**On Approval of the Methodology for Calculating Fertility Indicators**

Order of the Chairman of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan dated July 29, 2019 No. 3. Registered with the Ministry of Justice of the Republic of Kazakhstan on August 5, 2019 No. 19190.

      In accordance with subparagraph 5) of Article 12 of the Law of the Republic of Kazakhstan dated March 19, 2010 "On State Statistics" and subparagraph 258) of paragraph 17 of the Regulation on the Ministry of National Economy of the Republic of Kazakhstan, approved by the Decree of the Government of the Republic of Kazakhstan dated September 24, 2014 No. 1011, ORDER:

      1. Approve the attached Methodology for calculating fertility rates.

     2. The Department of Social and Demographic Statistics, together with the Legal Department of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, shall ensure in the manner prescribed by law:

     1) state registration of this order with the Ministry of Justice of the Republic of Kazakhstan;

     2) within ten calendar days from the date of state registration of this order with the Ministry of Justice of the Republic of Kazakhstan, sending it in electronic form in Kazakh and Russian languages to the Republican State Enterprise on the right of economic management "Institute of Legislation and Legal Information of the Republic of Kazakhstan" of the Ministry of Justice of the Republic of Kazakhstan for official publication and inclusion in the Reference Control Bank of regulatory legal acts of the Republic of Kazakhstan;

     3) placement of this order on the Internet resource of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan.

     3. The Department of Social and Demographic Statistics of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan to bring this order to the structural subdivisions and territorial bodies of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan for guidance and use in work.

     4. To impose control over the execution of this order on the supervising Deputy Chairman of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan (Koshkimbaev N.Zh.).

     5. This order shall enter into force ten calendar days after the day of its first official publication.

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|   | Approved by the order of the Chairman of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan dated July 29, 2019 3  |

 **Methodology for calculating fertility rates**

**Chapter 1. General provisions**

      1. The methodology for calculating fertility rates (hereinafter - Methodology) refers to a statistical methodology formed in accordance with international standards and approved in accordance with the Law of the Republic of Kazakhstan dated March 19, 2010 "On State Statistics" (hereinafter - Law).

     2. This Methodology is used by the employees of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan (hereinafter - the Committee) and its territorial bodies when calculating fertility and population reproduction indicators.

     3. The purpose of this Methodology is to obtain accurate and reliable data, the formation of complete and up-to-date information on the birth rate among the population, which are necessary for effective social, economic, family and demographic policies, as well as the development of programs for the development of the country and regions.

     4. The significance of estimated birth rates is due to their role in the analysis of demographic phenomena and the assessment of the current demographic situation in the country and its regions. Calculation and analysis of fertility rates are necessary for the purposes of demographic research, as well as for use by health, education and social policy authorities.

     5. The following concepts are used in this Methodology:

     reproductive period (age) - the period of time during which a woman is capable of childbearing. For statistical purposes, most countries conventionally assume a period of 15-49 years;

     population reproduction is the process of continuous renewal of generations of people as a result of the interaction of fertility and mortality.

     6. The sources of information on the birth rate among the population are administrative data received by the territorial bodies of the Committee in accordance with the Law from local executive bodies.

**Chapter 2. Calculation of annual fertility rates**

     7. The total fertility rate is expressed in per thousand and determines the intensity of births in the population. This indicator is the ratio of the total number of live births in the reference year to the average population for the year:



      where:

      CBR - total fertility rate;

       N - the number of births per year;

     P - the average annual population.

     8. The special fertility rate is the ratio of the number of live births in the reference year to the average number of women of reproductive age.



     where:

      F 15-49 - special birth rate;

       N - the number of births;

     P 15-49 - the average annual number of women aged 15-49 years.

     9. Age-specific birth rates characterize the average birth rate in each age group in a calendar year. When calculating the coefficient for the age group under 20, the number of women aged 15-19 was taken as the denominator. When calculating the coefficient for the age group of 15-49 years, the numerator includes all those born, including those born to mothers under the age of 15 and 50 years and older.



     where:

      ASFR x - the age-specific fertility rate, where x is age;

      N x - the number of births to women aged x years;

     P x - the average annual number of women aged x.

     10. The total fertility rate is the most accurate indicator of the level of fertility. This indicator characterizes the average number of children born by one woman over her entire reproductive period, provided that the intensity of age-specific fertility for the reference year is maintained. The total fertility rate is calculated under the assumption that there is no mortality, that is, all women of the conditional generation will remain alive until the end of the reproductive period.

     The total fertility rate is calculated as the sum of age-specific rates for ages 15 to 49:



     where:

      TFR - total fertility rate;

      ASFR x - the birth rate at age x;

     If data are published at 5-year age intervals, then the following formula is used:



     where:

      TFR - total fertility rate;

     5 ASFR x - age-specific fertility rates for 5-year age intervals.

     Division by 1000 is done to bring the value of the coefficient to one woman.

