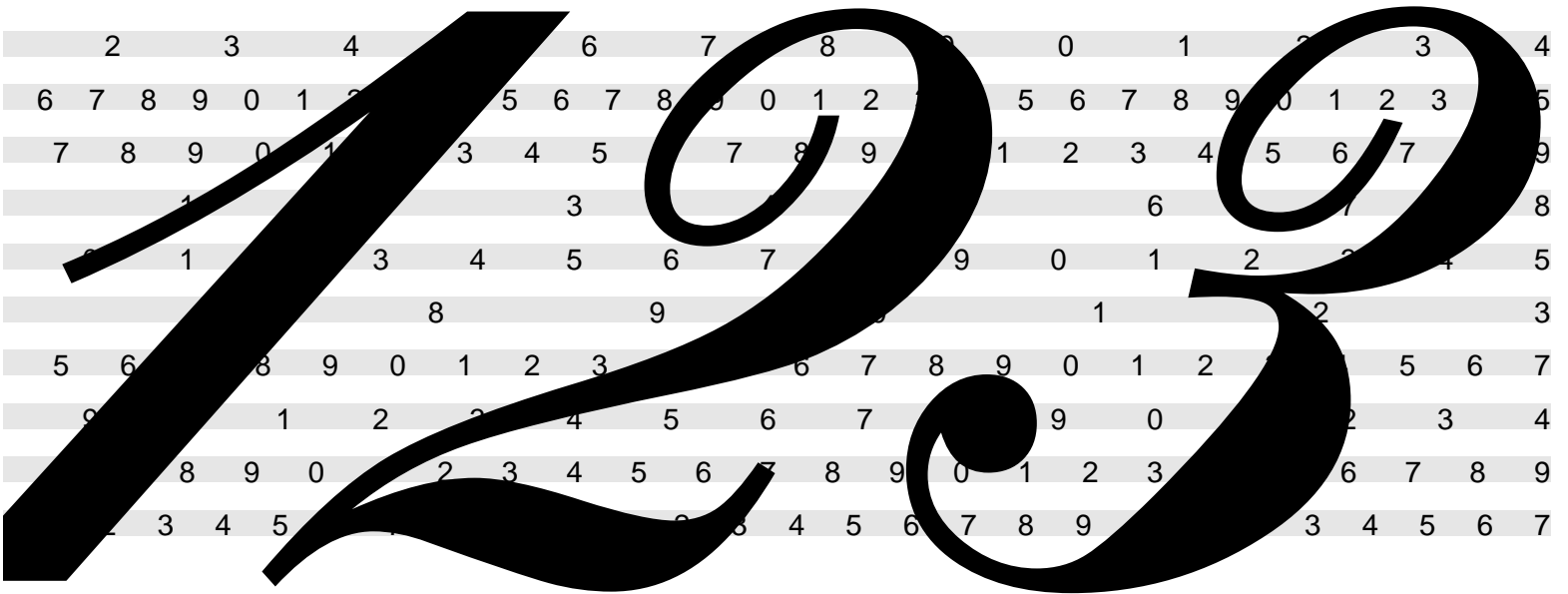


Glossary



Terms, Methods, and Computational Examples

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

(See **HIV Disease**.)

AGE-SPECIFIC FERTILITY RATE (ASFR)

The rate of live births per 1,000 women for the specific age group. This is a more detailed measure than the crude birth rate, as it reflects variations in the birth rate by age groups of the female population.

(See **Statistical Computation** under Fertility Rate for an example.)

AGE STANDARDIZATION

Age standardized is a method of calculation which adjusts a statistical measure for differences in the age/gender structures between populations. With standardized measures, more meaningful comparisons can be made between genders, different time periods, or geographic areas, because the age standardized statistic is calculated as if all populations had the same age/gender population distribution.

(See **Age Standardized Mortality Rate (ASMR)**, **Standardized Mortality Ratio (SMR)**, **Potential Years of Life Lost Standardized Rate (PYLLSR)**, and **Potential Years of Life Lost Index (PYLLI)**; for an example, see **Statistical Computation**.)

AGE STANDARDIZED MORTALITY RATE (ASMR)

A summary of age adjusted death rates by age and gender, which have been standardized to a 'standard' population (1991 Canada Census) for the purpose of rate comparisons between genders, different time periods or different geographic locations. The ASMR is the theoretical number of deaths that would occur per 10,000 population, if the specific population had the same age structure as the standard population.

(See **Age Standardization** and **Standard Population**; for an example, see **Statistical Computation**.)

AIDS

(See **HIV Disease**.)

ALCOHOL-RELATED DEATHS

Alcohol-related deaths are based on the ICD-10 diagnostic categories listed below, for which the resulting deaths are directly attributed to the use or abuse of alcohol. Coding practices from 1995 to 1999 may have produced over-counting of alcohol-related mortality. With the introduction of ICD-10 in 2000, more specific codes are available. Currently produced data should not be used in combination with data produced prior to 2000.

