Technical Supplement—
Adding years to life
and life to years:
Life and health
expectancy in Ontario

Research Atlas

ICES Institute for Clinical Evaluative Sciences

Adding Years to Life and Life to Years: Life and Health Expectancy in Ontario—Technical Supplement

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KEY TERMS & CONCEPTS

- **Age/sex Standardized Mortality Rate**
- **Cause-deleted Hospitalization**
- **Cause-deleted Life and Health Expectancy**
- **Crude Death Rate**
- **Disability-free Life Expectancy**
- **Health Expectancy**
- **Health-adjusted Life Expectancy**

KEY MESSAGES

- ✔ This Technical Supplement contains additional health status information to enable statistical comparison between District Health Councils.

- ✔ A description of the methods used in the main report are provided to allow regional health planners to modify the report for local planning needs.

Background

This Technical Supplement is published separately to more fully describe the data findings and details on how each health status measure in the main report was calculated. The purpose is to allow regional health planners to expand the finding of the report to meet regional needs. Appendix A to E show indicators for 1990 and confidence intervals for 1990 and 1996/97. This information will allow local planners the ability to examine whether a measure for a District Health Council (DHC) or region shows statistical changes over time or differences between other regions. The data sources that were used to estimate the health status measures are increasingly available to regional health planners in Ontario, e.g. through the Health Intelligence Units. With these data sources, the methods in this report can be modified to estimate the burden of disease for specific planning issues for regions. For example, using the cause-deleted life table approach and local mortality and hospitalization rates a DHC could estimate the potential impact on life expectancy or health care utilization that might be expected following a reduction in the prevalence of specific diseases.

The health status measures that were used in this report can be divided into measures of Health-related Quality of Life (HRQOL), mortality and health expectancy measures that combine both HRQOL and mortality. Exhibit TS1 gives an overview of the measures and their limitations. The remaining sections provide details regarding the sources of data and the method that was used to estimate each indicator.

Data Sources

Ontario Health Survey (OHS)

The OHS I (1990) and OHS II (1996/97) are used in this Atlas Report to obtain local and provincial estimates of the prevalence of long-term disability, the need for assistance with activities of daily living (ADL and IADL), self-rated health status and the Health Utilities Index. These surveys were designed to provide regional population-based estimates for health and health-related indicators. Surveys require a high response rate for the results to be valid and generalizable to the population. As well, most surveys rely on self-report and, in some cases, proxy responses that may be a source of bias. Finally, the self-reports of medical conditions have not been independently verified by a professional practitioner, so reported disease prevalence may deviate from actual prevalence.

Ontario Health Survey I (1990)

The 1990 Ontario Health Survey is a cross-sectional, population-based household survey commissioned by the Ontario Ministry of Health to assess the health of Ontarians. The survey was conducted between January and December 1990 (excluding July). Persons living in remote communities, institutions and on native reserves were excluded. Overall, there were 61,239 respondents who were statistically weighted to represent the 9.7 million people in Ontario in 1990. The survey was sampled to produce reliable estimates for the 42 Public Health Units present in 1990. All members of each selected household were included in the survey. The survey consisted of two parts. The first of these was a face-to-face interview in which a trained interviewer collected basic sociodemographic data as well as information about chronic conditions, recent hospitalization and disability, from one member of the household who acted as a proxy for all other household members. The second part, which dealt with more personal information such as health behaviours, was a self-completed questionnaire completed by all household members 12 years of age and over.

Ontario Health Survey II (1996/97)

The 1996 Ontario Health Survey (OHS II) was also a population-based household survey. The Ontario Ministry of Health sponsored Statistics Canada to augment the Ontario sample of the 1996/97 National Population Health Survey to enable the production of local level estimates. Random Digit Dialing (RDD) was used to contact potential respondents for the additional sample across 23 geographic areas that represent Public Health Units (PHUs) or combinations of PHUs. Once a selected household was contacted, one randomly chosen member aged 12 or over was asked to respond to the survey, which was conducted using computer-assisted telephone interviewing (CATI). The OHS II also includes the respondents who are part of the longitudinal NPHS, who were also interviewed using CATI. Overall, 36,892 respondents were included as part of the OHS II.

National Population Health Survey (1996/97)

The National Population Health Survey (NPHS) was used to obtain provincial and national estimates for the Health Utilities Index and the prevalence of long-term disability. The NPHS comprises both a longitudinal survey and a series of cross-sectional surveys designed to measure the health status of the Canadian population. The longitudinal component began in 1994/95 and will interview the same panel of respondents every two years for 20 years. The sample design

is intended to produce estimates at the national and provincial levels.

