**DEMOGRAPHY**

**AND**

**FAMILY PLANNING INDICES**

**DEMOGRAPHY AND FAMILY PLANNING INDICES**

**DEMOGRAPHY:**

The scientific study of human populations including their size, composition, distribution, density, and growth; as well as the causes and socioeconomic consequences of changes in these factors. It encompasses the study of the size, structure and distribution of populations, and spatial and/or temporal changes in them in response to [birth](http://en.wikipedia.org/wiki/Birth), [migration](http://en.wikipedia.org/wiki/Migration_%28human%29), [aging](http://en.wikipedia.org/wiki/Aging) and [death](http://en.wikipedia.org/wiki/Death).

[Demographic analysis](http://en.wikipedia.org/wiki/Demographic_analysis) can be applied to whole societies or to groups defined by criteria such as [education](http://en.wikipedia.org/wiki/Education), [nationality](http://en.wikipedia.org/wiki/Nationality), [religion](http://en.wikipedia.org/wiki/Religion) and [ethnicity](http://en.wikipedia.org/wiki/Ethnicity). In academia, demography is often regarded as a branch of either [anthropology](http://en.wikipedia.org/wiki/Anthropology), [economics](http://en.wikipedia.org/wiki/Economics), or [sociology](http://en.wikipedia.org/wiki/Sociology). Formal demography limits its object of study to the measurement of population’s processes, while the broader field of social demography population studies also analyzes the relationships between economic, social, cultural and biological processes influencing a population.[[1]](http://en.wikipedia.org/wiki/Demography#cite_note-0)

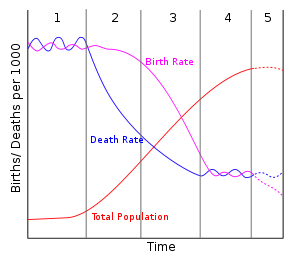
The term [demographics](http://en.wikipedia.org/wiki/Demographics) is often used erroneously for demography, but refers rather to selected population characteristics as used in government, [marketing](http://en.wikipedia.org/wiki/Marketing) or [opinion research](http://en.wikipedia.org/wiki/Opinion_poll), or the [demographic profiles](http://en.wikipedia.org/wiki/Demographic_profile) used in such research.

**DEMOGRAPHIC CYCLE:**

The Demographic Transition Model (DTM) is a model used to represent the process of explaining the transformation of countries from high [birth rates](http://en.wikipedia.org/wiki/Birth_rate) and high [death rates](http://en.wikipedia.org/wiki/Death_rate) to low birth rates and low death rates as part of the economic development of a country from a pre-industrial to an industrialized [economy](http://en.wikipedia.org/wiki/Economic_system). It is based on an interpretation begun in 1929 by the American demographer [Warren Thompson](http://en.wikipedia.org/wiki/Warren_Thompson) of prior observed changes, or transitions, in birth and death rates in industrialized societies over the past two hundred years.

Most [developed countries](http://en.wikipedia.org/wiki/Developed_countries) are beyond stage three of the model; the majority of [developing countries](http://en.wikipedia.org/wiki/Developing_countries) are in stage 2 or stage 3. The model was based on the changes seen in Europe so these countries follow the DTM relatively well. Many developing countries have moved into stage 3.

The transition involves four stages, or possibly five. The original Demographic Transition model has just four stages; however, some theorists consider that a fifth stage is needed to represent countries that have [sub-replacement fertility](http://en.wikipedia.org/wiki/Sub-replacement_fertility). Most European and many East Asian countries now have higher death rates than birth rates.

[](http://en.wikipedia.org/wiki/File:Stage5.svg)

There may be a further stage of demographic development.