Directly Related to Alcohol

Cause of Death:	ICD-10 Code(s)
Alcoholic intoxication	F10.0–F10.1
Alcoholic psychoses and dependence	F10.2–F10.9
Alcoholic liver disease	K70
Alcoholic neurological disorders	G31.2, G62.1, G72.1
Alcoholic cardiomyopathy	I42.6
Alcoholic gastritis	K29.2
Alcoholic chronic pancreatitis	K86.0
Alcohol poisoning	X45, X65
Other causes	E24.4, O35.4, P04.3, Q86.0, R78.0, T51.0–T51.2, T51.9

Alcohol is considered to be a direct cause of death if one of the above conditions is listed as the underlying cause of death on the medical certification of death. If, however, any of the above conditions are listed on the certificate as antecedent causes giving rise to the underlying cause or other significant conditions contributing to the death, the death is considered to be indirectly related to alcohol. ICD-10 codes for deaths indirectly related to alcohol are listed below:

Indirectly Related to Alcohol (excludes codes for directly related to alcohol)

Cause of Death	ICD-10 Code(s)
Infectious/parasitic diseases	A00–B99
Neoplasms	C00–D48
Endocrine/nutritional/metabolic diseases	E00–E24.3, E24.8–E89
Mental and behavioural disorders	F00–F09, F11–F99
Nervous system diseases	G00–G31.1, G31.8–G62.0, G62.2–G72.0, G72.2–G99
Circulatory system diseases	I00–I42.5, I42.7–I99
Respiratory system diseases	J00–J99
Digestive system diseases	K00–K29.1, K29.3–K69, K71.0–K85, K86.1–K92
Genitourinary system diseases	N00–N39, N99.0–N99.1, N99.5
Unintentional injury/accidents	V01–X44, X46–X59, Y40–Y86, Y88
Suicide	X60–X64, X66–X84, Y87.0
Homicide	X85–Y09, Y87.1
Other causes	

Refer to Glossary in previous annual reports for ICD-9 codes.

ASFR

(See **Age Specific Fertility Rate.**)

ASMR

(See **Age Standardized Mortality Rate.**)

AVERAGE AGE

The average ages of brides, grooms, and mothers of newborns in this annual report are calculated based on information provided on marriage or birth registration forms. The average ages of the population living in data dissemination areas are based on the mid-year population estimates for five-year age groups.

AVERAGE AGE POPULATION

The average age of the population is a grouped average based on the mid-year population estimates for five-year age groups.

BIRTH ORDER

Denotes the number position of the present birth relative to previous live births. That is, whether the live birth being counted is the 1st, 2nd, 3rd, etc. live born infant to a particular mother.

BIRTH RATE

(See **Crude Rates.**)

BIRTH WEIGHT

The first weight of the fetus or newborn after birth. For live births this weight should be measured within the first hour of life before significant postnatal weight loss has occurred. Hospitals in B.C. measure weight in grams; the approximate equivalents in imperial measures are included below for comparisons to other jurisdictions. For statistical and risk assessment purposes, birth weights are grouped as:

- Extremely Low Birth Weight: weight less than 500 grams (< 1 lb 2 oz).
- Very Low Birth Weight: weight less than 1,500 grams (< 3 lb 5 oz).
- Low Birth Weight (LBW): weight less than 2,500 grams (< 5 lb 8 oz).
- “Normal” Birth Weight: weight from 2,500 to 4,499 grams (5 lb 8 oz to 9 lb 15 oz).
- High Birth Weight: weight of 4,500 grams or more (> 9 lb 15 oz).

BIRTHS

(See **Total Births.**)

BREECH

(See **Mode of Delivery**.)

CESAREAN

(See **Mode of Delivery**.)

COMMUNITY

A geographic area defined by a municipal (city, town, village, district municipality, island municipality, or Indian Government district) boundary. In this report, data are provided only for those communities that are incorporated.

CONFIDENCE INTERVAL

(See **Statistical Test**.)

CONGENITAL ANOMALIES

Physical defects that existed or date from birth.

CRUDE RATES

For live births: the crude rate is the number of births divided by the mid-year population and converted to a rate per 1,000 population.

For birth-related statistics (teenage mother, elderly gravida, C-section, low birth weight, and pre-term): the rate is the number of these births divided by the number of live births and converted to a rate per 1,000 live births.

For stillbirths and perinatal deaths: the rate is the number of stillbirths, perinatal deaths divided by the number of total births (live births plus stillbirths) and converted to a rate per 1,000 total births.

For infant deaths: the crude rate is the number of infant deaths divided by the number of live births and converted to a rate per 1,000 live births.

For maternal deaths: the rate is the number of maternal deaths divided by the number of live births, and converted to a rate per 10,000 live births.

For deaths and mortality statistics: the crude rate is the number of deaths divided by the mid-year population and converted to a rate per 1,000 population.

For marriages: the crude rate is the number of marriages divided by the mid-year population and converted to a rate per 1,000 population.

DEATH RATE

(See **Crude Rates**.)