In addition to the longitudinal component, in 1996/97 several provinces paid for increases in their sample sizes to enable estimates to be made at the local health area level as well. These additional "buy-ins" were selected using RDD. In 1996/97, all RDD respondents and most longitudinal respondents were interviewed using CATI. The 1996/97 longitudinal and RDD portions have been combined into one cross-sectional file. This cross-sectional file contains information from 81,804 individuals.

Mortality Data

Mortality data were used to calculate the crude death rate, age-specific death rates, survival probabilities and life table estimates such as life and health expectancy. The Office of the Registrar General, a division of the Ministry of Consumer and Commercial Relations of Ontario, records deaths occurring in the province. The cause of death and accompanying demographic information is completed by the attending physician (Death Certificate), and the family and funeral director (Statement of Death). A trained professional reviews the cause of death. Provincial death certificates are sent to Statistics Canada where out-of-province deaths are added and further validation is performed. In this study, national and provincial mortality rates were estimated using data from Statistics Canada's Health Indicators 1999 CD-ROM. DHC estimates were derived using Statistic Canada individual mortality records that were obtained through the Health Planning Branch, Ministry of Health. All 1990 mortality indicator estimates were based on the average number of deaths per year from 1989-1991.

OECD Health Data 1998 (CD-ROM)

OECD (Organization for Economic Cooperation and Development) Health Data is a package of aggregated health system-related data collected by the OECD from 29 countries. This data was used for cross-country comparisons. The data are divided into 10 chapters, each containing a number of different variables. The chapters are: health status, medical resources and use, health expenditure and funding, costs and financial flows, social protection, pharmaceutical production and consumption, medical services, non-medical determinants of health, demographic references and economic references.

Canadian Institute for Health Information (CIHI)

CIHI is a federally chartered but independent, non-profit organization that collects and processes health data from a number of sources, particularly from hospitals. In this Atlas Report we used hospital discharge data obtained from CIHI to estimate the life expectancy in hospital for citizens of Ontario and the impact of eliminating certain disease groups on life expectancy in hospital.

Methods and Definitions

Crude Death Rate

The crude death rate (CDR) is the total number of deaths during a time period (usually one year) divided by the total population at risk at the mid-point of the time period; it is usually multiplied by a factor of 100, 1,000 or 100,000. For example, the crude death rate per 100,000 for the Central East Region of Ontario in 1996 is calculated:

Equation 1

$$CDR = \frac{\text{total \# death to Central East residents in 1996}^*}{\text{estimated total Central East population, July 1, 1996}} \times 100,000$$

(excluding those that occurred outside Ontario)

Age/sex Standardized Mortality Rate

This Atlas Report shows both crude death rates and age-/sex-standardized mortality rates for the 16 District Health Councils and seven Health Planning Regions of Ontario. Standardization removes the effect of differences in the age-/sex-distribution from region to region and from one time period to another. In direct standardization, the method used in this analysis, the age-/sex-specific death rates for each area were applied to the standard population, which in this case is the 1996 Ontario population.

Leading Causes of Death and Disability— Disease Groupings

For the purpose of this Atlas Report, disease categories were developed that would allow for the examination of the impact of both the leading causes of death and the leading causes of disability. The final classifications are found below in Exhibit TS2. Columns 3 to 6 give detail regarding the inclusion criteria for each category. Column 3 contains the criteria in terms of standard ICD-9 codes.

These codes were used for causes of death and, where possible, for the leading causes of disability reported in the NPHS/OHS II.

Unfortunately, not all the reported causes of disability fit neatly into the standard ICD-9 code categories. This necessitated the use of additional codes—the ICD-9 V-codes and a system called the "Musculoskeletal Impairment Supplementary Coding Scheme" (MISCS). The ICD-9 V-codes are used for such causes as the presence of a cardiac pacemaker, an artificial opening like a colostomy or an organ or tissue transplant. The MISCS system codes impairments by the type of impairment (e.g. arthritis, fracture, stiffness, weakness) and site (e.g. hands, wrists, shoulders etc.). Assignment of the ICD-9 V-codes to the various categories is found in Column 4. For the MISCS, if it was reported to be the result of an injury, it was included in that category. Otherwise these were included with the musculoskeletal group.

Finally, leading causes of disability and morbidity were also defined using the OHS questions about chronic conditions. Column 6 details the assignment of the 21 chronic conditions to the 11 disease groups.