* In stage one; [pre-industrial society](http://en.wikipedia.org/wiki/Pre-industrial_society), death rates and birth rates are high and roughly in balance.
* In stage two, that of a [developing country](http://en.wikipedia.org/wiki/Developing_country), the death rates drop rapidly due to improvements in food supply and sanitation, which increase life spans and reduce disease. These changes usually come about due to improvements in farming techniques, access to technology, basic healthcare, and education. Without a corresponding fall in birth rates this produces an [imbalance](http://en.wikipedia.org/wiki/Demographic_trap), and the countries in this stage experience a large increase in [population](http://en.wikipedia.org/wiki/Population).
* In stage three, birth rates fall due to access to [contraception](http://en.wikipedia.org/wiki/Contraception), increases in wages, [urbanization](http://en.wikipedia.org/wiki/Urbanization), a reduction in [subsistence agriculture](http://en.wikipedia.org/wiki/Subsistence_agriculture), an increase in the status and education of women, a reduction in the value of children's work, an increase in parental investment in the education of children and other social changes. Population growth begins to level off.
* During stage four there are both low birth rates and low death rates. Birth rates may drop to well below replacement level as has happened in countries like [Germany](http://en.wikipedia.org/wiki/Germany), [Italy](http://en.wikipedia.org/wiki/Italy), and [Japan](http://en.wikipedia.org/wiki/Japan), leading to a [shrinking population](http://en.wikipedia.org/wiki/Population_decline), a threat to many industries that rely on population growth. As the large group born during stage two ages, it creates an economic burden on the shrinking working population. Death rates may remain consistently low or increase slightly due to increases in lifestyle diseases due to low exercise levels and high [obesity](http://en.wikipedia.org/wiki/Obesity) and an aging population in [developed countries](http://en.wikipedia.org/wiki/Developed_countries).

**CENSUS:**

The Indian Census is the largest single source of a variety of statistical information on different characteristics of the people of India. With a history of more than 130 years, this reliable, time tested exercise has been bringing out a veritable wealth of statistics every 10 years, beginning from 1872 when the first census was conducted in India non-synchronously in different parts. To scholars and researchers in demography, economics, anthropology, sociology, statistics and many other disciplines, the Indian Census has been a fascinating source of data. The rich diversity of the people of India is truly brought out by the decennial census which has become one of the tools to understand and study India.



The responsibility of conducting the decennial Census rests with the Office of the Registrar General and Census Commissioner, India under Ministry of Home Affairs, Government of India. It may be of historical interest that though the population census of India is a major administrative function; the Census Organization was set up on an ad-hoc basis for each Census till the 1951 Census. The Census Act was enacted in 1948 to provide for the scheme of conducting population census with duties and responsibilities of census officers. The Government of India decided in May 1949 to initiate steps for developing systematic collection of statistics on the size of population, its growth, etc., and established an organization in the Ministry of Home Affairs under Registrar General and ex-Officio Census Commissioner, India. This organisation was made responsible for generating data on population statistics including Vital Statistics and Census. Later, this office was also entrusted with the responsibility of implementation of Registration of Births and Deaths Act, 1969 in the country. In 2003 this office has been assigned the work of a pilot project on Multipurpose National Identity Card (MNIC). This pilot project is under implementation in 12 States and one Union territory covering a population of 3.1 million. The Census Commissioners from 1881 Census to 1941 Census and thereafter Registrar General and Census Commissioner, India

**DEMOGRAPHIC DIVIDEND**

The **demographic dividend** is a rise in the rate of economic growth due to a rising share of working age people in a population. This usually occurs late in the [demographic transition](http://en.wikipedia.org/wiki/Demographic_transition) when the [fertility rate](http://en.wikipedia.org/wiki/Fertility_rate) falls and the youth dependency rate declines. During this [demographic window](http://en.wikipedia.org/wiki/Demographic_window) of opportunity, output per capita rises.

It has been argued that the demographic dividend played a role in the "economic miracles" of the [East Asian Tigers](http://en.wikipedia.org/wiki/East_Asian_Tigers)[[1]](http://en.wikipedia.org/wiki/Demographic_dividend#cite_note-0) [[2]](http://en.wikipedia.org/wiki/Demographic_dividend#cite_note-1)and that the economic boom in Ireland in the 1990s (the [Celtic tiger](http://en.wikipedia.org/wiki/Celtic_tiger)) was in part due to the [legalization of contraception in 1979](http://en.wikipedia.org/wiki/An_Irish_solution_to_an_Irish_problem) and subsequent decline in the fertility rate [[3]](http://en.wikipedia.org/wiki/Demographic_dividend#cite_note-2).