DRUG-INDUCED DEATHS

Deaths due to drug-induced causes. This category of deaths excludes accidents, homicides, and other causes indirectly related to drug use, as well as alcohol-related deaths and smoking-attributable mortality. The causes of death classified as being drug-induced (as shown below) are based on those used by the National Center for Health Statistics.¹

Cause of Death	ICD-10 Code(s)
Psychoactive substance and drug use/abuse	F11-F16, F19
Accidental poisoning by drugs and medicaments	X40-X44
Suicide by drugs and medicaments	X60-X64
Assault by drugs and medicaments	X85
Poisoning by drugs and medicaments, undetermined if accident or intentional	Y10-Y14
Adverse effects of drugs and medicaments	Y40-Y56, Y57.0-Y57.4, Y57.7-Y57.9, Y88.0

EARLY NEONATAL DEATH

Death of a child under seven days of age.

ELDERLY GRAVIDA

Any woman who was 35 years of age or older at the time of delivery of a live born infant.

¹ National Center for Health Statistics (1993). Technical notes. Monthly Vital Statistics Report. 41 (Suppl. 7), 48.

EXPECTED DEATHS

The number of deaths expected for residents of a sub-provincial geographic area, based on the age-specific mortality rates for the province as a whole and the population age structure of the sub-provincial geographic area.

(See **Statistical Computation** for an example.)

EXPECTED LOW BIRTH WEIGHT

The number of live births with low birth weight (less than 2,500 grams) that would be expected to be born to residents of a sub-provincial geographic area, based on the low birth weight rate for the province as a whole, and the number of births in the sub-provincial geographic area.

(See **Statistical Calculation** under Low Birth Weight Live Births for an example.)

EXPECTED POTENTIAL YEARS OF LIFE LOST

The number of potential years of life lost (to age 75, as in this report) expected for residents of a sub-provincial geographic area based on the age-specific mortality rates for the province as a whole and the population age structure of the sub-provincial geographic area.

(See **Statistical Computation** under Potential Years of Life Lost Index for an example.)

FERTILITY RATE

The number of live births occurring in a given time period divided by the number of women of child-bearing age for residents of a geographic area. B.C. rates are per 1,000 women aged 15 to 44. Canadian rates are per 1,000 women aged 15 to 49.

(See **Total Fertility Rate**.)

FORCEPS

(See **Mode of Delivery**.)

GESTATIONAL AGE

Fetal age or duration of pregnancy measured from the first day of the last normal menstrual period.

Gestational age is expressed in completed days or completed weeks (e.g., events occurring 280 to 286 days after the onset of the last normal menstrual period are considered to have occurred at 40 weeks of gestation).

Measurements of fetal growth, as they represent continuous variables, are expressed in relation to a specific week of gestational age as follows:

- Extremely premature: gestational age of less than 28 weeks.
- Moderately premature: gestational age of 28 to 36 weeks.
- Pre-term/Premature: gestational age less than 37 weeks.
- Term: gestational age of 37 to 41 weeks.
- Post-term/Postmature: gestational age of 42 weeks or more.

HEALTH AUTHORITY (HA)

A geographic subdivision of the province used by the Ministry of Health for administrative purposes. The appendices 1 and 3 include data by 6 health authorities. Figure 2 presents a map of the province by HAs.

HEALTH SERVICE DELIVERY AREA (HSDA)

A geographic subdivision of the province used by the Health Authorities for administrative purposes. The appendices 1 and 3 include data by 16 Health Service Delivery Areas. Figure 2 presents a map of the province by HSDAs.

HIV DISEASE

In 1987, the World Health Organization added new codes to the *International Classification of Diseases* (ICD) to identify Acquired Immunodeficiency Syndrome (AIDS) and Human Immunodeficiency Virus (HIV). In ICD-10, these conditions are coded to B20–B24 and are called HIV disease..

HUMAN IMMUNODEFICIENCY VIRUS (HIV)

The virus that causes HIV disease.

ICD-9 CODES

The World Health Organization's *International Classification of Diseases, Ninth Revision*. This version of ICD was used by the B.C. Vital Statistics Agency for coding of birth complications and causes of death from 1979 until 1999.

ICD-10 CODES

The World Health Organization's *International Classification of Diseases and Related Health Problems, Tenth Revision*, implemented by the B.C. Vital Statistics Agency on January 1, 2000. The Preamble to Appendix 2 presents a summary of ICD-10.

INFANT MORTALITY

Death of children under one year of age.

INFANT MORTALITY RATE

The number of deaths of children under one year of age expressed as a rate per 1,000 live births. The infant mortality rate is an internationally accepted indicator of the health status of a population.

LBW

(See **Low Birth Weight**.)

LHA

(See **Local Health Area**.)

LIFE EXPECTANCY

Life expectancy at age 0 represents the mean number of years a birth cohort (persons born in the same year) may expect to live given the present mortality experience of a population. The life expectancy for a population is a summary measure that reflects the mortality rates for all ages combined, weighted in accordance with a life-table population structure. Life expectancy is an internationally accepted indicator of the health status of a population.