Leading Causes of Death and Disability— Mortality and Prevalence Estimates

Age-/sex-specific mortality rates for the various disease groupings were calculated using the mortality data previously identified and post-censal population estimates from Statistics Canada.

Prevalence estimates for leading causes of disability or morbidity came from three sections of the NPHS/OHS questionnaire. In the section on activity restriction, respondents were asked if they had any long-term disabilities or handicaps. Those who said "Yes" were asked, "What is the main condition or health problem causing you to be limited in your activities or have a long term disability or handicap?" and "What is the best description of the cause of this condition (e.g. injury, existed from birth, work environment, disease, aging etc.)." Information about the presence of chronic conditions was also collected in a section that asked specifically if the respondent had ever been diagnosed with each of 20 chronic conditions. Finally, in the section of the survey dealing with mental health, respondents were asked a series of questions that allowed for the calculation of a predicted probability of depression. A new chronic condition variable was created for depression, and a person was defined as having a diagnosis of depression if their predicted probability for depression was .90 or greater.[1]

The methodology used for defining and calculating prevalence rates for various conditions as leading causes of disability and morbidity attempted to mirror that for death rates—i.e. where possible we tried to define only one cause for each respondent. For those with a long-term disability or handicap this was relatively straightforward, as all respondents who reported long-term disability were asked to give a "main cause."

Respondents who did not report long-term disability or handicap were divided into three groups: those who did not report any chronic conditions, those who reported only one chronic condition and those who reported multiple chronic conditions.

For those who reported only one chronic condition, this was taken as their leading cause of disability/morbidity. However, it was impossible to identify a leading cause for those reporting multiple chronic conditions. In these cases, the observations were counted once for each reported condition. As a result, the per cent prevalence estimates add up to more than 100.

Using this methodology, a condition was counted if it was mentioned as a leading cause of disability or handicap, or if it was reported by someone who did not have a long-term disability or handicap. For those who reported a long-term disability and a leading cause for that disability, no other information regarding the presence or absence of chronic conditions was used.

Life Tables

A life table is a summarizing technique used to describe the pattern of mortality and survival in populations. The life table method can be applied to the study not only of death, but also of any defined endpoint such as the onset of disease or the occurrence of specific complication(s) of disease. There are two types of life tables: cohort and current or period. The period life table is used most frequently and is the method used in this report. In a period life table, the average cross-sectional mortality experience of a population measured over a short period of time (usually one to three years) is applied to the life span of a hypothetical population. It also assumed that this hypothetical population is stationary and that the number of births equals the number of deaths. Using this technique, expectations of life and conditional probabilities of dying may be computed for any age.

Life tables for Canada, the provinces and Ontario District Health Councils were constructed in order to estimate life expectancy, health-adjusted life expectancy, disability-free life expectancy, the probability of death prior to age 65 years, and

cause-deleted life, health expectancy and hospital utilization. The period life tables were constructed using an adapted method of Chiang's[2,3] using mortality and population data obtained from Statistics Canada. The spreadsheet life table application that was used in this report is available from the Central East Health Information Partnership website: **http://www.cehip.org.** See Exhibit TS3 for an example of the life tables used in this report.

Health Expectancy

Health expectancy was estimated using the same method as life expectancy. The difference lies in the fact that in health expectancy, the years of life lived are weighted, or discounted, according to some measure of health status. The various measures of health expectancy use the same methodology, originally developed by Sullivan,[4] what differs is the health status measure used to derive the weights.[5] The compression or expansion of morbidity is estimated by comparing health expectancy to life expectancy. When the difference between life expectancy decreases, there has been a compression of morbidity. If, on the other hand, the difference has increased, then there has been an expansion of morbidity. Absolute compression of morbidity (life expectancy minus health expectancy) occurs when age-specific morbidity rates decrease more rapidly than age-specific mortality rates. A relative compression of morbidity [(life expectancy minus health expectancy)/life expectancy] occurs when the amount of life in poor health decreases as a percentage of life expectancy.[6]

Health-adjusted Life Expectancy

Health-adjusted life expectancy (HALE) is life expectancy weighted or adjusted for the level of HRQOL. In this report HALE was estimated by the period life table approach using a modified Sullivan's method.[4] Age-specific life-years lived (L) in the abridged period life table were weighted by the age-specific mean Health Utilities Index (HUI) scores for each region, which were obtained from the 1996/97 NPHS (Canada and provinces) or the 1996/97 OHS (for Ontario regions). As there were few respondents under 10 years old and the NPHS only contains HUI scores for those over four years of age, the Canadian HUI estimates for ages four to nine were used for all ages one to nine years.

