(9) \text{ Early neonatal death rate} = \frac{\text{Number of early neonatal deaths in a year} - (\text{Number of deaths before 1 week (7 days) of birth})}{\text{Number of live births in a year}} \times 1,000$$

$$(10) \text{ Marriage rate} = \frac{\text{Number of marriage in a year}}{\text{Japanese population on October 1}} \times 1,000$$

$$(11) \text{ Divorce rate} = \frac{\text{Number of divorce in a year}}{\text{Japanese population on October 1}} \times 1,000$$

Under the "10th amendment of international statistical classification of diseases and related health problems" (ICD-10) stipulated by WHO, it is defined that the perinatal period "commences from 22 weeks (154 days) of pregnancy and ends within less than 7 days after birth.

In Japan, ICD-10 has been applied since 1995. Accordingly, the number of perinatal deaths is amended as "number of foetal deaths after 22 weeks of pregnancy plus early neonatal death" and the calculation method for the perinatal death rate is also amended.

Before 1994, perinatal death was defined as foetal death after 28 weeks of pregnancy plus early neonatal death and the calculation method for the perinatal death rate was as follows.

$$\text{Perinatal mortality rate} = \frac{\text{Number of perinatal deaths in a year}}{\text{Number of live births in a year}} \times 1,000$$

$$\begin{aligned} &\text{Foetal death rate after 28 completed weeks of gestation (Total, spontaneous, artificial)} \\ &= \frac{\text{Number of foetal deaths after 28 completed weeks of gestation (Total, spontaneous, artificial)}}{\text{Number of live births in a year}} \times 1,000 \end{aligned}$$

<Live Birth>

$$(1) \text{ Sex ratio} = \frac{\text{Number of male live births in a year}}{\text{Number of female live births in a year}} \times 100$$

$$(2) \text{ Live birth rate by age of mother (Age groups)} \\ = \frac{\text{Number of live births by mothers of an age group}}{\text{Number of Japanese women of the age group as of October 1}} \times 1,000$$

$$(3) \text{ Monthly birth rate (annualized)} = \frac{\text{Number of live births in a month}}{\text{Population at the beginning of the month} \times \text{Annual conversion factor}} \times 1,000$$

$$\text{Note: Annual conversion factor} = \frac{\text{Number of days in a month (30, 31, 28 or 29)}}{\text{Number of days in a year (365 or 366)}}$$

Or, the length of each month, taking the length of a year as 1. (Hereafter the same.)

$$(4) \text{ Total fertility rate} = \left[\frac{\text{Number of live births in a year age of mother}}{\text{Female population by age as of October 1}} \right] \text{ Total of women aged 15 years to 49 years}$$

The total fertility rate refers to the total of live birth rates by age for women aged 15 years to 49 years. It is equivalent to the number of children a woman would bear in a lifetime at that live birth rate by age.

Moreover, number of live births at 15 years and 49 years respectively include deliveries at 14 years or less and 50 years or more of age. But deliveries by mothers whose age are unknown are excluded.

<Death rate>

$$(1) \text{ Death rate by sex} = \frac{\text{Number of male deaths in a year}}{\text{Number of female deaths in a year}} \times 100$$

$$(2) \text{ Death rate (total, male, female) by age (age groups)} \\ = \frac{\text{Number of deaths at a certain age (age group) in a year (total, male, female)}}{\text{Population of Japanese people of the age (age group as of October 1)}} \times 1,000$$

$$(3) \text{ Monthly death rate (annualized)} = \frac{\text{Number of deaths in a month}}{\text{Population at the beginning of the month} \times \text{Annual conversion factor}} \times 1,000$$

$$(4) \text{ Death rate by cause} = \frac{\text{Number of deaths in a year by cause}}{\text{Population of Japanese people as of October 1}} \times 100,000$$

$$(5) \text{ Age-standardized death rate} = \frac{\left\{ \left[\begin{array}{l} \text{Sum total for each age (age group) of} \\ \text{(Death rate of each age (age group) in a} \\ \text{group under observation} \end{array} \right] \times \left[\begin{array}{l} \text{Population of} \\ \text{the same age} \\ \text{(age group)} \end{array} \right] \right\}}{\text{Total number of standard population groups}} \text{ in the standard population group}$$

(Reference)

Since the death rate differs by age, the age-standardized death rate is useful for country-wise comparisons or observation of yearly trends as it excludes the differences in age composition.

