Introduction to Demographic Methods

Glossary

Abridged life table: life table containing data by intervals of 5 or 10 years of age.

Actuarial method of life table: method used in the construction of an abridged life table. Assumes that the population distribution is the same as the life table distribution and that the life table distribution is linear between age x and x+n.

Age pyramid: detailed picture of the age-sex structure of a population. Consists of bars representing age groups in ascending order pyramided on one another. The number, or percentage, in an age group is indicated by length of its bar from central axis. Absolute pyramids show differences in overall size of total population and in number at each age. Percent pyramids show relative differences in population size at each age-sex group.

Age ratio: the number of persons of a specific age is compared to the number of persons of adjacent ages. If the ratio is close to 100 then there are about the same coverage errors in the age groups.

Age: in demography, age is defined in completed years i.e. age of an individual at last birthday.

Age-dependency ratio: proportion of children less than 15 and elderly 65+ relative to the population of "working ages" i.e. 15-64.

Age-order specific fertility rate AOSFR: number of births of a specific order per 1000 women of a specific age (group).

Age-order-specific marriage rate AOSMR: number of marriages of order i per 1000 women of a specific age (group) who are at their i-1th marriage. Is always sex specific.

Age-sex specific activity rate: active population in a specific age-sex group per 100 population in that specific age-sex group.

Age-sex specific migration rate: number of migrants of a specific sex and specific age (group) per 1000 persons of that sex and age (group).

Age-specific death rate: number of deaths per 1000 persons of a specific age (group).

Age-specific divorce rate: number of divorces per 1000 women (or men) of a specific age (group).

Age-specific enrollment rate: proportion of persons of a specific age (group) enrolled in any regular educational institution.

Age-specific fertility rate ASFR: number of births per 1000 women of a specific age (group).

Age-specific literacy rate: proportion of persons of a specific age (group) who are literate.

Age-specific marital fertility rate: number of legitimate births per 1000 married women of a specific age (group).

Age-specific marriage rate ASMR: number of marriages per 1000 women (or men) of a specific age (group). Is always sex-specific.

Age-specific migration rate: number of migrants of a specific age (group) per 1000 persons of that age (group).

Age-specific mortality rate: number of deaths per 1000 persons of a specific age (group) = age specific death rate

Alien: person included in census, register, etc... of a country but non-citizen thereof. An alien,however, is usually citizen of another country. That country is his/her legal nationality.

Balancing equation: most basic method in demography for decomposing population change into its components.

$$P_t - P_0 = B - D + I - O$$

Where P_t = population at the end of the period; P_0 = population at the beginning of the period; B = births during the period; D = deaths during the period; I = in-migration during the period; and O = out-migration during the period.

Birth interval: time between successive live births.

Birth probability: probability of having an ith order birth for women who already have i-1 births.

Bookkeeping equation: cf balancing equation.

Case fatality rate: proportion of persons with a specific cause who die from it.

Cause-specific death rate: number of deaths attributable to a specific cause per 100,000 population.

Cause-specific death ratio: percentage of all deaths attributable to a specific cause.

Census: the total process of collecting, compiling, analyzing and publishing or otherwise disseminating demographic, economic and social data pertaining to all persons in a country or in a well delineated part of a country at a specified time. (United Nations) The essential characteristics of a census are universality, simultaneity, and individual enumeration.

Childbearing years: Ages at which a woman can bear a child. The ages traditionally used in demography are 15 to 44 (or 49).

Child-dependency ratio: proportion of children less than 15 relative to the population of "working ages" i.e. 15-64.

Children ever born CEB: total number of children a woman has ever given birth to.

Child-woman ratio: number of children 0-4 years old relative to number of women of reproductive ages.

Citizenship: legal nationality. May be acquired by birth or naturalization.

Cohort probability of death before age one: the portion of deaths under 1 in year y and the portion of deaths under 1 in year y+1 occurring to births in year y are combined and divided by the births in year y.

Cohort: group of persons who experience an event in the same time period e.g. birth, marriage, etc.