Disability-free Life Expectancy

Disability-free Life Expectancy (DFLE) was computed for Canada and the provinces using estimates of the prevalence of disability derived from the 1996/97 NPHS.

Disability is measured in two ways in the NPHS: Respondents are asked whether they are forced to restrict their activities due to a long-term health problem, and they are asked directly if they have any long-term disabilities or handicaps. A variable called the restriction of activity flag is derived based on whether a person reported either some form of activity restriction or a long-term disability or handicap. For the purposes of this report, we used only the long-term disability or handicap question as our indicator of the presence of disability.

The actual derivation of disability-free life expectancy involved once again weighting the life-years lived from the period life table, this time by the prevalence of disability. This disability measure is dichotomous yes-no, and years spent with disability are discounted to zero.

Variance estimates for HALE and DFLE were calculated by using Mather's method[7] using the derivation:

Equation 2

$$V(HE_x) = \frac{1}{l_x^2}\left\{\sum_{i=x}^{i=z-1} l_x^2\left[(1-a_i)n_i(1-HRQOL_i)+HE_{i+1}\right]^2 V(p_i)+\sum_{1=x}^{i=z} L_i^2 V(HRQOL_i)\right\}$$

where:

HE_x	= the health expectancy for a person entering the xth age interval;
1_x	= the number of people in the life table cohort surviving to the start of the xth age interval;
a_x	= the fraction of life lived in the xth age interval;
n_x	= the length of years in the xth age interval;
$HRQOL_x$	= the mean HRQOL indicator xth age interval;
L_x	= the person years lived in the xth age interval;
$V(p_x)$	= variance of the conditional probability of death xth age interval;
$V(HRQOL_x)$	= the variance of the mean HRQOL indicator xth age interval.

Cause-deleted Life and Health Expectancy

One way to measure the impact a particular cause of death or disability has on the health of the population is to turn the question around and estimate the impact of eliminating the condition. This technique assumes that when a particular

cause is eliminated, there is no effect on the remaining causes and the mortality and morbidity patterns in the rest of the population (those not afflicted by the cause of interest) generalize to the entire population. Any resultant change in population health status is attributed to the eliminated cause and, thus, impact on health is measured by comparing life and health expectancy estimates with and without a particular cause.

Cause-deleted expectancies were calculated for each of the leading causes of disability and death outlined above based on the period life table. Cause-deleted mortality rates were calculated by subtracting the cause-specific mortality rate from the overall mortality rate.

The calculation of cause-deleted mean HUI scores was somewhat more complex, due to the fact that the second assumption—that any resulting change after cause elimination is attributed to the cause eliminated—is invalid for those with two or more chronic conditions. To deal with this, the population was divided into two groups, those with zero or one chronic condition (Group 1) and those with two or more chronic conditions (Group 2).

The general formula for cause-deleted mean HUI is:

Equation 3

$$mHUI_{CD} = \frac{mHUI_T - (mHUI_C \times P_C)}{1 - P_C}$$

where:

$mHUI_{CD}$	= Cause-deleted mean HUI
$mHUI_T$	= Overall mean HUI
$mHUI_C$	= Cause-specific mean HUI
P_C	= Proportion reporting the specific cause

With two groups (see above), the overall mean becomes the sum of the two individual means, weighted by their proportions. The formula becomes:

Equation 4

$$mHUI_{CDT} = (mHUI_{CDG1} \times P_{G1}) + (mHUI_{CDG2} \times P_{G2})$$

Substituting Equation 3 into Equation 4 we get:

Equation 5

$$mHUI_{CDT} = \left[\left[\frac{mHUI_{TG1} - (mHUI_{CG1} \times P_{CG1})}{1 - P_{CG1}} \right] \times P_{G1} \right] + \left[\left[\frac{mHUI_{TG2} - (mHUI_{CG2} \times P_{CG2})}{1 - P_{CG2}} \right] \times P_{G2} \right]$$

where:

$G1$	= Group 1—those with no leading causes or one only
$G2$	= Group 2—those with more than 1 of the leading causes
$mHUI_{CDT}$	= Overall cause-deleted mean HUI
$mHUI_{TG1/TG2}$	= Overall mean HUI for each group
$mHUI_{CG1/CG2}$	= Cause-specific mean HUI for each group
$P_{G1/G2}$	= Proportion of the total population in each group
$P_{CG1/CG2}$	= Proportion of each group reporting the specific cause