LIVE BIRTH

The *Vital Statistics Act* defines a live birth as "The complete expulsion or extraction from its mother, irrespective of the duration of the pregnancy, of a product of conception in which, after the expulsion or extraction, there is:

- (a) breathing;
- (b) beating of the heart;
- (c) pulsation of the umbilical cord; or
- (d) unmistakable movement of voluntary muscle, whether or not the umbilical cord has been cut or the placenta attached."

LOCAL HEALTH AREA

A geographic subdivision of the province used by the Ministries of Health for data dissemination purposes, which can be aggregated into Health Authorities (HA), or Health Service Delivery Areas (HSDA). In the tables in this report, four pairs of LHAs have been combined for ease of data presentation. Figure 1 presents a map of the province by local health areas.

LOW BIRTH WEIGHT (LBW)

A birth weight of less than 2,500 grams. Low birth weight babies have increased risks of morbidity and premature death.

LOW BIRTH WEIGHT RATE

The number of low birth weight live born babies per 1,000 live births.

MARRIAGE RATE

(See **Crude Rates**.)

MEDICALLY TREATABLE DISEASES, DEATHS DUE TO

Deaths due to medically treatable diseases are based on Charlton's² classification. The disease categories (shown below) are ones for which mortality could potentially have been avoided through appropriate medical intervention. The calculation of this measure is based on deaths of a specified age where the underlying cause stated on the medical certificate of death falls into one of these categories.

Cause of Death (Age)	ICD-10 Code(s)
Hypertensive disease (5–64)	I10–I15
Cervical cancer (5–64)	C53

² Charlton, J.R.H. (1987). Avoidable Deaths and Diseases as Monitors of Health Promotion. In T. Abelin, Z.J. Brzezinski, & V. Carstairs (Eds.), *Measurement in Health Promotion and Protection* (pp. 467–479). Copenhagen, Denmark: World Health Organization, Regional Office for Europe.

Pneumonia and unqualified bronchitis (5–49)	J12–J18.1, J18.8–J18.9, J40
Tuberculosis (5–64)	A15–A19, B90
Asthma (5–49)	J45, J46
Chronic rheumatic heart disease (5–44)	I05–I09
Acute respiratory infections and influenza (5–49)	J00–J06, J20–J22, J10–J11
Bacterial infections (5–64)	A00–A05, A20–A49, B95–B96, G00, H66, H70, H95.0–H95.1, I00–I01, I02.0, I02.9, L01–L08, M00, M02.8, M02.9, M46.2, M86, M87.1
Hodgkin’s disease (5–34)	C81
Abdominal hernias, cholecystitis and cholelithiasis, appendicitis (5–64)	K40–K46, K80–K81, K35–K37
Deficiency nutritional anemias (5–64)	D50–D53

MODE OF DELIVERY

- **Cesarean:**
A delivery involving the surgical incision of the abdomen and uterine walls.
- **Forceps:**
An assisted delivery employing forceps.
- **Spontaneous Breech:**
An unassisted (spontaneous) delivery in which the buttocks or feet of the fetus appear first.
- **Spontaneous Vertex:**
An unassisted (spontaneous) delivery in which the head of the fetus appears first.
- **Vacuum:**
An assisted delivery employing suction or vacuum.

MVA DEATHS

Motor Vehicle Accidental Deaths.

NATURAL POPULATION GROWTH

The component increase in a population due to the number of live births less deaths. This increase may often be expressed as a rate, such as per 1,000 population.

NEONATAL DEATH

Death of a child under 28 days of age.

OBSERVED DEATHS

The actual number of deaths that occurred in the province to residents of a geographic area in a specified time period.

OBSERVED LOW BIRTH WEIGHT LIVE BIRTHS

The actual number of low birth weight live births that occurred in the province to residents of a geographic area in a specified time period.

OBSERVED PYLL

The actual number of potential years of life lost (to age 75) from deaths that occurred in the province to residents of a geographic area in a specified time period.

OUT-OF-WEDLOCK BIRTHS

Births where the mother of the baby is not lawfully married to the father of the baby.

P-VALUE

(See **Statistical Test**.)

PERINATAL

Pertaining to or occurring in the period shortly before, during, and after birth.

POPULATION

Mid-year population estimates used in the preparation of this report were obtained from BC STATS, Ministry of Management Services.

POST NEONATAL DEATH

Death of a child between the ages of 28 days and less than one year.

POST-TERM

(See **Gestational Age**.)

POTENTIAL YEARS OF LIFE LOST (PYLL)

The number of years of life lost when a person dies before a specified age (75 years). In this report, all deaths are assumed to occur at the midpoint of five-year age groups.

(See **Statistical Computation** for an example.)

PRE-TERM

(See **Gestational Age**.)

PYLL INDEX (PYLLI)

The ratio of an area's observed PYLL to its expected PYLL. This is a health status indicator.

(See **Statistical Computation** for an example.)

PYLL STANDARDIZED RATE (PYLLSR)

An age-standardized measure of an area's PYLL, expressed in terms of a rate per 1,000 population, adjusted to a standard population (1991 Canada Census). This is a health status indicator.

(See **Statistical Computation** for an example.)

PYLLI

(See **PYLL Index**.)