Africa, on the other hand continues to have high fertility and youth dependency rates, which contribute to its economic stagnation [[4]](http://en.wikipedia.org/wiki/Demographic_dividend#cite_note-3). The magnitude of the demographic dividend appears to be dependent on the ability of the economy to absorb and productively employ the extra workers [[5]](http://en.wikipedia.org/wiki/Demographic_dividend#cite_note-4), rather than be a pure [demographic gift](http://en.wikipedia.org/wiki/Demographic_gift).

Low fertility initially leads to low youth dependency and a high ratio of working age to total population. However as the relatively large working age cohort grows older, [population aging](http://en.wikipedia.org/wiki/Population_aging) sets in. The graph shows the ratio of working age to dependent population (those 15 to 64 years old, divided by those above or below this age range - the inverse of the [dependency ratio](http://en.wikipedia.org/wiki/Dependency_ratio)) based on data and projections from the [United Nations](http://esa.un.org/unpp/).

**DEMOGRAPHIC WINDOW**

**Demographic Window** is defined to be that period of time in a nation's [demographic](http://en.wikipedia.org/wiki/Demographic) evolution when the proportion of [population](http://en.wikipedia.org/wiki/Population) of working age group is particularly prominent.

Typically, the demographic window of opportunity lasts for 30–40 years depending upon the country. Because of the mechanical link between fertility levels and age structures, the timing and duration of this period is closely associated to those of fertility decline: when [birth rates](http://en.wikipedia.org/wiki/Birth_rates) fall, the age pyramid first shrinks with gradually lower proportions of young population (under 15s) and the [dependency ratio](http://en.wikipedia.org/wiki/Dependency_ratio) decreases as is happening (or happened) in various parts of [East Asia](http://en.wikipedia.org/wiki/East_Asia) over several decades. After a few decades, low fertility however causes the population to get older and the growing proportion of elderly people inflates again the dependency ratio as is observed in present-day [Europe](http://en.wikipedia.org/wiki/Europe).

The exact technical boundaries of definition may vary. The [UN Population Department](http://en.wikipedia.org/wiki/Commission_on_Population_and_Development) has defined it as period when the proportion of children and youth under 15 years falls below 30 per cent and the proportion of people 65 years and older is still below 15 per cent.

***Countries status of demographic windows:***

[Europe](http://en.wikipedia.org/wiki/Europe)'s demographic window lasted from 1950 to 2000.

[China](http://en.wikipedia.org/wiki/China) : 1990 - 2015.

[India](http://en.wikipedia.org/wiki/India) 2010 - may last until the middle of the present century.

Much of [Africa](http://en.wikipedia.org/wiki/Africa) will not enter the demographic window until 2045 or later.

Societies who have entered the demographic window have smaller [dependency ratio](http://en.wikipedia.org/wiki/Dependency_ratio) (ratio of dependents to working-age population) and therefore the demographic potential for high economic growth as favorable dependency ratios tend to boost savings and investments in human capital. But this so called "**demographic bonus" (or** [**demographic dividend**](http://en.wikipedia.org/wiki/Demographic_dividend)**)** remains only a potential advantage as low participation rates (for instance among women) or rampant unemployment may limit the impact of favorable age structures.

**DEMOGRAPHIC TRAP**

The term **demographic trap** applies to a country whose population is growing rapidly due to a high [birth rate](http://en.wikipedia.org/wiki/Birth_rate) and low [death rate](http://en.wikipedia.org/wiki/Death_rate). This usually happens when a [developing country](http://en.wikipedia.org/wiki/Developing_country) moves through the [demographic transition](http://en.wikipedia.org/wiki/Demographic_transition) of becoming developed.

During the [3rd stage](http://en.wikipedia.org/wiki/Demographic_transition#Stage_Three) of demographic transition (called the late transition stage), quality of health care has improved enough that death rates fall into the "accepted" range, which is usually well below 10 per 1000 people. However, birth rates remain high, and the country becomes "trapped" in a self-perpetuating cycle. The country's [economic growth](http://en.wikipedia.org/wiki/Economic_growth) from the transition stage ends up being used to support the needs of the exploding population instead of economic and social development. As a result, the country cannot proceed to the final stage, post-transition, and remains in the 3rd stage.