Cohort-component method: calculation of estimates by age groups on the basis of separate allowances for the components of population change. Estimates net migrants as difference between actual population at time t and the population at time zero survived to time t. Three ways of estimation: forward, reverse, and average.

Complete life table: life table containing data for every single year of age from birth to the last applicable age.

Consensual union: establishment of a marital union without recorded legal sanction.

Conventional Infant mortality rate: number of infant death per 1000 births. Re. infant mortality rate.

Crude activity rate: proportion of the total population in the labor force = crude labor force participation rate.

Crude birth rate CBR: number of births per 1000 population.

Crude death rate CDR: number of deaths per 1000 population.

Crude divorce rate: number of divorces per 1000 population.

Crude enrollment rate: proportion of population enrolled in any regular educational institution.

Crude in-migration rate: number of in-migrants per 1000 population.

Crude literacy rate: proportion of the population who are literate.

Crude marriage rate: number of marriages per 1000 population.

Crude net migration rate: difference between the number of in-migrants and the number of out-migrants per 1000 population.

Crude out-migration rate: number of out-migrants per 1000 population.

Crude rate: the number of events is divided by the total population.

Cumulative order-specific birth rate (up to age x) COSFR: total number of births of a specific order per 1000 women at or below a specific age (group) x.

De facto: demographic events are registered at the place of occurrence.

De jure: demographic events are registered at the place of usual residence.

Death: permanent disappearance of all evidence of life at any time after live birth has taken place = post-natal cessation of vital functions without capability of resuscitation. This definition excludes foetal deaths. (WHO)

Demographic analysis: study of components of variation and change in demographic variables and the relationships between them. This is also called formal demography.

Demographic and Health Surveys: nationally representative household surveys carried out in about fifty developing nations by Macro International Inc. The objective of the surveys is to provide data concerning fertility, family planning and maternal and child health that can be used by program managers, policymakers and researchers. In the household questionnaire there are questions on household composition, education and occupation of the wife and husband, household facilities, and household possessions, etc. Women of reproductive age in the households are identified and interviewed. The woman's questionnaire includes sections on background characteristics, a birth history, knowledge and use of family planning, breastfeeding, immunization and health of children under age five, marriage, and fertility preferences, etc.

Demography: study of the population in its static and dynamic aspects. The static aspects include characteristics such as composition by age, sex, race, marital status, economic characteristics. The dynamic aspects are fertility, mortality, nuptiality, and migration.

Direct standardization: the rates from two or more study populations are applied to a common population distribution (standard population). Simplest and most straightforward technique. Provides the best basis for determining the difference between two crude rates. The standard population is arbitrary, and can be any one of the study populations, their average, or any other population distribution.

Divorce rate among married: number of divorces per 1000 married persons. Can be sex-specific.

Divorce rate specific for duration of marriage: number of divorces per 1000 persons who have been married for a specific duration.

Divorce: final legal dissolution of a marriage, that is, that separation of husband and wife which confer on the parties the right to remarriage under civil, religious and/or other provisions, according to the laws of each country. (United Nations)

Duration (of marriage)-specific fertility rate: number of legitimate births per 1000 women who have been married for a specific duration.

Education: enrollment at any regular educational institution, public or private, for systematic instruction at any level of education during a well-defined and recent time period (United Nations).

Emigrant: an international migrant departing to another country by crossing the international boundary.

Employed: in censuses or surveys, refers to persons who work for pay or profit during a specified week and those who had a job or business that week but were absent from it because of vacation, illness, etc.

Employee: a person who works for a public or private employer and receives remuneration in wages, salary, commission, tips, piece-rates, or pay in kind.

Employer: a person who operates his/her own economic enterprise or engages independently in a profession or trade, and hires one or more employees.

Ethnic group: sub-race. Covers racial, nationality, cultural or linguistic groups. To varying extents, each such a group will have a common descent, history, and habitat.

Fecundability: probability that a woman will conceive during a menstrual cycle.

Fecundity: physiological capacity to conceive.

Fertility: manifestation of fecundity = natality.

Fetal death rate: number of fetal deaths divided by number of births plus number of fetal deaths.

Fetal death ratio: number of fetal deaths divided by number of births.