PYLLSR

(See **PYLL Standardized Rate**.)

QUINTILE

A ranking is derived by dividing a group (e.g., LHAs within British Columbia) into five subgroups, each with equal numbers of LHAs. These divisions are derived from a ranking of the group members according to the value of a measure, such as the SMR or the PYLLI.

SAM

(See **Smoking-attributable Mortality**.)

SAM(%)

(See **Smoking-attributable Mortality**.)

SIDS

Sudden Infant Death Syndrome.

SMOKING-ATTRIBUTABLE MORTALITY (SAM)

The absence on death certifications of complete and reliable data on smoking as a contributing factor requires that estimation or other techniques be used to approximate the extent of smoking-attributable deaths. Estimation methods, while not precise, may at least provide a general indication of the extent of such deaths. The method used here is based on the concept of attributable risk.

To define attributable risk mathematically, consider d_0 and d_1 respectively to represent the death rates, in a given time period, in two cohorts from a population — those not exposed and those exposed to a given risk factor. The attributable risk of this factor, AR_1 , would then be:

$$AR_1 = \frac{d_1 - d_0}{d_1} = \frac{r_1 - 1}{r_1}$$

Where: $r_1 = d_1/d_0$ is the relative risk of the exposed cohort.

The relative risk of the unexposed cohort is $r_0 = 1$; the attributable risk of this cohort is $AR_0 = 0$.

The attributable risk (AR) for the population as a whole (exposed plus unexposed cohorts) is given by:

$$AR = \frac{p_1 (r_1 - 1)}{p_1 (r_1) + (1 - p_1) (r_0)} = \frac{(p_1) (r_1 - 1)}{(p_1) (r_1 - 1) + 1}$$

Where: $p_1 =$ the proportion or fraction of the population exposed to the risk factor; and

$1-p_1 =$ the proportion or fraction of the population not exposed to the risk factor.

This may be extended to account for multiple levels of exposure, as follows:

$$AR = \frac{\sum_{i=1}^n p_i (r_i - 1)}{\sum_{i=1}^n p_i (r_i - 1) + 1}$$

Where: p_i = the proportion (prevalence) of the population in the i th level of exposure group;
 r_i = the relative risk at the i th level of exposure; and
 i = the i th risk category.

When applied to smoking-attributable mortality (SAM), the attributable risk is often expressed as a percentage:

$$SAM (\%) = AR \times 100$$

The number of adult (35+ years of age) smoking deaths in British Columbia was estimated for 19 diseases. Smoking-attributable deaths are derived by multiplying the smoking-attributable mortality percentage expressed as a decimal fraction by the number of deaths in each cause of death category listed below.

Cause of Death	ICD-10 Code(s)
Malignant Neoplasms	
Malignant neoplasm of lip, oral cavity, and pharynx	C00–C14
Malignant neoplasm of esophagus	C15
Malignant neoplasm of pancreas	C25
Malignant neoplasm of larynx	C32
Malignant neoplasm of trachea, lung, and bronchus	C33–C34
Malignant neoplasm of cervix, uterus	C53–C55
Malignant neoplasm of urinary bladder	C67
Malignant neoplasm of kidney and other unspecified urinary organs	C64–C66, C68
Circulatory System Diseases	
Hypertension	I10–I13
Ischemic heart disease	I20–I25
Other heart diseases	I01–I09, I27, I30–I52
Cerebrovascular disease	I60–I69
Atherosclerosis	I70
Aortic aneurysm	I71
Other arterial diseases	I26, I28, I72–I78
Respiratory System Diseases	
Pneumonia/influenza	J10–J18.1, J18.8–J18.9
Bronchitis, emphysema	J40–J43
Chronic obstructive pulmonary disease	J44
Other respiratory diseases	A15–A19, J45–J46

Relative-risk data from the American Society's Cancer Prevention Study (CPS-II) 1982–1988³ were selected for use, as they have been widely used for similar analyses. The data from the CPS-II established the age groups and the classification of smokers (current, former, and never) for which smoking prevalence data were required. The relative risk age categories were for 35+, or 35–64 and 65+. B.C. prevalence rates for smoking were provided in the *Tobacco Use in B.C. (1997)* survey commissioned by the B.C. and Yukon Health and Stroke Foundation.⁴

³ Centers for Disease Control. (1990). *Smoking and health: A national status report*. (DHSS publication no. (CDC) 87–8396). 2nd Edition. Rockville, MD: U.S. Department of Health and Human Services.

⁴ Tobacco Use in B.C., ANGUS REID GROUP survey results, September 1997.

SMR(See **Standardized Mortality Ratio**.)**STANDARD POPULATION**

A reference population of known age distribution used in the calculation of standardized indicators to adjust for variations in population age structures in different geographic areas or time periods. For SMR and PYLLI calculations the standard population is the British Columbia population for the year(s) concerned. The 1991 Canadian Census is used as the standard population in the calculation of ASMR and PYLLSR.