What may happen instead, as predicted indirectly by [Thomas Malthus](http://en.wikipedia.org/wiki/Thomas_Malthus), is a [**Malthusian collapse**](http://en.wikipedia.org/wiki/Malthusian_catastrophe), in which famine and disease ravage the country's population, lowering numbers dramatically.

**POPULATION GROWTH IN INDIA**

Population growth in India continues to be high on account of:

* The large size of the population in the reproductive age-group (estimated contribution 58 percent). This momentum of increase in population will continue for some more years because high TFRs in the past have resulted in a large proportion of the population being currently in their reproductive years.
* Higher fertility due to unmet need for contraception (estimated contribution 20 percent).
* High wanted fertility due to the high infant mortality rate (IMR) (estimated contribution about 20 percent). Repeated child births are seen as an insurance against multiple infant (and child) deaths and accordingly, high infant mortality stymies all efforts at reducing TFR.
* Over 50 percent of girls marry below the age of 18, the minimum legal age of marriage, resulting in a typical reproductive pattern of "too early, too frequent, too many". Around 33 percent births occur at intervals of less than 24 months, which also results in high IMR.

**EXERCISES**

1. What are the sources of data collection? Plan a visit to your library, MRD block, take a look on census reports, all demographic health surveys, DLHS (RCH) survey reports, case sheets, hospital records etc .
2. Check all that apply. The objectives of the Demographic and Health Surveys are:
   1. -To make a census of the female population
   2. -To provide data on fertility
   3. -To provide data on family planning
   4. -To provide data on cardio-vascular diseases
   5. -To provide data on maternal and child health
   6. -To provide data on the economy of the country
3. Which of the following are true [T] and which are false [F]?

|  |
| --- |
| * Demography is a branch of statistics |
| * Church recordings of baptisms, marriages and burials preceded state vital registration |
| * Multiple causes of death are sometimes problematic during analyses |
| * Most countries of the world have now had at least one census |
| * Birth registration is more complete than death registration in most developing countries |
| * The data from the Demographic and Health Surveys can be used to estimate both fertility and infant mortality in developing countries |
| * Without a census for a sampling frame it is impossible to have a survey |
| * A stillbirth must first be registered as live birth and then as death |
| * Age pyramids can often tell us something about the demographic history of a population |
| * In demography we use age rounded to the nearest year |
| * The sex ratio at birth can be used to check data quality in a civil registration system? |
| * The sex ratio of most populations declines at older ages |
| * Age pyramids can often tell us something about the demographic history of a population |
| * The index of dissimilarity is useful for summarizing differences in two age distributions |
| * In demography we use age rounded to the nearest year |
| * The sex ratio at birth can be used to check data quality in a civil registration system? |
| * The sex ratio of most populations declines at older ages |

3. What do you understand by the terms?

1. Demographic transition and epidemiological transition
2. Demographic trap
3. Demographic bonus/Demographic dividend
4. Demographic window
5. Demographic gift

4. Community X has 30% below 15 yrs of age and 10% over 65 yrs of age. Dependency ratio for community X is

1. 20%
2. 40%
3. 66.6%
4. 3%

Hint:

Proportion of person < 15yrs of age and >65yrs of age

**Dependency ratio =** ----------------------------------------------------------------------

Proportion of persons 15-64 yrs age

5 In a town of 36,000 peoples, there are 1200 live births, and 60 infant deaths. What is the IMR?

1. 50
2. 25
3. 10
4. 5

Hint**:** No. of infant death in a given year

IMR = ---------------------------------------------------- X 100

Total no. of live birth in a given year

6. Comment on the figure shown regarding Birth Rate, Death Rate, Dependency Ratio and Life Expectancy. What is demographic bonus? Give examples. Suppose this is the projected pyramid of 2025 of one of the region of India, which will be that region?

