

## Potential Years of Life Lost

**Full data definition sign-off completed.**

<b>Name of Measure</b>	<b>Potential Years of Life Lost:</b> The total number of years not lived by an individual who died before their 75 <sup>th</sup> birthday.
<b>Name of Measure (short)</b>	Potential Years of Life Lost (PYLL)
<b>Definition</b>	<p>PYLL is a measure of premature death.</p> <p>PYLL estimates the total number of years a population might have lived if they hadn't died prematurely due to any cause</p> <p>In Alberta, PYLL is defined as the years of life lost when a person dies before the age of 75 years from all causes. PYLL is expressed per 1,000 population and is age-standardized to the Statistics Canada 1991 Canadian population under age 75.</p>
<b>Domain</b>	Population Health
<b>Type of Measure</b>	Outcome Measure
<b>Business Context</b>	AHS 2010 – 2015 Health Plan: Improving Health for All Albertans AHS Tier 1 Measure
<b>Rationale</b>	PYLL is useful for measuring and understanding the magnitude of premature deaths.
<b>Notes for Interpretation</b>	<p>Age-standardized PYLL is used to adjust for the confounding effects of different age structures across time periods, sex and/or geographies.</p> <p>A change in PYLL over time could be due to multiple factors including changes in disease incidence and/or survival.</p> <p>PYLL does not take into account quality of life.</p> <p>Caution must be used when comparing PYLL over different time frames or geographies. Different agencies present PYLL different, some per 1,000, some per 100,000 and some as the total years lost. There are also two methods of calculating PYLL, one using a fixed age (eg 75) as a cutoff, another using the expected life length at time of death.</p> <p>All cause PYLL does not indicate which diseases/conditions contribute to the years of life lost. However, cause specific PYLL can also be calculated.</p>
<b>Organizational Strategy</b>	2010-15 Alberta Health Action Plan
<b>Benchmark Comparisons</b>	
<b>Cited References:</b>	Government of Alberta, Health and Wellness, Interactive Health Data Application: <a href="http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectSubCategory.do">www.ahw.gov.ab.ca/IHDA_Retrieval/selectSubCategory.do</a>

Potential Years of Life Lost ( <i>continued</i> )	
Technical Specifications	
<b>Metric</b>	Potential years of life lost per 1,000 population.
<b>Preferred Display Format</b>	99.9
<b>Numerator</b>	<p>Note that the PYLL per 1,000 population is age standardized and the calculation is more complex than numerator/denominator. See the technical notes and calculation section for more details.</p> <p>The numerators are the age-specific numbers of potential years of life lost for the population less than 75.</p> <p>The PYLL for a given age group is calculated from the Alberta Vital Statistics Death data by taking the mid-point age in each age group, subtracted from 75, and multiplied by the number of deaths in that age group. The exception of taking the midpoint for each age group is for deaths occurring at less than one year of age, where it is assumed that deaths occur on average, 10% of the way through the year from birth to age one.</p> <p><b><u>Assignment of age, sex and geography to each death record:</u></b></p> <p>Additional documentation regarding the process for assignment of age, sex, and geography to each death record can be found from the data notes of the PYLL Indicator from the IHDA:</p> <p><a href="http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectSubCategory.do">http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectSubCategory.do</a></p> <p>The date of birth, sex, and date of death for each death is identified on the Alberta Vital Statistics Death file. The age is calculated as of the date of death.</p> <p>The postal code for the residence of the person who died is used to determine where the person resided in Alberta, according to various geographic areas.</p>
<b>Inclusion Criteria for Numerator</b>	All deaths of Alberta residents who died in Alberta occurring in the calendar year are included.
<b>Exclusion Criteria for Numerator</b>	Non-Alberta residents dying in Alberta are excluded, and Alberta residents dying outside of Alberta excluded.
<b>Data Source(s) for Numerator</b>	Alberta Vital Statistics Death Files
<b>Refresh Rate of Numerator</b>	Annually

**Potential Years of Life Lost (*continued*)**

<b>Denominator</b>	<p>Note that the PYLL per 1,000 population is age standardized and the calculation is more complex than numerator/denominator. See the technical notes and calculation section for more details.</p> <p>The denominators are the age-specific populations.</p> <p>The Alberta Health Care Insurance Plan (AHCIP) Population Registry is a listing of Alberta Residents eligible for medical coverage of hospital and physician services through the Alberta Health Care Insurance Plan. The counts in this registry serve as population estimates.</p> <p><b><u>Assignment of age, sex and geography to each population registry record:</u></b></p> <p>The Registry includes for each person; residential postal code (used to determine geographic information) and date of birth (to generate age) and sex.</p> <p>Additional documentation regarding the process for assignment of age, sex, and geography to each population registry record can be found from the data notes of the PYLL Indicator from the IHDA:</p> <p><a href="http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectSubCategory.do">http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectSubCategory.do</a></p>
<b>Inclusion Criteria for Denominator</b>	Individuals eligible to receive medical coverage of hospital and physician services through the Alberta Health Care Insurance Plan. The eligibility (based on information in Eligibility and Premiums (EAP)) is determined 4 months after the quarter end date. All people eligible as of June 30 in each year are selected as the population for the given year.
<b>Exclusion Criteria for Denominator</b>	The coverage would not include members of the armed forces, RCMP, inmates of federal penitentiaries, or persons opting not to register with the AHCIP.
<b>Data Source(s) for Denominator</b>	Alberta Health Care Insurance Plan Quarterly Population Registry.
<b>Refresh Rate of Denominator</b>	Annually
<b>Technical Notes</b>	<p>The potential years of life lost for an age group are calculated by taking the mid-point age in the age group, subtracting from 75, and multiplying by the number of deaths in that age group.</p> <p>The age groups are identified as &lt;1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69 and 70-74.</p> <p>Example: There are 30 deaths for ages 20 to 24, note that these are completed years, so 24 implies up to, but not including 25 years, so the mid-point age is 22.5 years.</p> <p>The potential years of life lost = <math>30 \times (75 - 22.5) = 1,575</math> years.</p> <p>The exception to taking the midpoint for each age group is for deaths occurring at less than one year of age, where it is assumed that deaths occur on average, 10% of the way through the year from birth to age 1.</p> <p>Example: There are 40 deaths for the age group &lt;1 year, the potential years of life lost = <math>40 \times (75 - 0.1) = 2,996</math> years.</p>