STANDARDIZED MORTALITY RATIO (SMR)

The ratio of the number of deaths occurring to residents of a geographic area (e.g., LHA) to the expected number of deaths in that area based on provincial age-specific mortality rates. The SMR is a good measure for comparing mortality data that are based on a small number of cases or for readily comparing mortality data by geographical area. SMR is an internationally recognized health status indicator.

(See **Age Standardization** and **Standard Population**; for an example see **Statistical Computation**.)

STATISTICAL COMPUTATION

The following provides the reader with computational examples of how various measures are calculated. In the examples, LHAs have been employed as the geographic unit of analysis. All data shown in the examples are hypothetical.

- **Age Standardized Mortality Rate (ASMR):**

Age Group (i)	Standard Population (π_i)	LHA		
		Estimated Population (p_i)	Death Rate/10,000 (m_i)	Observed Deaths (d_i)
<1	403,061	1,339	22.4	3
1-4	1,550,285	5,483	1.8	1
.
.
80-84	382,303	1,198	701.2	84
85 +	287,877	908	1596.9	145
TOTAL	28,120,065	81,016		561

For the Local Health Area:

$$ASMR = \frac{\sum m_i \times \pi_i}{\Pi} = \frac{22.4 \times 403,061 + \dots + 1,596.9 \times 287,877}{28,120,065} = 46.2$$

Where: p_i = area population in age group i;
 π_i = standard population in age group i;
 Π = $\sum \pi_i$ = total standard population;
 d_i = deaths in LHA population in age group i; and
 m_i = $d_i/p_i \times 10,000$ = mortality rate per 10,000 LHA population in age group i.

e.g., $m_1 = \frac{3 \times 10,000}{1,339} = 22.4$, for age group 1.

• **Fertility Rate:**

Age Group (i)	LHA		
	Live Births (b _i)	Female Population (w _i)	Age Specific Fertility Rate (ASFR _i)
15–19	19	598	31.8
20–24	46	440	104.5
25–29	74	498	148.6
30–34	51	745	68.5
35–39	12	690	17.4
40–44	2	581	3.4
TOTAL	204	3,552	374.2

For the Local Health Area:

- 1) the age specific fertility rate (ASFR) for age group 15–19 years is:

$$ASFR_i = \frac{b_i}{w_i} \times 1,000 = \frac{19}{598} \times 1,000 = 31.8$$

Where: b_i = number of live births for age group i; and
 w_i = number of female population for age group i.

- 2) the total fertility rate (TFR) is:

$$TFR = a \times \sum ASFR_i = 5 \times (31.8 + \dots + 3.4) = 1,871$$

Where: $ASFR_i$ = age specific fertility rate for age group i; and
 a = number of years in each age group i.

• **Low Birth Weight (LBW) Live Births:**

Year (i)	LHA			British Columbia	
	Low Birth Weight Live Births		Total Live Births (L _i)	Low Birth Weight Live Births Observed (b _i)	Total Live Births (B _i)
	Observed (O _i)	Expected (E _i)			
1995	92	82.9	1,701	2,096	42,989
1996	69	74.6	1,588	1,965	41,846
1997	102	80.2	1,582	2,113	41,655
1998	85	74.7	1,495	2,145	42,913
1999	91	78.1	1,501	2,267	43,586
TOTAL	439	390.6	7,867	10,586	212,989

For the Local Health Area:

- 1) the expected low birth weight live births for year i = 1995 were:

$$E_i = \frac{b_i}{B_i} \times L_i = \frac{2,096}{42,989} \times 1,701 = 82.9$$

Where: b_i = number of LBW live births for the province in year i;
 B_i = number of live births for the province in year i; and
 L_i = number of live births for the LHA.

- 2) the ratio of observed over the expected LBW live births for the five-year period was:

$$\text{Ratio} = \frac{\sum O_i}{\sum E_i} = \frac{92 + \dots + 91}{82.9 + \dots + 78.1} = \frac{439}{390.6} = 1.1$$

Where: O_i = observed LBW live births for year i; and
 E_i = expected LBW live births for year i.

3) Chi-Square (χ^2) :

$$\chi^2 = \frac{(O - E)^2}{E} = \frac{(439 - 390.6)^2}{390.6} = 6.0$$

Where: O = ΣO_i = total number of observed LBW live births; and
 E = ΣE_i = total number of expected LBW live births.

• Potential Years of Life Lost (PYLL) and Standardized Rate (PYLLSR):

Age Group (i)	Age Factor (75-Y _i)	Standard Population (π_i)	LHA			
			Estimated Population (p _i)	Death Rate/1,000 (m _i)	Observed Deaths (d _i)	Observed PYLL (d _i (75-Y _i))
<1	74.5	403,061	1,339	2.2	3	223.5
1-4	72.0	1,550,285	5,483	0.2	1	72.0
5-9	67.5	1,953,045	6,553	0.2	1	67.5
.
.
65-69	7.5	1,084,588	3,538	18.7	66	495.0
70-74	2.5	834,024	2,779	28.8	80	200.0
TOTAL 0-74		28,120,065	79,140		239	3,183.0

For the Local Health Area:

$$PYLL = \Sigma d_i \times (75 - Y_i)$$

Where: d_i = number of deaths in age group i;
 Y_i = age at midpoint of age group i; and
 Σ = summation.

$$PYLLSR = \frac{\Sigma m_i \times \pi_i \times (75 - Y_i)}{\Pi} = \frac{2.2 \times 403,061 \times 74.5 + \dots + 28.8 \times 834,024 \times 2.5}{28,120,065} = 37.0$$

Where: p_i = LHA population in age group i;
 π_i = standard population in age group i;
 Π = $\Sigma \pi_i$ = total standard population;
 d_i = deaths in LHA population in age group i;
 Y_i = age at midpoint of age group i; and
 m_i = (d_i/p_i) × 1,000 = mortality rate per 1,000 LHA population in age group i.