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**Hint: which stage is this according to demographic transition cycle?**

**Would this be south India region?**

1. See these figures carefully and give the answers for the following questions.

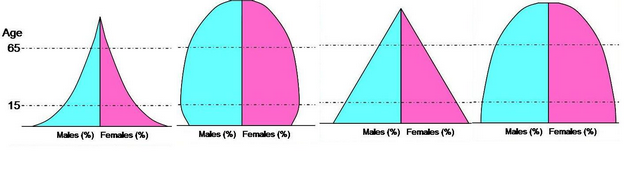
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Figure-2

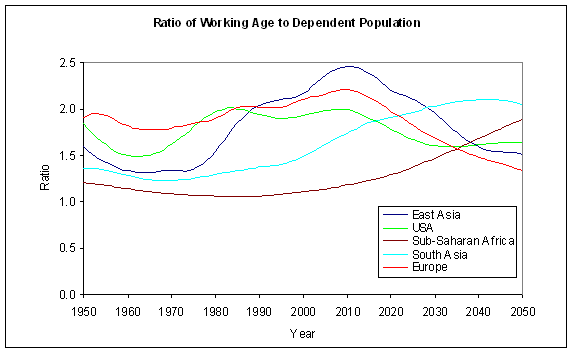
Figure-3

Figure-4

Figure-1

1. Comment on the figures regarding birth rate, death rate and life expectancy? And give characteristics ?
2. Suppose these pictures represents 4 stages of the Demographic Transition Cycle, arrange the figures in order.
3. Give examples, which country in which stage?
4. Which stage [according to demographic transition cycle] in these figures is contracting, expanding and stationary?

1. Discuss the graph. What are the interpretations you can make with this graph.

[](http://en.wikipedia.org/wiki/File:Graph_1.PNG)

1. Discuss status of India regarding demographic trap. Make groups among the students give them 30 min time to discuss and present it what should as a student you will take action at your level now and propose to GOI to avoid / escape from the demographic trap?

**FERTILITY**

**Fertility** is the natural capability of giving life. As a measure, "fertility rate" is the number of children born per couple, person or population. This is different from [fecundity](http://en.wikipedia.org/wiki/Fecundity), which is defined as the *potential* for reproduction (influenced by gamete production, fertilisation and carrying a pregnancy to term). [Infertility](http://en.wikipedia.org/wiki/Infertility) is a deficient fertility.

The total fertility rate (TFR, sometimes also called the fertility rate, period total fertility rate (PTFR) or total period fertility rate (TPFR)) of a population is the average number of children that would be born to a woman over her lifetime if (1) she were to experience the exact current age-specific fertility rates (ASFRs) through her lifetime, and (2) she were to survive from birth through the end of her reproductive life. It is obtained by summing the single-year age-specific rates at a given time.

**FERTILITY INDICATORS:**

Following are the useful indicators of fertility

1. Crude birth rate
2. Fertility rates
3. Sex ratio
4. Age and sex composition of population
5. **CRUDE BIRTH RATE**

Crude birth rate is the nativity or [childbirths](http://en.wikipedia.org/wiki/Childbirth) per 1,000 people per year. It can be represented by number of childbirths in that year, and p is the current [population](http://en.wikipedia.org/wiki/Population). This figure is combined with the crude to produce the rate of natural [population growth](http://en.wikipedia.org/wiki/Population_growth) (natural in that it does not take into account net migration).

Number of live birth which occurred in a year in a specific area

CBR = ----------------------------------------------------------------------------------- X 1000

Midyear population of the area in the same year

**Midyear population –1st July**

1. **FERTILITY RATES:**
2. **GENERAL FERTILITY RATE**

A refined [measure](http://www.mondofacto.com/facts/dictionary?measure) of [fertility](http://www.mondofacto.com/facts/dictionary?fertility) in a [population](http://www.mondofacto.com/facts/dictionary?population); the [numerator](http://www.mondofacto.com/facts/dictionary?numerator) is the [number](http://www.mondofacto.com/facts/dictionary?number) of [live](http://www.mondofacto.com/facts/dictionary?live) births in a [year](http://www.mondofacto.com/facts/dictionary?year), the [denominator](http://www.mondofacto.com/facts/dictionary?denominator) is the number of [females](http://www.mondofacto.com/facts/dictionary?females) of child-[bearing](http://www.mondofacto.com/facts/dictionary?bearing) [age](http://www.mondofacto.com/facts/dictionary?age), usually defined as ages 15-44 (but increasingly recognised as extending to age 49).

