

## Period fertility

The most important measures are age-specific fertility rate (ASFR) and total fertility rate (TFR) as the summation of ASFRs. R code for today's class can be obtained as <https://minato.sip21c.org/demography-special/code20220428.R>.

The definition of "fertility": the number of live births a woman has actually had. One of the vital events.

"fertile" roughly opp. "childless", English "fertile" = French "fécondité" ~ "natalité", English "fecund" = French "fèrtilite"

The maximum number of children an average woman can theoretically produce = about 15 (if she starts childbearing as soon as possible after menarche in about 12-14 yrs, continues until menopause in middle or late 40s) ~ fecundity (biological possible maximum). Guinness Book record is 69 by a woman in 18 C.

The actual highest recorded average number of children for any population = about 10 per woman among the Hutterites (Louis Henry, 1961, 1972). (cf.) The first generation in the Paradise village in Western Province, Solomon Islands also had about 10. This number is called as "mean completed parity" or "mean completed fertility".

The type of fertility analysis: period fertility vs cohort fertility

The essence of period fertility = looking at fertility cross-sectionally = births occurring during a specified period of time.

The essence of cohort fertility = looking at fertility longitudinally = all births occurring to a specific group of women (usually birth cohort or marriage cohort).

### **Indicators (Technical terms are also given in Japanese below, but foreign students can ignore those)**

1. Child/Woman Ratio (CWR=婦人子供比) = [Children aged 0-4] / [Women aged 15-44 or 49].  
Based on population structure at one time, this indicator means the level of fertility. Denominator is -49 in Japan.  
See, Table 4.1. (cf.) Daughter / Mother Ratio (DMR=母娘比) can be calculated from family tree records.
2. Crude Birth Rate (CBR=粗出生率) = [Births in Year] / [Population at mid-year] x 1000.  
(The word "birth rate" (in Japanese, 出生率 or 普通出生率) is used when the denominator is total population. When the denominator is female population, the word "fertility rate" (in Japanese, 出生率 or 特殊出生率) is used. The reason why the total fertility rate (TFR) is 合計特殊出生率 in Japanese is that the denominator is female's population.
3. General Fertility Rate (GFR) = [Births during year] / [Women 15-44 or 49 at mid-year] x 1000.  
(Less commonly used, but it's better than CBR because it can substantially control for age and sex structure.)
4. Age-Specific Fertility Rates (ASFR=年齢別出生率) = [Births in year to women aged x] / [Women aged x at mid-year]  
See, Table 4.2 and Figure 4.1.
5. Total Fertility Rate (TFR=合計出生率 or 合計特殊出生率) = [Sum of ASFRs for ages 15-44 or 49] x 5  
If ASFRs are given as multiplied by 1000, TFR should be divided by 1000.  
In Japan, the Population Association of Japan (日本人口学会) recommends to use 合計出生率 since 1984 because of no idea of "total birth rate", but the Ministry of Health, Labor and Welfare still uses 合計特殊出生率  
\* It means the number of children a woman will bear *only if she survives to age 50 and experiences the given ASFRs*.  
It's acceptable "to include ASFRs for the age groups 10-14 or 50-54, or to omit the 45-49 one."
6. General Marital Fertility Rate (GMFR) = [All births in year] / [Married women 15-44 or 49] x 1000
7. General Legitimate Fertility Rate (GLFR) = [Legitimate births in year] / [Married women 15-44 or 49] x 1000
8. General Illegitimate Fertility Rate (GIFR)  
= [Illegitimate births in year] / [Single, widowed, divorced women 15-44 or 49] x 1000
9. Age-specific Marital Fertility Rates (ASMFR=年齢別有配偶出生率, a.k.a. MASFR)  
= [Births in year to married women aged x] / [Married women aged x] (x 1000)  
\* TMFR (合計有配偶出生率) is similarly defined as TFR, but less common and complicated idea, because it's largely affected by small proportion of married women in teenagers and so-called "Dekichatta-kon" in Japan.
10. Coale's indices (a.k.a. Princeton Indices)  
\* Comparing with the Hutterites' ASMFR, relative fertility level is shown. See, Table 4.4 and 4.5.  
\* The numbers of children by mother's ages are not necessary for the calculation.  
\*  $I_f$  (Overall fertility index=総合出生力指標)  
= [Births in year] / [Sum of expected births in year if women aged x obeys Hutterites' ASMFR for ages 15-49]  
\*  $I_g$  (Marital fertility index=有配偶出生力指標)  
= [Legitimate births in year] / [Sum of expected births in year if married women aged x obeys Hutterites' ASMFR]  
\*  $I_h$  (Illegitimate fertility index=無配偶出生力指標)  
= [Illegitimate births in year] / [Sum of expected births in year if unmarried women aged x obeys Hutterites' ASMFR]  
\*  $I_m$  (Marital index=結婚指標)  
= [ $I_g$ 's denominator] / [ $I_f$ 's denominator]