## Potential Years of Life Lost (continued)

**Calculation**

Where  $e_j$  = the potential years of life lost in the  $j^{\text{th}}$  stratum  
 $n_j$  = the number of individuals in the  $j^{\text{th}}$  stratum  
 $w_j$  = the standardization weight of the  $j^{\text{th}}$  stratum, calculated as:

Where  $n_j^*$  = the number of individuals in the  $j^{\text{th}}$  stratum in the standard population

**Illustrative Example: Calculation of Age-Standardized PYLL Rate for 2009 (Alberta level, combined sexes)**

	A	B	C	D	E	F	G	H
AGE	Deaths	Population	Years of life lost per death	Years of Life Lost (A X C)	Standard Populations (1991 Statistics Canada)	Weights	Crude PYLL Rate (D / B)	AS PYLL Calculation (F X G)
0	280	50,875	74.9	20,972	403,061	0.0150	0.4122	0.00619332
01to04	40	191,042	72.0	2,880	1,550,285	0.0578	0.0151	0.00087115
05to09	25	218,401	67.5	1,688	1,953,045	0.0728	0.0077	0.00056249
10to14	28	227,843	62.5	1,750	1,913,115	0.0713	0.0077	0.00054772
15to19	117	247,082	57.5	6,728	1,926,090	0.0718	0.0272	0.00195482
20to24	179	267,469	52.5	9,398	2,109,452	0.0786	0.0351	0.00276265
25to29	202	287,454	47.5	9,595	2,529,239	0.0943	0.0334	0.00314691
30to34	193	269,520	42.5	8,203	2,598,289	0.0969	0.0304	0.00294754
35to39	253	263,921	37.5	9,488	2,344,872	0.0874	0.0359	0.00314206
40to44	387	262,731	32.5	12,578	2,138,891	0.0797	0.0479	0.00381671
45to49	670	291,754	27.5	18,425	1,674,153	0.0624	0.0632	0.00394097
50to54	934	271,144	22.5	21,015	1,339,902	0.0499	0.0775	0.00387097
55to59	1,031	214,352	17.5	18,043	1,238,441	0.0462	0.0842	0.00388563
60to64	1,319	165,578	12.5	16,488	1,190,217	0.0444	0.0996	0.00441769
65to69	1,472	118,067	7.5	11,040	1,084,588	0.0404	0.0935	0.00378027
70to74	1,759	90,938	2.5	4,398	834,024	0.0311	0.0484	0.00150334
<b>Total</b>	<b>8,889</b>	<b>3,438,171</b>		<b>172,685</b>	<b>26,827,664</b>	<b>1</b>		<b>0.04734422</b>

Total of Column H = 0.0473  
 PYLL per 1,000 population = 47.3

The weights use Statistics Canada's 1991 Canadian population.

**Relationship to Other Indicators**

Similar to Life Expectancy, PYLL is dependent upon incidence and survival,

**Level of Reporting**

Provincial level by male, female and combined sexes, Zone combined sexes  
 Most level of reporting fields refer to the geographical level and not the stratification. PYLL and Life Expectancy are a little different in that the Tier 1 measure has a prescribed breakdown. PYLL is by sex for Alberta.

Potential Years of Life Lost ( <i>continued</i> )	
<b>Frequency of Reporting</b>	Annually
<b>Limitations</b>	<p>Reliability:</p> <p>Since the measure relies on the population estimates derived from the Alberta Health Care Insurance Population Registry, there is concern these estimates may become inflated in the future given the impact that abolishment of premiums will have on people updating their address information when leaving Alberta or moving within Alberta.</p> <p>Updates (or adding of completely new records) to past vital statistics death records is always possible when receiving up to date files, meaning that any indicator could potentially change in value – although the changes noted over the past several years are quite small.</p>

Potential Years of Life Lost (*continued*)

**Document Version History**

Version	Version Date	Summary of Changes
1.0	May 18, 2010	Final version for initial use.
2.0	August 5, 2010	Draft content
	October 13, 2010	Move title into header, formatting and add new signoff page.
2.1	December 6, 2010	Align title and names, add AHW Contact field.
2.2	December 7, 2010	Added comments from PMR and AHS Population Health, for discussion with AHW.
2.3	December 14, 2010	Added illustrative table example to technical notes and modify example instead of adding link.
2.4	December 16, 2010	Provided feedback
2.5	December 20, 2010	Add column identifiers to PYLL example and moved to calculation field.
2.6	January 5, 2011	Add key and executive contact info.
3.0	January 12, 2011	Version ready for signoff.
3.1	March 7, 2011	Corrected title for Key Contact.
3.2	May 31, 2011	Full data definition signoff completed.