**Total no of live birth per thousand women in a reproductive age group (15-45 yrs)**

Total no of Live birth in a year

GFR = ------------------------------------------------------- X 1000

Women in reproductive age group (15-49yrs)

**GFR = Birth Rate X 5** [female in reproductive age group are nearly 20% of total population]

## Example: Data of a city given below:

## Population of males – 500

## Population of females- 450

## Live birth – 30

## Women in 15- 44 yrs – 300-240

## Married Women in 15- 44

## Calculate Sex-Ratio, General Fertility Rate and General Marital Fertility Rate.

## Solution:

## Sex ratio = no. of females X 1000 =450 X 1000 = 900 per 1000 males

## No of males 500

## GFR = No Of Live Birth X 1000

## No. of women in 15-44 yrs group

## = 30/3000 x 1000 + 100 per 1000 women in 15-44 yrs age group

## GMFR = no of live births X 1000

## No. of women in 15-44 yrs group

## = 30 / 240 X 1000 = 125 per 1000 married women in 15- 44 yrs age group.

1. **TOTAL FERTILITY RATE:**

The total fertility rate (TFR, sometimes also called the fertility rate, period total fertility rate (PTFR) or total period fertility rate (TPFR)) of a population is the average number of children that would be born to a woman over her lifetime if

(1) She were to experience the exact current age-specific fertility rates (ASFRs) through her lifetime, and

(2) She was to survive from birth through the end of her reproductive life. It is obtained by summing the single-year age-specific rates at a given time.

∑ Age specific fertility rates X 5

TFR = ----------------------------------

1000

TFR = family size completed.

b15 b16 bi b49

TFR= 5 ------------- +---------------+----+---------- X k

p 15 p 16 pi p 49

49  bi

= 5 ∑ -------- X k

I=15 pi

Where k is sometimes 1000 and sometimes 1, i= 15,16,…….,49 yrs. Obviously this ratio is the sum of age specific fertility rates over the child bearing age range of the women.

Example:

The data in the table give the number of birth only by 5 yr of age groups. Let us assume the births in any age group are equally distributed over the 5 ages that constitute the age groups. Thus the age specific fertility rates are calculated as

|  |  |  |  |
| --- | --- | --- | --- |
| Age of mothers [yrs] | No. of mothers [pi] | Total no. of live birth [bi] | Age specific fertility rates 5[bi/pi] |
| 15-19 | 1,40,000 | 4838 | 5 x 0.0345 |
| 20-24 | 1,09,000 | 21656 | 5 x 0.1980 |
| 25-29 | 80,000 | 17829 | 5 x 0.2230 |
| 30-34 | 81,000 | 12413 | 5 x 0.1530 |
| 35-39 | 79,000 | 6161 | 5 x 0.0780 |
| 40-44 | 82,000 | 1712 | 5 x 0.0210 |
| 45-49 | 62,000 | 322 | 5 x 0.0047 |
| Total Fertility Rates | 6,39,000 | 64931 | 5( 0.0345+…….+0.0047)  =3.561 |

It is easy to see that if the age specific birth rates are calculated for the seven 5 yr age groups (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49), then the total fertility rate would be five times the sum of seven age specific rates.

Thus,

b15-19 b20-24 bi b45-49

TFR= 5 ------------- +---------------+……+----+…. +---------- X k

p 15-19 p 20-24 pi p 45-49

7  bi

= 5 ∑ -------- X k

I=1 pi

= 5 (0.0345 + 0.1980 + 0.2230 + 0.1530 + 0.0780 + 0.0210 + 0.0047 )

= 3.561

Therefore the TFR of the data is 3.561

1. **GROSS REPRODUCTION RATE:**

The gross reproduction rate (GRR) is the average number of daughters that would be born to a woman (or a group of women) if she survived at least to the age of 45 and conformed to the age-specific fertility rate of a given year. This rate is similar to the [net reproduction rate](http://en.wikipedia.org/wiki/Net_reproduction_rate) but it ignores the fact that some women will die before completing their childbearing years

**GRR = ½ TFR [if female: male is 1]**

Actually,

100

GRR = --------- x TFR

205

Because it is assume that5 the sex ratio at birth is 105 males for every 100 females, so out of 205 births, 100 are female births.