The standard population used for age-standardized death was the total population in 1935 by sex until 1989 (prefectures used the total population in 1960), and the 1985 model population (a population calculated based on Japan's population in the national census in 1985 on a 1000-person basis with a correction of extreme changes in such a case of a baby boom) from 1990 to 2019. However, this was far removed from the actual population composition. Therefore, the 2015 model population (a population calculated based on Japan's population in the national census in 2015) on a 1000-person basis with a correction of extreme changes in such a case of a baby boom has been used since 2020.

Moreover, the “death rate of each age (age group) in a group under observation” in the equation is multiplied by 1,000 (multiplied by 100,000 when calculating by cause).

<Infant mortality>

$$(1) \text{ Infant mortality rate by sex} = \frac{\text{Number of male infant deaths in a year}}{\text{Number of female infant deaths in a year}} \times 100$$

$$(2) \text{ Infant mortality rate by death cause} = \frac{\text{Number of Infant deaths in a year by death cause}}{\text{Number of live births in a year}} \times 100,000$$

$$(3) \text{ Neonatal mortality rate by death cause} = \frac{\text{Number of neonatal deaths in a year by cause}}{\text{Number of live births in a year}} \times 100,000$$

$$(4) \text{ Monthly infant mortality rate (annualized conversion rate)} = \frac{\text{Number of Infant deaths in a month}}{\text{Number of live births in a year} \times \text{Annual conversion factor}} \times 1,000$$

<Foetal death>

$$(1) \text{ Foetal deaths by sex} = \frac{\text{Number of male foetal deaths in a year}}{\text{Number of female foetal deaths in a year}} \times 100$$

$$(2) \text{ Monthly foetal deaths rate (Total, spontaneous, artificial)} = \frac{\text{Number of foetal deaths in a month (Total, spontaneous, artificial)}}{\text{Number of births in a month (number of live births in a month + number of foetal deaths in a month)}} \times 1,000$$

$$(3) \text{ Monthly foetal death rate after 22 completed weeks of gestation (Total, spontaneous, artificial)} = \frac{\text{Number of foetal deaths in a month after 22 completed weeks of gestation (Total, spontaneous, artificial)}}{\text{Number of live births in a month + Number of foetal deaths in a month after 22 completed weeks of gestation}} \times 1,000$$

<Perinatal mortality>

$$\text{Monthly perinatal mortality rate} = \frac{\text{Number of perinatal deaths in a month}}{\text{Number of live births in a month + Number of foetal deaths in a month after 22 completed weeks of gestation}} \times 1,000$$

<Maternal mortality>

$$\text{Maternal mortality rate} = \frac{\text{Number of maternal deaths in a year}}{\text{Number of births in a year (number of live births in a year + number of foetal deaths in a year) (or number of live births in a year)}} \times 100,000$$

Maternal death refers to the death of a woman during gestation or before 42 completed days of gestation (“within 90 days postpartum” until 1978 and “within 42 days after giving birth” from 1979 until 1994).

Although unrelated to the period of gestation and the site, it includes all causes that worsened due to pregnancy, its management or any reason related to them.

However, it excludes accidents or contingencies.

It covers direct obstetric deaths, indirect obstetric deaths and obstetric deaths from unspecified cause (Code O95 of the detailed list of statistical classification of diseases, injuries and causes of death (omitted below) from 1995).

Death from direct obstetric cause:

Death from obstetric complications during gestation (pregnancy, childbirth and the puerperium).

Listed under "XI Complications of pregnancy, childbirth and the puerperium" (contents correspond to direct obstetric death) in the detailed list of statistical classification of diseases, injuries and causes of death before 1978, under 630–646 and 650–676 from 1979 to 1994 and under O00–O92 from 1995 onwards.

Indirect obstetric death:

Death due to disease existing before or arising during gestation and directly unrelated to gestation, but worsened due to physiological effects of pregnancy.

Listed under 647–648 from 1979 to 1994. From 1995 onwards, listed under Indirect obstetric death excluding O98–O99 and Chapter XV (O codes).

Corresponds to obstetrical tetanus (A34) and Human immunodeficiency virus [HIV] disease complicating pregnancy, childbirth and the puerperium (B20–24) from 1995 to 2016.

Due to application of Japan ICD-10 (Version: 2013) from 2017, the code for Human immunodeficiency virus [HIV] disease complicating pregnancy, childbirth and the puerperium (B20–24) was changed to O98.7, and Hypopituitarism (E23.0), Mental and behavioural disorders associated with the puerperium, not elsewhere classified (F53), Puerperal osteomalacia (M83.0) and External causes of morbidity and mortality (V01–Y89) were added.