Fetal death: death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy. The death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. (WHO)

Fetal death is subdivided into three categories:

Early fetal loss = loss before 20 weeks of gestation.
Intermediate fetal loss = loss between 20th and 27th week of gestation.
Late fetal loss = stillbirth = loss after 27 weeks of gestation.

General activity rate: proportion of persons of working age who are in the labor force.

General divorce rate: number of divorces per 1000 persons age 15 and more.

General enrolment rate: proportion of population 5-34 years old enrolled in any regular educational institution.

General fertility rate GFR: number of births per 1000 women of reproductive ages.

General marital fertility rate: number of births per 1000 married women of reproductive ages.

General marriage rate: number of marriages per 1000 population age 15 and older. Note: this rate is generally given sex-specific

Gravidity: number of pregnancies a woman has had.

Gross migration: in-migrants plus out-migrants = migration turnover.

Gross nuptiality table: assumes no person dies before passing through the marriageable ages. Same technique as in the life table construction. Allows one to determine what proportion of a cohort of single persons would be married at various ages assuming that the marriage rates used continued to prevail and there is no mortality.

Gross rate of population interchange: proportion of in-migration (or out-migration) between two populations.

Gross reproduction rate GRR: number of daughters expected to be born alive to a hypothetical cohort of women (usually 1000) if no one dies during childbearing years and if the same schedule of age-specific rates applied throughout the child bearing years.

Illiterate: an illiterate may not read and write at all, or may read and write only figures and his/her own name, or may only read and write a ritual phrase which has been memorized.

Immigrant: an international migrant who enter the area from a place outside the country.

Indirect standardization: the rates from a standard population are applied to the distribution of two or more study populations. The choice of the standard rates is arbitrary. Indirect standardization can be deceptive. Is to be used when there is no rates available for study populations i.e. only counts are available, or when the rates for study populations are not reliable because of small numbers of events or population.

Infant mortality rate IMR: number of infant deaths per 1000 births.

IMR = neonatal mortality rate + post-neonatal mortality rate

Infecundity: lack of physiological capacity to conceive = sterility.

Infertility: inability to bear a live birth.

In-migrant: a person who moves in a political area within the same country.

Intercensal period: period between two censuses.

Labor force: involves the carrying on of an activity from which the person derives, or attempts to derive, pay or profit. Persons who are neither employed nor unemployed are not in the labor force.

Language: one of the most sensitive indices of ethnic origin because linguistic differences tend to persist until complete assimilation. The United Nations recommends three types of languages data:

Language spoken at home in early childhood or language of parents (mother tongue).

Indicator of ethnic group.

Language currently spoken, or most often spoken in present home (usual language).

Indicator of ethnic origin. Can also be used to see degree of assimilation and integration of foreign stock or of specific ethnic minorities.

Ability to speak various languages (designated languages).

Indicator of linguistic skills of population, both native and foreign born.

Legitimate fertility rate: number of legitimate births per 1000 married women of reproductive ages.

Level-specific enrollment rate: proportion of persons of a specific age (group) enrolled in a school at a specific level.

Lexis diagram: graphical representation of the relationships between demographic events in time and persons at risk. Each demographic event is characterized by two numbers: the time (e.g. year) at which it occurs and the age (or other duration measure) of the person to whom it occurs. By convention, time is represented on the horizontal axis, and age (or other duration measure) is represented on the vertical axis.

Life line: straight line in a Lexis diagram representing a person's life. The line begins on the time axis at the time of the person's birth, continues diagonally upwards, and ends at the age/time point representing the person's death (or other demographic event). The sum of all the life line lengths in a particular portion of the diagram represents person-years lived or exposure. Life lines can be looked at as cohort or period data.

Literacy: ability of a person to both read and write, with understanding, a short statement on his everyday life (United Nations). The language or languages in which a person can read and write are not a factor in determining literacy.

Live birth interval: interval between two live births = pregnancy interval plus waiting time due to non-live births.

Live birth: complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which after such separation, breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered a live born (WHO).

Marital status: the United Nations recommends the following minimum list: single (never married), married and not legally separated, widowed and not remarried, divorced and not remarried, married but legally separated.