GRR gives the idea of the rate at which the female population of the child bearing age range is replaced. If the GRR=2.5, it means that the number of females of the child bearing age group are replaced by 2.5 tomes their present number.

1. **NET REPRODUCTION RATE**

Number of daughter a new born girl will bear during her life time assuming fixed age specific and fertility and mortality rates.

(i.e. it is GRR with mortality factors) NRR = Age specific fertility rates of female X survival factor

Since all the females born will not survive to become women in the child bearing age group, it is desirable to apply suitable survival factors in calculating the reproduction rate. For example, out of 1000 females born to women age group 15-19. Only 965 will survive to grow up to the age of 15-19, then 0.965 is the corresponding survival factors. In determining the replacement of women in the child bearing age group, the female birth should therefore, be multiplied by the appropriate survival factors. If poi is the chance of survival from birth to age I according to the currently applicable life tables for females, the net reproduction rate is given by

49  fi

NRR= ∑ -------- X poi  X k where k is either 100 or 1

I=15 pi

If the data are by 5 year age groups, then

49  fi

NRR= 5 ∑ -------- X poi X k

I=15 pi

Where j denotes 5 year age group and poi is the survival possibility from birth to age group j.

Therefore for the given data, we assume that the required survival factors are given. Using these, NRR is easily obtained as shown.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Serial no. | Age of mothers [yrs]  (1) | Survival factor  (2) | No. of births in age group (f) + No. of mothers  (3) | (2) + (3) |
| 1 | 15-19 | 0.9694 | 0.0345 | 0.0334 |
| 2 | 20-24 | 0.9698 | 0.198 | 0.1914 |
| 3 | 25-29 | 0.9632 | 0.223 | 0.2140 |
| 4 | 30-34 | 0.9584 | 0.153 | 0.1470 |
| 5 | 35-39 | 0.9519 | 0.078 | 0.0740 |
| 6 | 40-44 | 0.9424 | 0.021 | 0.1970 |
| 7 | 45-49 | 0.9279 | 0.047 | 0.0444 |

100

NRR= 5 x -------- x (0.0334 + 0.1914 + 0.2140 + 0.1470 + 0.0740 + 0.1970+ 0.0044) =1.668

205

Note: the multiplier 100/205 based on sex ratio at birth is used to get the number of the female births from the total number of births.

The NRR = 1.668 shows that the female in the child bearing age group would be replaced by 1.668 or roughly 5/3 times their number, if the existing age specific fertility rates band survival rates continue to operate.

1. **SEX RATIO**

This is also a index of fertility. It is defined as

Number of females

Sex ratio = ----------------------------- X 1000

Number of males

But, sex ratio at birth is a better indicator of fertility than the overall sex ratio. It is defined as

Number of females live births

Sex ratio at birth = ------------------------------------ X 1000

Number of males live births

**EXERCISES**

1. Plan a visit to the nearby PHC/ urban center/ family planning department of your hospital and see number of registers regarding family planning maintained there.
2. If TFR in a population is 4 per women, the GRR approx would be
3. 2
4. 4
5. 8
6. 16

Hint: **GRR or NRR = ½ TFR (approximately)**

2. In a village with 180 eligible couples, family planning data of contraceptive methods is :-

-sterilization: vasectomy-3 & tubectomy -8

-IUD users – 10

-Oral pills users- 10

-Condom users – 29

Effective CPR in the village is

1. 60%
2. 33%
3. 25%
4. 10%

**Hint:**

Total no. of eligible couples protected by any of approved methods

CPR = ------------------------------------------------------------------------------------ X 100

Total no. of eligible couples in the community

Total no. of eligible couples EFFECTIVELY protected by

any of approved methods

ECPR = ------------------------------------------------------------------------------------ X 100

Total no. of eligible couples in the community

|  |  |
| --- | --- |
| **Contraceptive methods used** | **Effectivety of contraceptive methods** |
| Condoms | 50% |
| IUCDs | 95% |
| Oral pills | 100% |
| Vasectomy | 100% |
| Tubectomy | 100% |