**Chapter 3. Calculation of the total fertility rate for a separate period of the year**

     11. The calculation of the total fertility rate is carried out for a month and for any number of months with accumulation (period), using the conversion coefficient and the average population.

     The conversion factor in a month (period) is calculated with an accuracy of six decimal places according to the following formula:



     where:

     K t - conversion factor in a month (period);

      DN - the number of calendar days in a year;

      dn - the number of calendar days in a month (period);

      t - month (period).

     Using the conversion factor, the data in the month (period) are converted to annual terms. The number of days in a year is taken from the calculation of 365 calendar days (in a leap year - 366).

     The average population in a month (period) is calculated with an accuracy of one decimal place according to the following formula:



     where:

      P t - average population;

      P 1 - population as of January 1 of the reporting year;

     OP t - total increase, decrease;

      t - month (period).

     12. The total fertility rate for a month (period) is calculated using the following formula:



     where:

     K ( n t ) – total fertility rate;

      N t - the number of live births;

     K t - conversion factor;

      P t - average population;

      t - month (period).

**Chapter 4**

**Paragraph 1. Population reproduction indicators**

     13. Population reproduction indicators characterize the change in the population over the period of time during which the parental generation is replaced by the generation of their children.

     14. The birth table (hereinafter - Table) is a system of indicators characterizing the birth process in a real or hypothetical generation. The tables are built either for all women, characterizing the process of fertility as a whole, or only for married persons, which reflects marital fertility.

     15. Fertility tables are of two types - general and special. General tables are built for all births without taking into account the order of birth. Special tables are built taking into account the order of birth.

     16. The tables are divided into complete tables based on one-year age groups and short tables calculated on five-year and larger age intervals.

     17. The construction of fertility tables is based on the distribution of births by mother's age and data on the number of women of each age.

     18. Age-specific fertility rates serve as input data for the calculation of general tables.

     19. The cumulative fertility rate characterizes the average number of children born by the time the mother reaches a specified age. This indicator is calculated as the sum of age-specific fertility rates from 15 years to the specified age and shows the number of births per 1000 women by this age, excluding the decline in the female population due to death and migration, provided that the birth rate remains unchanged in the reference year.



     where:

      F x - the cumulative birth rate at the age of x years;

      f x – age-specific fertility rate at the age of x years;

     K - the length of the age interval.

     The value of the cumulative fertility rate corresponding to the age interval of 49 years and older is the total fertility rate.

     20. The average number of births of girls in an age interval, or the age-specific reproduction rate, is defined as the product of the corresponding age-specific fertility rate and the share of girls among those born in the age interval:



     where:

     ʹ f x – average number of births of girls;

      f x – age-specific fertility rate at the age of x years;

     K - the length of the age interval;

       d - the proportion of girls among newborns.

     21. The gross reproduction rate of the population characterizes the replacement of generations without taking into account mortality and shows the average number of girls that a woman of a hypothetical generation will give birth to, provided that there is no mortality and that the age-specific fertility rates of the reference year are maintained throughout her life. The gross replacement rate of the population is calculated by multiplying the total fertility rate by the share of girls among those born.



     where:

      R - the gross reproduction rate;

     ʹ f x - the average number of births of girls.

     22. Net population replacement rate is the average number of girls born to one woman in her lifetime until the end of the reproductive period at the birth and death rates in the reference year.



     where:

      R 0 - net reproduction rate of the population;

      n - the length of the age interval;

       d - the proportion of girls among newborns;

      F x - age-specific fertility rate at age x ;

      FL x - the average number of living women aged x years from separately calculated mortality tables;

      l0 - the initial size of the generation is taken as 100 000.

     If the net reproduction rate of the population is less than 1, then the current levels of fertility and mortality cannot ensure the replacement of the maternal generation by the child in the future.

**Paragraph 2. The average age of the mother at the birth of a child**

     23. The average age of a mother at the birth of a child is determined as the arithmetic weighted average among all ages of women who gave birth to a child in the reference year. This indicator is also calculated according to the order of birth of the child:



     where:

     T n - the average age of the mother at the birth of a child;

      n - the order of birth;

      x – age;

       n N x - the number of women who gave birth to a child at the age of x years;

     P n - the total number of women who gave birth to a child in the reference year.

**Chapter 5 Direct Standardization of Fertility Rates**

     24. The direct standardized fertility rate represents the total fertility rate for a reference population with the same age-specific fertility as the study population, but with a standard fixed population structure. The calculation is carried out by weighting age-specific fertility rates according to a fixed system of weights:



     where:

      n st - standardized fertility rate;

      n x – age-specific fertility rates;

      x – age;

      V x - shares of the corresponding age groups in the total population taken as a standard.

     25. An important factor influencing the value of the overall coefficients is the age structure of the population. The way to eliminate the influence of structural factors is to standardize the demographic coefficients.

     26. For the calculation of standardized fertility rates by region, the age structure of the population in the republic is taken as the standard.

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