**Components of population growth**

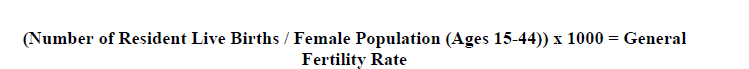
**The effect on population structure of fertility, mortality and migration**

Fertility, mortality and migration are principal determinants of population growth (or its inverse). In the absence of technological intervention, one might say almost the sole determinants, but improvements in contraceptive techniques, increasing acceptance of abortion, and slackening of some traditional religious and cultural traditions has in many parts of the world reduced the role of fertility.

**Fertility**

The human female is generally fertile from early teens to about mid forties. The human male generally remains fertile throughout adulthood, though sperm count and quality diminish from middle-age onward

**The Total Fertility Rate of a population is the average number of children that would be born to a woman over her lifetime**

In the absence of a conscious effort to control the size of families, the larger the fraction of the population who are in the fertile age range the more rapid will be the population growth, and this will influence the average age of the population structure towards the younger end of the spectrum. 

In terms of populations rather than individuals, fertility is usually expressed using the proxy measure of birth rate, either crude or standardised for age and sex. Worldwide, there are significant differences between birth rates. A major study in the 1980s, carried out by the Population Division of the Department of International Economic and Social Affairs of the UN Secretariat, studied the relationship between population age and sex distribution and crude fertility rates for twenty one countries in the developing world. They concluded  
*The higher the birthrate the more markedly the birthrate is depressed by the age structure.  All other things being equal, fertility should decline more rapidly in the countries where it is currently lowest since the age structure appears to favor such a course.* The mean number of children ever born also ranged widely among the twenty one countries. Differences in completed family size range from 8.6 children in Jordan to 5.2 children in Indonesia. 1 In the developed world, though, there is a global tendency for family sizes on average to be smaller than the replacement level. This is true of every country in the European Union

**Mortality**

The effect of mortality on population structures is to reduce the component of the population in which the mortality occurs. Historically, the most dangerous ages were infancy and old age (variously reckoned accord to circumstances). In addition, some epidemics of infectious diseases (eg Spanish 'flu) had their highest mortality among young adults, whose immune systems were presumably insufficiently primed. It is expected that the forecast bird 'flu epidemic will behave similarly. War differentially reduces the proportion of younger men. The majority of infectious diseases of early childhood have been conquered by immunisation, and improved nutrition and hygiene have rendered childhood safer. Antibiotics, welfare state, and improvements in medical, surgical, and palliative care have resulted in great increases in life expectancy in the developed world, where life expectancy is now in the middle to upper 70s or lower 80s, and rising every year. The effect of this is to raise the population in the upper age groups substantially. Women have high life expectancy than men wherever they live. The tendency of people to retire to particular resorts means that in some parts of the South Coast of England the average (arithmetic mean) age of the population is only just below retirement age.

**Mortality rate is typically expressed in units of deaths per 1,000 individuals per year; thus, a mortality rate of 9.5 (out of 1,000) in a population of 1,000 would mean 9.5 deaths per year in that entire population, or 0.95% out of the total.**

The down side of this is that the extended lives are often lived in bad health, as the treatments people receive may keep them alive but do little to ameliorate the underlying pain or disability brought on by the diseases, and virtually nothing for the various forms of senile dementia that are increasingly encountered.

**Migration**

This has been less studied. In areas where natural disasters or politico-military concerns lead to entire populations being displaced the initial population structure will be unchanged, though post-migration the population will have altered to reflect those who have survived the process, typically showing increases in older children and younger adults. Opportunistic migration tends to occur mostly among younger adults, and may be permanent or temporary. Some studies have shown increased fertility levels in migrants, So the effect of migration on population structure is to deplete the population emigrated from in the young adult groups, to augment this group in the immigrated-to population, and to increase the fertility/birthrate in the new population.

**In combination**

Increased fertility rates and migration can have remarkable effects on the overall structure of populations. In the United States the combination has led to the Hispanic ethnic group becoming the largest ethnic minority in the country. The rapid growth of the Hispanic population in the last three or four decades has in effect rejuvenated the aging U.S. population by adding children and working-age adults, at the same time making it more ethnically diverse. The size of the Latino population doubled between 1980 and 2000, and Latinos also accounted for 40% of the country's population growth. That rapid growth has continued since 2000, accounting for almost half the increase of the U.S. population (U.S. Census Bureau, 2006). 2