1. If the total fertility rate of India is 2.2, the crude birth rate would be –
2. 18.6 per 1000 population
3. 19.2 per 1000 population
4. 22.4 per 1000 population
5. 26.2 per 1000 population

**Hint: Relationship between crude birth rate (CBR) and total fertility rate (TFR):**

**CBR = (8** X **TFR) + 1 [approx]**

1. Around 100 women are follow-up for 20 months for oral contraceptive pills. Out of become 5 become pregnant. Calculate the pearl index.

Hint:

Total Accidental Pregnancies

Pearl Index = ---------------------------------------------- X 1200

Total Months of Exposure

Pearl index is expressed in Failure Rate Hundred Women Years [H.W.Y.]

5. Study the following data and answer the following questions:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Age Group  of Mother | Female Population | | Births | | | | Stationary |
| x, x+4 | Total | Married | Total | First | Male | Mother | 5Lx |
| 10-14 | 8,322 | 8,322 | 12 | 11 | 6 | 11 | 494,443 |
| 15-19 | 8,709 | 8,274 | 522 | 391 | 267 | 345 | 493,629 |
| 20-24 | 9,389 | 5,895 | 1,094 | 515 | 560 | 399 | 492,399 |
| 25-29 | 10,625 | 3,300 | 1,277 | 465 | 653 | 227 | 490,989 |
| 30-34 | 10,971 | 1,804 | 886 | 231 | 454 | 117 | 489,203 |
| 35-39 | 10,013 | 1,041 | 318 | 67 | 163 | 44 | 486,812 |
| 40-44 | 8,913 | 712 | 49 | 9 | 25 | 8 | 483,465 |
| 45-49 | 7,004 | 353 | 2 | -- | 1 | 8 | 478,365 |
| -- Less than 500 Total population (both sexes): 248,710 (Numbers are in 1,000s) Assume all ever-married women are married | | | | | | | |

a) Check the correct CBR per 1,000

1. 15.7
2. 16.7
3. 17.7

b) Check the correct GFR per 1,000

1. 42.3
2. 55.2
3. 56.3

c) Check the correct TFR per 1,000

1. 2.1
2. 2.5
3. 3.2

d) Check the correct general marital fertility per 1,000

1. 82.0
2. 94.0
3. 100.1

e) Check the correct age-specific first birth rate per 1,000 for the age group 20-24

1. 37.8
2. 54.9
3. 69.1

f) Check the correct sex ratio at birth

1. 99
2. 101
3. 105

g) Check the correct GRR

1. 1.02
2. 2.01
3. 1.00

h) Check the correct NRR

1. 0.99
2. 1.00
3. 2.00

i) Check the correct mean age of childbearing

1. 26.5
2. 27.3
3. 28.2

Q6. See the table carefully.

NUMBER DISTRIBUTION OF CURRENT USERS OF CONTRACEPTIVES ACCORDING TO AGE OF WOMEN

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| AGE  [in years] | **CONTRACEPTIVE METHOD** | | | | | | |
|  | Female Sterilization | Male Sterilization | Copper T | Oral Pills | Condoms | Safe/Rhythm Method | DMPA Injections | |
| 15-20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 21-25 | 22 | 0 | 6 | 0 | 6 | 0 | 0 | |
| 26-30 | 16 | 0 | 8 | 13 | 19 | 3 | 0 | |
| 31-35 | 47 | 2 | 11 | 6 | 8 | 0 | 2 | |
| 36-40 | 39 | 2 | 8 | 0 | 7 | 2 | 0 | |
| 41-45 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 46-50 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | |

* Which age group is not using any contraceptives?
* Highest users of contraceptives
* Which type of contraception method is highest in number?
* Why male sterilization in India is very low?