Note that ever married = married + widowed + divorced + separated

Additional options to take into account when appropriate = consensual union (common-law, extra-legal or de facto unions), and practices such as polygamy, concubinage and inherited widows.

Marriage squeeze: There are less men than women in the marriageable ages. This may for example be due to wars which predominantly kill men.

Marriage: act, ceremony or process by which the legal relationship of husband and wife (of persons of opposite sex) is constituted. The legality of the union may be established by civil, religious, or other means as recognized by the laws of each country. (United Nations)

Maternal mortality rate: number of deaths due to maternal causes per 1000 women of reproductive ages.

Maternal mortality ratio: number of deaths due to maternal causes per 100,000 births.

Maternal mortality: = maternal death = death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental causes (WHO).

Member of producers' co-operative: a person who is an active member of a producer's co-operative, regardless of the industry in which it is established.

Midpoint population: approximation of the average population exposed to risk. = (population at the beginning of the period + population at the end) / 2.

Migrant: a person who moves from one political area to another.

Migration counterstream: migration in opposite direction of stream.

Migration stream: a group of migrants having a common origin and destination in a given migration period.

Migration: geographic or spatial mobility involving a relatively permanent change in usual residence between clearly defined political or statistical units. Migration has two dimension: time and space.

Mover: a person who changes residence.

Nationality: country of present citizenship, or country or other area of origin, sometimes an extinct country or a country that once had very different boundaries.

Natural fertility: fertility in the absence of deliberate parity-specific control.

Neonatal mortality rate: number of deaths of newborns in the first month of life per 1000 births.

Net immigration: immigrants minus emigrants.

Net migration: in-migrants minus out-migrants. Note that net migration for an area is often used to include both international and internal migration.

Net nuptiality tables: takes into account mortality as well as marriage. Indicates the pace at which a group of single persons is decreased annually by marriage and death. Also gives the probability of a single person marrying at each year of age according to the current nuptiality and mortality rates. Provides information on the average age at marriage. Multiple decrement life table techniques are needed.

Net reproduction rate NRR: average number of daughters expected to be born alive to a hypothetical cohort of women if the same schedule of age-specific rates applied throughout the childbearing years, but acknowledging that some of the cohort will die.

Non-migrant: non-movers plus local movers.

Occupation: kind of work done during the time-reference period established for data on economic characteristics by the person employed (or performed previously by the unemployed) irrespective of the industry or the status in which the person should be classified (United Nations).

Old-age dependency ratio: proportion of adults over age 65 relative to the population of "working ages" i.e. 15-64.

Order-specific divorce rate: number of divorces of order i per 1000 persons who have married i times. Alternative interpretation = number of divorces of order i per 1000 persons who have divorced i-1 times.

Order-specific fertility rate OSFR: number of births of a specific order per 1000 women of reproductive ages.

Order-specific marriage rate OSMR: number of marriages of order i per 1000 persons age 15 and older with marriage order i-1. Can be general or sex-specific.

Out-migrant: a person who moves out of a political area within the same country.

Out-of-wedlock (illegitimate) fertility rate: number of illegitimate births per 1000 unmarried women of reproductive ages.

Own-account worker: a person who operates his/her own economic enterprise or engages independently in a profession or trade, and hires no employees.

Parity progression ratio PPR: probability that a woman has an i+1st birth given that she already has had i births.

Parity: number of children born alive to a woman.

Partial migration rates: number of migrants to an area from a particular origin, or from an area to a particular destination, per 1000 of the population at either origin or destination.

Paternal general fertility rate: number of births per 1000 men age 15 to 54.

Personal Identification Number (PIN): method used in Sweden, Norway, Denmark, and Israel. Each individual is assigned a unique number used for the rest of his/her life on all pertinent documents in the national data system. The system acts as a census because it is continuously updated by births, deaths, immigrants, and emigrants.

Persons not classified by status: experienced workers with status unknown or inadequately described and unemployed persons not previously employed.

Population studies: study of the relationships between demographic variables and other variables such as social and economic variables.