(Health statistics)

$$(1) \text{ Number of physicians against 100,000 of population} = \frac{\text{Number of physicians}}{\text{Total population of Japan as of October 1st}} \times 100,000$$

$$(2) \text{ Number of beds against 100,000 of population} = \frac{\text{Number of beds}}{\text{Total population of Japan as of October 1st}} \times 100,000$$

(3) Ratio of persons with subjective symptoms

Persons with subjective symptoms mean the household member (excluding inpatient) with subjective symptom such as sickness and injury and the ratio of persons with subjective symptoms means the rate of persons with subjective symptoms against 1,000 of population.

$$\text{Ratio of persons with subjective symptoms} = \frac{\text{Number of persons with subjective symptoms}}{\text{Number of household members}} \times 1,000$$

(4) Rate of outpatients

Outpatient means a household member (excluding inpatient) who visits hospital, clinic, Japanese traditional massage, acupuncture, moxa cautery and judo-orthopaedics due to illness or injury, and the rate of outpatients against 1,000 of population is called the "rate of outpatients".

$$\text{Rate of outpatients} = \frac{\text{Number of outpatients}}{\text{Number of household members}} \times 1,000$$

(5) Rate of persons with difficulties in daily life

Persons with difficulties in daily life mean household members (excluding hospitalized person and person aged less than 6) who have health problems that affects daily life (such as bodily movement in daily life, outings, work, housework and exercise). The "rate of persons with difficulties in daily life" means the rate of persons with difficulties in daily life against 1,000 of population (aged 6 or older).

$$\text{Rate of persons with difficulties in daily life} = \frac{\text{Number of persons with difficulties in daily life}}{\text{Number of household members aged 6 or older}} \times 1,000$$

(6) Prevalence rate

The rate of number of infectious diseases or food-poisoning patients during a year against the population is called the "Prevalence rate".

Normally, the prevalence rate of infectious diseases or food-poisoning is calculated as the ratio of patients against 100,000 of population.

$$\text{Prevalence rate} = \frac{\text{Number of reported patients of infectious diseases or food-poisoning}}{\text{Total population of Japan as of October 1st}} \times 100,000$$

(7) Rate of Estimated Patients(per day, per 100,000 population)

The rate is obtained by dividing the estimated number of patients by population (against 100,000 of population).

Rate of Estimated Patients(per day, per 100,000 population) by sex, age or prefecture is calculated by using the population of each sex, age or prefecture.

When a patient survey (every 3 years) and a national census (every 5 years) are conducted in a year, the population in the national census is used.

$$\text{Rate of Estimated Patients (per day, per 100,000 population)} = \frac{\text{Estimated number of patients}}{\text{Population estimates}} \times 100,000$$

(8) Bed occupancy rate

$$\text{Bed occupancy rate} = \frac{\text{Annual number of inpatients}}{\text{Total of (Number of days of a month} \times \text{Number of beds at the end of a month) from January to December}} \times 100$$

(9) Average length of stay

$$\text{Average length of stay} = \frac{\text{Annual number of inpatients}}{1/2 \times (\text{Annual number of newly admitted inpatients} + \text{Annual number of discharged})}$$

Average length of stay about beds for long-term care is as follows.

$$\text{Average length of stay} = \frac{\text{Annual number of inpatients}}{1/2 \times (\text{Annual number of newly admitted inpatients} + \text{Annual number of inpatients transferred from beds for other types of diseases within the same hospital} + \text{Annual number of discharged patients} + \text{Annual number of inpatients transferred to beds for other types of diseases within the same hospital})}$$

Average length of stay about beds for long-term nursing care is as follows.

$$\text{Average length of stay} = \frac{\text{Annual number of inpatients}}{1/2 \times (\text{Annual number of newly admitted inpatients} + \text{Annual number of inpatients transferred from beds other than beds for long-term nursing care within the same hospital} + \text{Annual number of discharged patients} + \text{Annual number of inpatients transferred to beds other than beds for long-term nursing care within the same hospital})}$$

(Comprehensive Survey of Living Conditions)