• Potential Years of Life Lost Index (PYLLI):

Note that this method is both age and gender standardized.

Age Group (i)	Gender (j)	Age Factor (75-Y _{ij})	LHA					British Columbia			
			Estimated Population (p _{ij})	Death Rate/1,000 (m _{ij})	Observed Deaths (d _{ij})	Observed PYLL (d _{ij} (75-Y _{ij}))	Expected PYLL (e _{ij} (75-Y _{ij}))	Estimated Population (P _{ij})	Death Rate/1,000 (D _{ij} /P _{ij} ×1,000)	Observed Deaths (D _{ij})	Observed PYLL (D _{ij} (75-Y _{ij}))
<1	M	74.5	1,339	2.2	3	223.5	766.3	42,700	7.7	328	24,436.0
<1	F	74.5	1,301	1.8	2	177.3	620.8	40,600	6.4	260	19,380.3
.
.
70-74	M	2.5	1,587	71.3	113	282.8	233.2	65,500	58.8	3,969	9,921.4
70-74	F	2.5	2,779	28.8	80	200.0	182.3	107,000	26.2	2,807	7,017.5
TOTAL			79,140		239	3,183.0	5,100.0	2,966,500		11,068	200,265.5

For the Local Health Area:

$$PYLLI = \frac{O}{E} = \frac{\sum d_{ij} \times (75 - Y_{ij})}{\sum e_{ij} \times (75 - Y_{ij})} = \frac{223.5 + 177.3 + \dots + 282.8 + 200.0}{766.3 + 620.8 + \dots + 233.2 + 182.3} = \frac{3,183}{5,100} = 0.6$$

- Where: O = observed PYLL;
 E = expected PYLL;
 d_{ij} = observed deaths in age group i and gender j;
 e_{ij} = expected deaths in age group i and gender j;
 Y_{ij} = age at midpoint of age group i and gender j;
 p_{ij} = LHA population for age group i and gender j;
 P_{ij} = provincial population for age group i and gender j;
 D_{ij} = provincial deaths for age group i and gender j.

1) Observed PYLL (O)

The number of potential years of life lost (PYLL) based on the number and age at death of deaths that occurred in the LHA. For example, for age group under one year of age and gender j, the observed PYLL are:

Observed PYLL = deaths × age factor = d_{ij} (75 - Y_{ij}) = 3 × 74.5 = 223.5

2) Expected PYLL (E)

The number of potential years of life lost (PYLL) expected for residents of the LHA based on the PYLL from the expected deaths in the age group. For example, for age group under one year of age and gender j, the expected PYLL are:

$$\begin{aligned} \text{Expected PYLL} &= \text{expected deaths} \times \text{age factor} = e_{ij} (75 - Y_{ij}) = \frac{D_{ij}}{P_{ij}} \times p_{ij} \times (75 - Y_{ij}) \\ &= \frac{328}{42,700} \times 1,339 \times 74.5 = 766.3 \end{aligned}$$

• **Standardized Mortality Ratio (SMR):**

Age Group (i)	Gender (j)	LHA				British Columbia		
		Estimated Population (P _{ij})	Death Rate/1,000 (m _{ij})	Observed Deaths (d _{ij})	Expected Deaths (e _{ij})	Estimated Population (P _{ij})	Death Rate/1,000 (M _{ij})	Observed Deaths (D _{ij})
<1	M	1,339	2.2	3	10.3	42,700	7.7	328
<1	F	1,301	1.8	2	8.3	40,600	6.4	260
.
.
85 +	M	1,198	70.1	84	87.2	48,100	72.8	3,502
85 +	F	908	159.7	145	138.8	34,500	152.8	5,272
TOTAL		81,016		561	595.1	3,131,700		23,389

Note that this method is both age and gender standardized.

For the Local Health Area:

$$SMR = \frac{\sum d_{ij}}{\sum e_{ij}} = \frac{3 + 2 + \dots + 110 + 145}{10.3 + 8.3 + \dots + 92.6 + 138.8} = \frac{561}{595.1} = 0.9$$

- Where: d_{ij} = observed deaths in age group i and gender j; and
 e_{ij} = expected deaths in age group i and gender j.

1) Observed Deaths (d)

The actual number of deaths that occurred in the LHA. For example, for age group under one year of age and gender j, the observed deaths are three.