Post-neonatal mortality rate: number of deaths of babies between the 1st and 12th month of life per 1000 births.

Postpartum non-susceptibility subinterval: time from previous pregnancy outcome to resumption of ovulation. For first order births, use date of marriage or beginning of sexual relations to start.

Pregnancy interval: time between successive pregnancies of a woman = sum of time of postpartum non-susceptibility subinterval plus conception-wait subinterval plus gestational subinterval.

Primary sterility: never able to produce a child.

Probability: in demography, probability indicates the likelihood that some event will (or will not) occur to some group of exposed persons during the course of some period of time. Consider the number of people exposed to risk at the start of the period. Probabilities are special cases of a ratio.

Rate of natural increase: crude birth rate – crude death rate.

Rate: Measure of the frequency with which an event occurs in a defined population during a given length of time. Consider the average number of people exposed i.e. midpoint population. Rates are special cases of a ratio and tend to be associated with population change.

Ratio: value obtained by dividing one quantity by another. Ratio indicate the relative magnitude of a numerator and a denominator. Ratios tend to be descriptive statistics.

Reproductivity: extent to which a group is replacing its own numbers by natural processes.

Residual method of estimating net migration: estimate net migration as difference in population counts at two time periods and net vital events in-between i.e. subtracts an estimate of natural increase during the period from the net change in population during the period.

Secondary sterility: sterility after one or more children have been born.

Sex ratio at birth: number of male births per 100 female births. In most population there are more male births than female births.

Sex ratio at death: number of male deaths per 100 female deaths.

Sex ratio of migrants: number of male migrants per 100 female migrants.

Sex ratio: proportion of males relative to females in a population. In general, the sex ratio is higher at young ages, then the gap narrows as age increases. Finally by middle age, the sex ratio goes below 100.

Sex-specific migration rate: number of migrants of a specific sex per 1000 persons of that sex.

Specific rate: the number of events is divided by some homogeneous sub-group of the total population.

Standardization: procedure of adjustment of crude rates to eliminate from them the effect of differences in population composition with respect to age and/or other variables. Note: adjusted rates have no direct meaning in themselves. They must be compared with the original crude rates or with other adjusted rates using the same standard.

Standardized mortality ratio SMR: in standardization, SMR equals actual number of events in the study population divided by the expected number of events in the study population. Note: SMR has no meaning by itself. It should be compared with other SMRs. Relative values indicate higher or lower standardized incidences of events.

Stationary population: population whose total number and distribution by age do not change with time i.e. number of births = number of deaths. Such an hypothetical population could be obtained if the number of births per year remained constant for a long period of time and each cohort of births experienced the current observed mortality rates throughout life.

Status: status of a person in the labor force with respect to his/her employment, that is whether s/he is (or was, if unemployed) an employer, own-account worker, employee, unpaid family worker, or a member of a producers' cooperative (United Nations). The categories can be combined or further subdivided to better reflect a country's reality.

Sterility: lack of physiological capacity to conceive = infecundity.

Survey: method to obtain information from a sample representative of some population. Can be single-round retrospective, multi-round follow-up (prospective), or dual record. The essential characteristics of a survey are that it is representative of some population and that its smaller size than a census allows collection of more in-depth information that can then be generalized

Total fertility rate TFR: number of children a woman will have if she lives through all the reproductive ages and follows the age-specific fertility rates of a given time.

Total marriage rate: total number of marriages a person will have at the end of his/her marriageable age if he/she follows the given schedule of marriage. Is always sex specific.

Underemployment: difference between the amount of work performed by persons in employment and the amount of work they would normally be able or willing to perform.

Unemployed: in censuses or surveys, refers to persons who were looking for pay or profit work during the past four weeks before a specified time and were not still working at that specified time.

Unpaid family worker: a person who works a specified minimum amount of time (at least 1/3 of normal working hours), without pay, in an economic enterprise operated by a related person living in the same household.

Vital registration: administrative system designed to collect data on the vital events happening in a population (generally concerned with live births, deaths, marriages, and divorces). Helps understand demographic characteristics of different populations at different points in time. The essential characteristics of a vital registration system are universality and continuity.