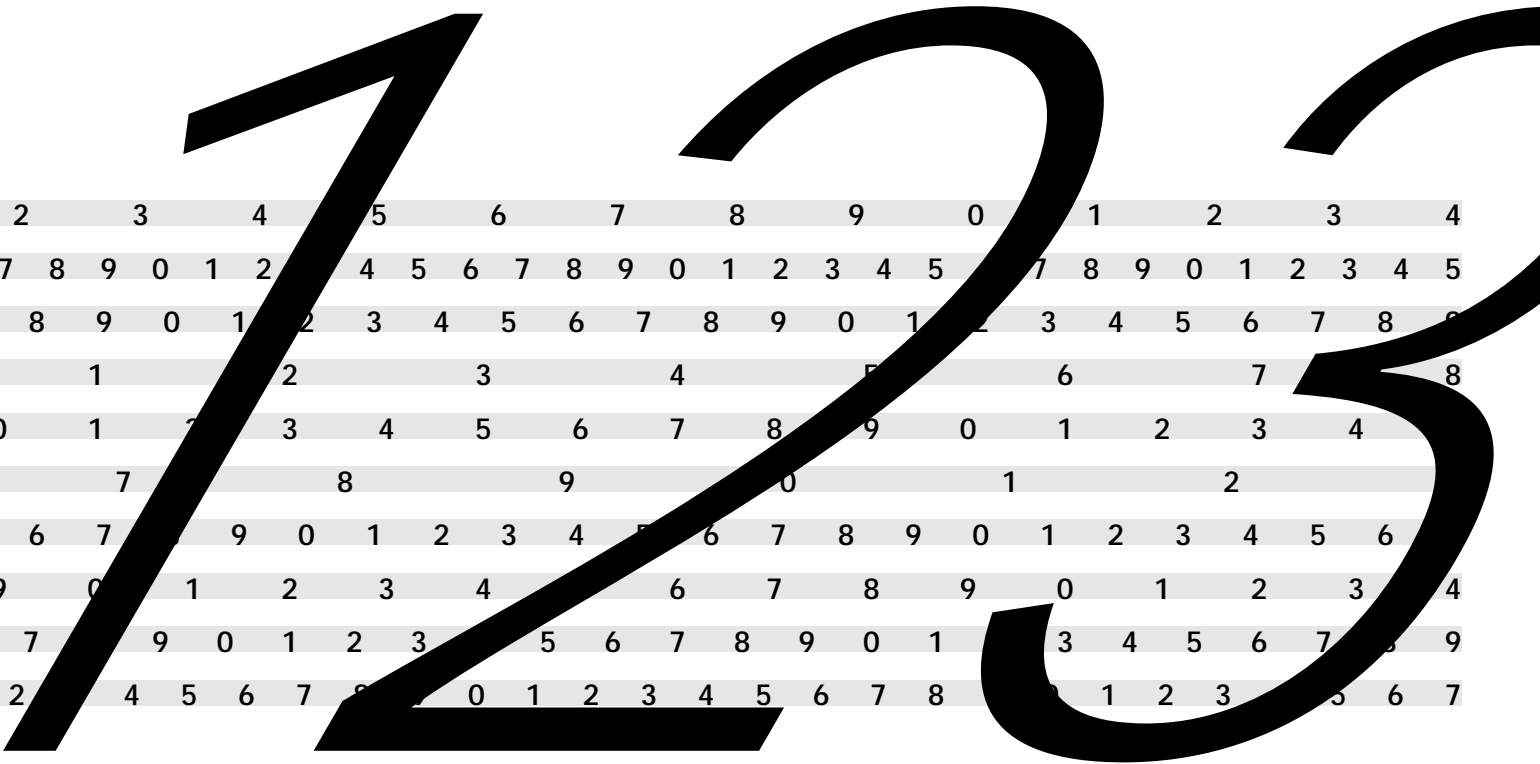


Glossary



Terms, Methods, and Computational Examples

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

In 1987, the World Health Organization, in recognition of AIDS and the human immunodeficiency virus (HIV) that causes AIDS as important health concerns, added new codes to the *International Classification of Diseases, Ninth Revision (ICD9)* which allowed AIDS (042) and HIV (043-044) to be identified as unique causes of death and also provided differentiation among the complications of AIDS.

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 **Acquired Immunodeficiency Syndrome**.)

ALCOHOL-RELATED DEATHS

Alcohol-related deaths are based on the ICD9 diagnostic categories listed below, for which the resulting deaths are directly or indirectly attributed to the use or abuse of alcohol.