- 1 "Household" means a group of people who live together in the same residence and share the household income or a single person who independently maintains a residence or independently supports himself/herself.
- 2 "Householder" means, regardless of age and income, a person declared by a household as the head of the family who plays a central role in managing household matters.
- 3 "Household" member means each person comprising a household. However, a person placed in a social welfare facility, job bachelor (including a migrant worker and person who is on a long-term overseas business trip), person who is studying away from home, person estranged from a family, child who is put out with a foster family and incarcerated person are excluded.
- 4 "Structure of household" is based on the following classifications.
 - (1) One-person household
 - ① One-person household sleeping-in or living in dormitory
Means a sleep-in store staff, or a single person who lives in school dormitory, student residence, bachelors' dormitory, etc.
 - ② Other One-person household
Means that a household is comprised of 1 household member and that the place of living of the household member is other than ①.
 - (2) Nuclear family household
 - ① Household of couple only
Means a household which is comprised only of householder and its spouse.
 - ② Household of couple with unmarried children
Means a household which is comprised only of husband, wife and unmarried child.
 - ③ Household of a parent with unmarried children
Means a household which is comprised only of a father or mother and unmarried child.
 - (3) Three-generation-family household
Means a household comprised of the householder at its center and household members of three generation or longer in a direct line.
 - (4) Other household
Means a household other than (1)-(3) above.

5 “Type of household” is based on the following classifications.

(1) Aged household

Means a household only with person aged 65 or older, or with person aged 65 or older and unmarried person aged less than 18.

(2) Mother-child household

Means a household comprised only of a female aged less than 65 without her spouse due to spouse's death, divorce, and other reasons (including unmarried relationship and the case where spouse is missing over a long time), and her child (including adopted child) aged less than 20.

(3) Father-child household

Means a household comprised only of a male aged less than 65 without his spouse due to spouse's death, divorce, and other reasons (including unmarried relationship and the case where spouse is missing over a long time), and his child (including adopted child) aged less than 20.

(4) Other household

Means a household other than (1)-(3) above.

6 “Type of occupation for household” is based on the following classifications.

(1) Household of employee

① Household of regular employee

Means a household whose member with the largest income is employed under a contract of 1 year or longer or without special conditions on employment period.

(i) Household of an officer of a company, organization, etc.

Means a household whose member with the largest income is a person who manages or represents a company or organization.

(ii) Household of a general employee

Means a household whose member with the largest income is employed by an individual business owner, company, organization, or government agency or ministry.

• Households of employees without a fixed contract period

Means a household with a member with the largest income is employed by an individual business owner, company, organization, or government agency or ministry, without special condition on employment period.

• Households of employees with a contract period of one year or longer

Means a household with a member with the largest income is employed by an individual business owner, company, organization, or government agency or ministry, under a contract of one year or longer.

② Household of employee under contract for 1-12 months

Means a household whose member with the largest income is employed under contract of 1 month or longer and less than 1 year.

③ Household of employee under daily contract or less than a month

Means a household whose member with the largest income is employed under daily contract or contract of less than 1 month.

(2) Household of self-employed

Meaning a household whose member with the largest income works in office, plant, store, restaurant, etc.

(3) Other household

Means a household whose member with the largest income does not fall under the above types.

Therefore, other household includes the household whose member with the largest income does not work at all (household which obtains income through interests, rents, dividends, pension, retired pension, etc.).

(4) Unknown

Means a household whose member with the largest income is a person whose employment status is unknown, or a household whose member with the largest income is a person who is unemployed, or where there are no members who are employed, or where there is any member whose employment status

- 7 “Child” means an unmarried person under 18 years of age.
- 8 “Family type” is based on the following classification:
- (1) One-person household
A family structure where the household consists of only one person.
 - (2) Household of a couple only
A family structure where the householder is living together with his/her spouse only.
 - (3) Coresident with child(ren)
 - a. Coresident with married child(ren) and the child’s spouse.
 - b. Coresident with child(ren) without spouse.
Where living with unmarried child(ren), child without spouse due to the death of or divorce from his/her spouse, or child with spouse currently living separately from the other household members.
 - (4) Coresident with other relative(s)
Coresident with relative(s) other than child(ren).
 - (5) Coresident with person(s) other than relative(s)
Coresident with person(s) other than relative(s) mentioned in (1) to (4) above.
- 9 “Income quintile groups” are a household group that divide a sequence of all households arranged in an ascending order equally into five, and of which each group is called the first, second, third, fourth and fifth quintile group from the lower income household, and each boundary values are called the first, second, third, fourth quintile value (quintile boundary value).