2) Expected Deaths (e)

The number of deaths expected for residents of the LHA based on the age specific mortality rates for the province as a whole and the population age structure of the LHA. For age group under one year and gender j, the expected deaths are:

$$e_{ij} = \frac{D_{ij}}{P_{ij}} \times p_{ij} = \frac{328}{42,700} \times 1,339 = 10.3$$

Where: p_{ij} = LHA population for age group i and gender j;
 D_{ij} = provincial death for age group i and gender j; and
 P_{ij} = provincial population for age group i and gender j.

STATISTICAL TEST

- **P-VALUE**

The p-value is the probability of rejecting the null hypothesis when a specified test procedure is used on a given data set. This probability is the smallest level of significance at which the null hypothesis would be rejected. Once the p-value has been determined, the conclusion at any particular level α results from comparing the p-value to α (e.g., 0.05):

(a) $p\text{-value} \leq \alpha \Rightarrow$ reject null hypothesis at level α ,

(b) $p\text{-value} > \alpha \Rightarrow$ do not reject the null hypothesis at level α ,

and we call the data statistically significant when the null hypothesis is rejected and not significant otherwise.

- For rates, such as ASMRs, the test employed to determine statistical significance is a confidence interval. The 95% confidence interval for the difference (D) between a LHA and a provincial rate is defined by the upper and lower limits of the interval as follows:

$$\text{Lower Limit} = D - 1.96 \sqrt{\frac{R_l^2}{O_l} + \frac{R_p^2}{O_p}}$$

$$\text{Upper Limit} = D + 1.96 \sqrt{\frac{R_l^2}{O_l} + \frac{R_p^2}{O_p}}$$

Where: R_l = Rate for LHA l ;
 R_p = Rate for the province;
 O_l = Observed number for LHA l ; and
 O_p = Observed number for the province.

If the Lower Limit > 0 , then R_l is statistically significantly higher than R_p ;
 if the Upper Limit < 0 , then R_l is statistically significantly lower than R_p ; otherwise,
 there is no statistically significant difference.

- For ratios, such as SMRs, a Chi-square (χ^2) test is applied to determine whether the observed number of cases is statistically significantly different from the expected number. For LHA l :

$$\chi_l^2 = \frac{(O_l - E_l)^2}{E_l}$$

(with one degree of freedom).

Where: O_l = Observed number for LHA l ; and
 E_l = Expected number for LHA l .

If $\chi_1^2 > 3.84$, the ratio is statistically significant at 5% significance level.

- For SMR values, the Chi-square statistic that is applied is:

$$\chi_1^2 = 9\hat{O}_l \left(1 - \frac{1}{9\hat{O}_l} - \left(\frac{E_l}{\hat{O}_l}\right)^{1/3}\right)^2$$

Where: $\hat{O}_l = O_l$ if $O_l > E_l$; otherwise
 $\hat{O}_l = O_l + 1$.

STILLBIRTH

The *Vital Statistics Act* defines a stillbirth as “The complete expulsion or extraction from its mother after at least 20 weeks of pregnancy, or after attaining a weight of at least 500 grams, of a product of conception in which, after the expulsion or extraction, there is no breathing, beating of the heart, pulsation of the umbilical cord, or unmistakable movement of voluntary muscle.”

The definition of a stillbirth has changed over the years. From July 1, 1962 until January 1, 1986, the definition of a stillbirth did not include the phrase “or after attaining a weight of at least 500 grams.” From 1950 until July 1, 1962, the definition of a stillbirth was: the birth of a viable fetus after at least 28 weeks pregnancy in which pulmonary respiration does not occur, whether death occurs before, during, or after birth.

STILLBIRTH RATE

(See **Crude Rates**.)

TEENAGE MOTHERS

Mothers less than 20 years of age.

TERM

(See **Gestational Age**.)

TFR

(See **Total Fertility Rate**.)

TOTAL BIRTHS

The number of live births plus stillbirths.

TOTAL FERTILITY RATE (TFR)

The rate is calculated by summing all of the age-specific birth rates multiplied by the number of years by which the age-specific birth rates are grouped (this assumes the same number of women in each age group). “The total fertility rate indicates the number of births that a group of 1,000 women would have if they experienced, during their childbearing years (i.e., age 15 to 44 years), the age-specific birth rates observed in a given calendar year. It is a hypothetical measure that shows the implications of current levels of fertility by age for completed family size.” (National Center for Health Statistics. Supplements to the monthly vital statistics report: advance reports, 1987. National Center for Health Statistics. Vital Health Stat 24 (4) p. 5. 1990.)

(See **Statistical Computation** for an example.)

TOTAL PYLL

The total number of potential years of life lost prior to an established cut-off point of 75 years.

VERY LOW BIRTH WEIGHT

A birth weight of less than 1,500 grams.

UCOD

(See **Underlying Cause of Death**.)

UNDERLYING CAUSE OF DEATH (UCOD)

The World Health Organization defines the underlying cause of death as “(a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury.”

VACUUM

(See **Mode of Delivery**.)

VERTEX

(See **Mode of Delivery**.)