ICD9 Code	Diagnostic Category	ICD9 Code	Diagnostic Category
291	Alcohol psychoses	571.5	Cirrhosis of liver without mention of alcohol
303	Alcohol dependence syndrome	571.9	Unspecified chronic liver disease without mention of alcohol
305.0	Non-dependent abuse of alcohol	577.1	Chronic pancreatitis
357.5	Alcoholic polyneuropathy	648.4	"Alcohol and pregnancy"
425.5	Alcoholic cardiomyopathy	760.7	"Fetal Alcohol Syndrome"
535.3	Alcoholic gastritis	790.3	Excessive blood level of alcohol
571.0	Alcoholic fatty liver	E860	Accidental alcohol poisoning
571.1	Acute alcoholic hepatitis		
571.2	Alcoholic cirrhosis of liver		
571.3	Alcoholic liver damage, unspecified		

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. ICD9 codes 648.4 and 760.7 include deaths due to substances other than alcohol. Only if alcohol is explicitly noted on the Medical Certificate is the Death considered to be alcohol-related for these codes. In 1993, the Medical Certification of Death form was revised to include a space to note environmental/occupational/lifestyle factors. As a result, the number of deaths indirectly related to alcohol has increased since 1993. Alcohol-related deaths can be viewed as a measure of the health status of the population.

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 5 year age groups; see footnotes to Appendix 1 for specific sources of population data.

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, or district municipality) boundary. In this report, data are provided only for those communities which 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. With the exception of codes E930–E949, the causes of death classified as being drug-induced (as shown below) are those used by the National Center for Health Statistics (National Center for Health Statistics (1993).

Technical notes. *Monthly Vital Statistics Report*. **41** (Suppl. 7), 48). ICD9 codes 779.5 (drug withdrawal syndrome in newborn) and E929.2 (late effects of accidental poisoning) were also considered but were excluded as they could include alcohol as well as other drugs.

ICD9 Code(s)	Diagnostic Category
292	Drug psychoses
304	Drug dependence
305.2–305.9	Nondependent use of drugs, not including alcohol and tobacco
E850–E858	Accidental poisoning by drugs, medicaments, and biologicals
E930–E949	Drugs, medicaments, and biologicals causing adverse effects in therapeutic use
E950.0–E950.5	Suicide by drugs, medicaments, and biologicals
E962.0	Assault from poisoning by drugs and medicaments
E980.0–E980.5	Poisoning by drugs, medicaments, and biologicals, undetermined whether accidentally or purposely inflicted

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.

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:**
age less than 37 weeks of gestation.
- **Term:**
gestational age of 37 to 41 weeks.
- **Post-term/Postmature:**
gestational age of 42 weeks or more.

HEALTH REGION (HR)

A geographic subdivision of the province used by the Ministry of Health for data dissemination purposes. In 1994, the Ministry began an extensive regionalization process which established Regional Health Boards, Community Health Service Societies, and Community Health Councils. This publication includes data by 20 health regions (HR); beginning with the 1998 report, the boundaries of these HR have been revised to correspond to those of the revised local health areas. To ensure data is provided for all the regional health authorities, additional data for Vancouver/Richmond Regional Health Board and the Simon Fraser Health Board have been included in Appendix 3.

Figure 2 presents a map of the province by health region.

HIV

(See **Human Immunodeficiency Virus**.)

HUMAN IMMUNODEFICIENCY VIRUS (HIV)

The virus that causes acquired immunodeficiency syndrome (AIDS).

ICD9 CODES

International Classification of Diseases Codes, Ninth Revision, established by the World Health Organization (1977).

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 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 Ministry of Health for data dissemination purposes, which can be aggregated into health regions (HR). In 1994, the Ministry began an extensive regionalization process that established Regional Health Boards, Community Health Service Societies, and Community Health Councils. Some of the boundaries of these new health authorities were adjusted in the regionalization process, resulting in significant revisions to the LHA boundaries. Beginning with the 1998 report, regional data and maps use the revised LHA boundaries that correspond to, or can be aggregated to, the boundaries of the regional health authorities. In LHA tables, four pairs of LHAs have been merged into combined areas for data dissemination purposes, to have their boundaries correspond to those of Community Health Councils.

Figure 1 presents a map of the province by local health area (LHA).

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**.)

MATERNAL DEATH/MORTALITY

A maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management (direct or indirect obstetrical) but not from accidental or incidental causes.

MATERNAL MORTALITY RATE

Maternal deaths expressed as a rate per 10,000 live births.

MEDICALLY TREATABLE DISEASES, DEATHS DUE TO

Deaths due to medically treatable diseases are based on Charlton's¹ 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 where the underlying cause stated on the medical certificate of death falls into one of these categories.

