

Tools of the Trade:

GENERAL FERTILITY RATE and TOTAL FERTILITY RATE

We would like to take a look at two statistical tools that define the rate of fertility within the population, the general fertility rate and the total fertility rate. Let us begin by taking a look at the general fertility rate which is the number of live births per 1,000 females of childbearing age between the ages of 15-44 years. (The age range can be slightly different, so it is important to note what age range is being used especially if comparison with other rates are contemplated).

To obtain the 1996 general fertility rate for Pennsylvania, one must compute the following:

$$\text{(Number of Resident Live Births / Female Population (Ages 15-44))} \times 1000 = \text{General Fertility Rate}$$

OR

$$(147,890 / 2,583,748) \times 1000 = 57.2$$

The 1996 general fertility rate of 57.2 live births per 1,000 females 15-44 years of age was the lowest recorded during the period of 1950-1996. (See table on last page.)

The total fertility rate (TFR) is the sum of the age-specific birth rates of women in five-year age groups multiplied by five in this example. (Single year or ten-year cohorts or other age groupings can be used. National TFR's are published using five-year Intervals and, therefore, we also use them for comparability.) The TFR estimates the number of children a cohort of 1,000 women would bear if they all went through their childbearing years exposed to the age-specific birth rates in effect for a particular time.

The TFR can be used as an estimate of the fertility growth factor in a population, e.g., whether the childbearing population is replacing itself or not. A TFR of 2,000 or above indicates that, on the average, couples are producing at least two children to replace themselves. When the TFR exceeds 2,000 for an extended period, the next generation of childbearing age will probably be larger than the present population of that age if all other factors affecting the population, such as death rates and migration, remain constant. Pennsylvania's TFR has been under 2,000 since 1972. However, it has remained relatively stable since then, although still below replacement level. The TFR is not meant to be used as an absolute measure of population trends, but can be helpful in understanding and analyzing them. There are many other factors to consider when determining population trends, such as crude birth rates, death rates and migration patterns. In fact, it would take several generations of a childbearing population maintaining a replacement level to just stabilize a specific population, again given that other factors, mainly age-specific death rates, were also maintained.

To obtain the 1996 TFR for Pennsylvania, compute the following:

| Age of Mother | Number of Live Births | | Female Population | | | Age-Specific Rate |
|---------------|-----------------------|---|-------------------|---|------------|-------------------|
| 10-14 | 367 | / | 387,341 | x | 1000 | = 0.9 |
| 15-19 | 15,267 | / | 408,422 | x | 1000 | = 37.4 |
| 20-24 | 30,613 | / | 403,191 | x | 1000 | = 75.9 |
| 25-29 | 42,245 | / | 397,398 | x | 1000 | = 106.3 |
| 30-34 | 39,105 | / | 446,488 | x | 1000 | = 87.6 |
| 35-39 | 17,378 | / | 469,810 | x | 1000 | = 37.0 |
| 40-44 | 2,808 | / | 458,439 | x | 1000 | = 6.1 |
| 45-49 | 94 | / | 413,377 | x | 1000 | = 0.2 |
| | | | | | Sum | 351.4 |

The TFR is the sum of the age-specific birth rates multiplied by five or $(351.4 \times 5 = 1757.0)$. Note that births to mothers under 15 are included in the 10-14 age group and births to mothers 45 and older are included in the 45-49 age group.

The general fertility rate is an age/sex-specific birth rate while the total fertility rate is an age/sex-adjusted birth rate. The TFR is an age-adjusted rate because it is based on the assumption that there are the same number of women in each age group. For example, if a hypothetical group of 1,000 women were to have the same birth rates in each age cohort that actually occurred within the childbearing population in 1996, they would have a total of approximately 1,757 children by the time they would have reached the end of their reproductive stage (used here as age 49). Of course, this assumes that all these 1,000 women survive to that age.

Below is a table showing the general fertility rate and the total fertility rate for Pennsylvania for the years 1950-1996.

| Year | General Fertility Rate | Total Fertility Rate | | Year | General Fertility Rate | Total Fertility Rate |
|-------------|-------------------------------|-----------------------------|--|-------------|-------------------------------|-----------------------------|
| 1996 | 57.2 | 1757.0 | | 1972 | 66.3 | 1892.5 |
| 1995 | 57.9 | 1769.5 | | 1971 | 75.4 | 2188.5 |
| 1994 | 59.4 | 1806.0 | | 1970 | 80.6 | 2378.5 |
| 1993 | 60.2 | 1821.5 | | 1969 | 76.6 | 2245.0 |
| 1992 | 61.2 | 1837.5 | | 1968 | 77.6 | 2319.5 |
| 1991 | 62.5 | 1860.5 | | 1967 | 80.0 | 2444.5 |
| 1990 | 63.6 | 1872.5 | | 1966 | 83.4 | 2593.5 |
| 1989 | 61.0 | 1778.0 | | 1965 | 87.6 | 2754.5 |
| 1988 | 60.1 | 1731.5 | | 1964 | 94.8 | 3002.0 |
| 1987 | 59.4 | 1693.5 | | 1963 | 96.2 | 3072.5 |
| 1986 | 58.9 | 1659.0 | | 1962 | 98.8 | 3222.0 |
| 1985 | 58.8 | 1642.0 | | 1961 | 104.1 | 3390.5 |
| 1984 | 57.9 | 1603.0 | | 1960 | 104.5 | 3354.5 |
| 1983 | 59.2 | 1633.0 | | 1959 | 104.3 | 3258.5 |
| 1982 | 60.6 | 1667.5 | | 1958 | 106.8 | 3315.5 |
| 1981 | 60.7 | 1654.5 | | 1957 | 107.7 | 3316.5 |
| 1980 | 60.1 | 1633.5 | | 1956 | 103.6 | 3169.5 |
| 1979 | 60.4 | 1672.0 | | 1955 | 100.1 | 3020.0 |
| 1978 | 58.7 | 1617.0 | | 1954 | 101.9 | 3042.0 |
| 1977 | 59.8 | 1620.5 | | 1953 | 98.9 | 2912.0 |
| 1976 | 57.7 | 1569.5 | | 1952 | 98.4 | 2873.5 |
| 1975 | 58.7 | 1600.5 | | 1951 | 96.5 | 2799.5 |
| 1974 | 60.5 | 1673.5 | | 1950 | 90.6 | 2610.0 |
| 1973 | 61.7 | 1734.5 | | | | |