ICD9 Code(s)	Diagnostic Category (Charlton)
001–005, 020–041, 320, 382, 383 390–392, 680–686, 711, 730	Bacterial infections (age 5–64)
010–018, 137	Tuberculosis (age 5–64)
180	Cervical cancer (age 5–64)
201	Hodgkin's disease (age 5–34)
280, 281	Deficiency anemias (age 5–64)
393–398	Chronic rheumatic heart disease (age 5–44)
401–405	Hypertensive disease (age 5–64)
460–466, 487	Acute respiratory infections and influenza (age 5–49)
481–486, 490	Pneumonia and unspecified bronchitis (age 5–49)
493	Asthma (age 5–49)
540–543, 550–553, 574, 575	Abdominal hernias, cholecystitis, cholelithiasis and appendicitis (age 5–64).

MID-YEAR POPULATION

The estimated population at the midpoint of the year, which approximates the average population for the year.

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 (ICD9 codes: E800–E825).

NATURAL POPULATION INCREASE

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.

¹ 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.

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 Finance. For specific sources, please refer to **Population Data** in the Introduction.

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 were 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 diagnostic category listed below.

ICD9 Code(s)	Diagnostic Category
140–149	Malignant neoplasms of lip, oral cavity, and pharynx
150	Malignant neoplasm of esophagus
157	Malignant neoplasm of pancreas
161	Malignant neoplasm of larynx
162	Malignant neoplasm of trachea, lung, and bronchus
180	Malignant neoplasm of cervix uteri
188	Malignant neoplasm of urinary bladder
189	Malignant neoplasm of kidney and other urinary organs
401–404	Hypertension
410–414	Ischaemic heart disease
415–417, 420–429, 390–398	Other heart diseases
430–438	Cerebrovascular disease
440	Atherosclerosis
441	Aortic aneurysm
442–448	Other arterial disease
480–487	Pneumonia and influenza
491–492	Bronchitis and emphysema
493, 010–012	Other respiratory diseases
496	Chronic obstructive pulmonary disease

Relative-risk data from the American Society's Cancer Prevention Study (CPS) II (1982–1988) (Centers for Disease Control, 1990) 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+. For the Vital Statistics Annual Reports up to 1996, the available smoking prevalence data were available for the broader age group 25–44; therefore the assumption had to be made that the prevalence rates for age groups 35+ were the same as the rates for age groups 25+. Additionally, provincial prevalence age group rates were not published, and had to be approximated by adjusting the Canadian rates.

Beginning with the 1997 Annual Report, actual B.C. prevalence rates were available separately for the required 25–34 and 35–44 age categories from the *Tobacco Use in BC (1997)* survey commissioned by the BC and Yukon Health and Stroke Foundation.² These additional prevalence data enabled the SAM% to better reflect B.C. data. As a result of this change, comparisons should not be made to earlier estimates of smoking attributable mortality.

Reference

Centres 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.

SMR

(See **Standardized Mortality Ratio**.)

SPONTANEOUS DELIVERY

(See **Mode of Delivery**.)

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. Beginning in the 1998 report, 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

² Detailed information from the *Tobacco Use in BC (1997)* survey is on CD-ROM. A link to summary data can be found on the ministry's web page <http://www.hlth.gov.bc.ca/program.html>

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., $m_i = \frac{3 \times 10,000}{1,339} = 22.4$, 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 (O _i)	Expected (E _i)		Observed (b _i)	Total Live Births (B _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 $i = 1985$ 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: $O = \sum O_i$ = total number of observed LBW live births; and
 $E = \sum E_i$ = total number of expected LBW live births.

• **Potential Years of Life Lost (PYLL) and Standard 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	-	28,120,065	79,140		239	3,183.0

For the Local Health Area:

$$\text{PYLL} = \sum d_i \times (75 - Y_i)$$

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

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

Where: p_i = LHA population in age group i ;
 π_i = standard population in age group i ;
 Π = $\sum \pi_i$ = total standard population;
 d_i = deaths in LHA population in age group i ;
 Y_i = age at midpoint of age group i ; and

• **Potential Years of Life Lost Index (PYLLI):**

Age Group (i)	Age Factor (75-Y _i)	LHA					British Columbia			
		Estimated Population (p _i)	Death Rate/1,000 (m _i)	Observed Deaths (d _i)	Observed PYLL (d _i (75-Y _i))	Expected PYLL (e _i (75-Y _i))	Estimated Population (P _i)	Death Rate/1,000 (D _i /P _i ×1,000)	Observed Deaths (D _i)	Observed PYLL (D _i (75-Y _i))
<1	74.5	1,339	2.2	3	223.5	766.3	42,700	7.7	328	24,436.0
1-4	72.0	5,483	0.2	1	72.0	139.6	172,500	0.4	61	4,392.0
5-9	67.5	6,553	0.2	1	67.5	96.6	215,100	0.2	47	3,172.5
.
.
65-69	7.5	3,538	18.7	66	495.0	443.9	137,200	16.7	2,295	17,212.5
70-74	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:

$$PYLLI = \frac{O}{E} = \frac{\sum d_i \times (75 - Y_i)}{\sum e_i \times (75 - Y_i)} = \frac{223.5 + \dots + 200.0}{766.3 + \dots + 182.3} = \frac{3,183}{5,100} = 0.6$$

Where: O = observed PYLL;
 E = expected PYLL;
 d_i = observed deaths in age group i ;
 e_i = expected deaths in age group i ;
 Y_i = age at midpoint of age group i ;
 p_i = LHA population for age group i ;
 P_i = provincial population for age group i ;
 D_i = provincial deaths for age group i ; and

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, the observed PYLL are:
 Observed PYLL = deaths × age factor = $d_i (75 - Y_i) = 3 \times 74.5 = 223.5$

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, the expected PYLL are:

$$\begin{aligned} \text{Expected PYLL} &= \text{expected deaths} \times \text{age factor} = e_i (75 - Y_i) = \frac{D_i}{P_i} \times p_i \times (75 - Y_i) \\ &= \frac{328}{42,700} \times 1,339 \times 74.5 = 766.3 \end{aligned}$$

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

Age Group (i)	LHA				British Columbia		
	Estimated Population (p _i)	Death Rate/1,000 (m _i)	Observed Deaths (d _i)	Expected Deaths (e _i)	Estimated Population (P _i)	Death Rate/1,000 (M _i)	Observed Deaths (D _i)
<1	1,339	2.2	3	10.3	42,700	7.7	328
1–4	5,483	0.2	1	1.9	172,500	0.4	61
.
.
.
80–84	1,198	70.1	84	87.2	48,100	72.8	3,502
85 +	908	159.7	145	138.8	34,500	152.8	5,272
TOTAL	81,016		561	595.1	3,131,700		23,389

For the Local Health Area:

$$SMR = \frac{\sum d_i}{\sum e_i} = \frac{3 + \dots + 145}{10.3 + \dots + 138.8} = \frac{561}{595.1} = 0.9$$

Where: d_i = observed deaths in age group i ; and
 e_i = expected deaths in age group i .

1) Observed Deaths (d)

The actual number of deaths that occurred in the LHA. For example, for age group under one year of age, 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, the expected deaths are:

$$e_i = \frac{D_i}{P_i} \times p_i = \frac{328}{42,700} \times 1,339 = 10.3$$

Where: p_i = LHA population for age group i ;
 D_i = provincial death for age group i ; and
 P_i = provincial population for age group i .

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

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

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

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

STILLBIRTH

The 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." For the earlier years shown in this report, prior to 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 years of life lost prior to an established cut-off point of 75 years.

TREND ANALYSIS

Appendix 3 presents summaries of various health status indicators by local health area and health region. In order to identify significant trends in ASMRs in the 1986 to 1999 period, this annual report used a statistical technique called linear regression. The use of the linear regression model was not intended for predictive purposes; rather the methodology was intended only to provide a description of the trend in ASMRs over the time period.

Data for individual years contain a certain amount of stochastic variability; especially when data consists of small numbers, the stochastic variability can reduce the reliability of using a linear regression model to describe time series data. In order to dampen the effects of stochastic variability in the ASMRs, a three-year moving average process was applied to create 12 smoothed data points for years 1986 to 1999 (i.e., the moving averages were calculated for the periods 1986–1988, 1987–1989, ..., 1997–1999). A linear regression was then calculated in the form:

$$y_i = a + \beta x_i + e_i$$

Where: y_i = ASMR for the i^{th} three-year period;
 x_i = the i^{th} three-year period;
 β = estimated slope ($\hat{\beta}$) of the regression;
 a = intercept of the regression; and
 e_i = error.

The slope of this regression line was tested at the 5% level and the trend was described as follows:

- i) if $\hat{\beta}$ is statistically significantly positive, the trend is increasing \blacktriangleright ; and
- ii) if $\hat{\beta}$ is statistically significantly negative, the trend is decreasing \blacktriangleleft .

Trends were not shown for areas with an average of less than 1 death per year in the 14-year period, 1986 to 1999.

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 underlying cause of death is the disease which triggered the chain of events leading directly to the death or the description of the accident or violence that produced the fatality (World Health Organization, 1977).