The overall mean HUI scores for both groups and the cause-specific mean HUI scores for Group 1 were calculated directly from the OHS II survey data. To control for comorbidity, the cause-specific mean HUI scores for Group 2 were calculated using linear regression modeling, with all conditions in the model. Age and sex were not included in the model, but instead separate regressions were run for each age-sex group, with age divided into 10-year age groups rather than five-year age groups. Cause-deleted mean HUI estimates were calculated from the regression coefficients using the following formula:

Equation 6

$$mHUI_{CDG2} = mHUI_{TG2} - (\beta_C \times P_C)$$

where:

β_C	= the beta coefficient for the particular cause
P_C	= the proportion reporting the particular cause

Example:

The regression model HUI = Cause1 Cause2 Cause3 Cause 4… Cause11 was run for women age 35-44. The proportion of women in this age group who have heart disease is .017874. From the regression analysis output, the beta coefficient for Cause1 (heart disease) was -0.056766. The overall mean HUI for women age 35-44 who reported more than one chronic condition but did not report activity restriction or long-term disability (and thus were in Group 2) was 0.9274. Using the above formula, the cause deleted mean HUI estimate for women age 35-44 in Group 2 becomes:

mean HUI (heart disease deleted) = .9274 − (-.056766 × .017874) = .9284

In other words, deleting heart disease would have the effect of raising the mean HUI of this group by .001.

Once the cause deleted mean HUI scores controlled for co-morbidity have been calculated for each age-sex group, they can be substituted into formula Equation 4 (above). See Exhibit TS4 for an example of the cause-deleted life tables used in this report.

Cause-deleted Hospitalization

The impact of eliminating leading causes of morbidity and mortality on hospitalization was estimated using a similar cause-deleted life table approach. The hospital admission rate and average length of stay for each cause were obtained from the CIHI hospital discharge abstract database. Total hospital days were calculated by multiplying the admission rate by the average length of stay. Next, age-sex specific hospitalization rates in days per person, overall and for each cause, were calculated as follows:

Equation 7
Hospitalization (days) = total # hospital days / population

Converting this into years (days in hospital per person/ 365) yielded the average proportion of a year spent in hospital. This proportion was used to weight the number of years lived (Lx in the life table) in the same way that the mean HUI was used to adjust for less than perfect health. The result is life expectancy in hospital. Life expectancy outside hospital can be calculated simply by using 1-proportion of life lived in hospital.

Cause-deleted hospitalization was calculated by subtracting the hospitalization rate for each cause from the overall hospitalization rate and then using this new, cause-deleted rate, along with the appropriate cause-deleted mortality rate, to calculate the cause-deleted life expectancies in hospital.

Acknowledgements

Exhibit TS1: Health Status Measures

Mortality		
Measure	**What it Captures**	**Limitations**
• **Mortality indicators are derived from vital statistics from the Office of the Registrar General. Since 1991 these data exclude deaths for residents outside Ontario.**		
Total deaths	A summary measure of "negative" health. Total deaths are associated with absolute health care demand.	Poor reflection of population health status since there is no adjustment for population size or age distribution.
Crude death rate	Similar to total deaths with adjustment for population size.	Poor reflection of population health status since there is no adjustment for age distribution.
Age-standardized death rate	Similar to total deaths with adjustment for population size and age-distribution. Useful for comparing health status to a standard population when size and age distribution varies.	Requires an arbitrary standard population. This report used the 1996 Ontario population as the standard population.
Life expectancy	Intuitive summary measure of mortality expressed in terms of years. Useful for comparing mortality between different populations without need for a standard, comparison population.	Generally should not be used to predict the future or potential life expectancy.
% Survival to 65 years	A summary measure of premature mortality.	Same as for life expectancy.

Health-related quality of life (HRQOL)		
Measure	**What it Captures**	**Limitations**
• **HRQOL indicators are derived from the OHS and NPHS. These surveys exclude certain populations including people living in long-term care institutions.**		
Health Utilities Index (HUI)	Functional health status	1/3 of respondents have perfect scores, implying perfect health. Does not capture functional health that is not represented within the eight attributes.
Activities of daily living (ADL)	Restrictions in activities of daily living including eating, bathing, dressing, or moving about a residence.	Does not capture whether needs are being met.
Instrumental activities of daily living (IADL)	Need for assistance with activities of daily living including shopping for groceries, meal preparation, light or heavy work.	Same as for ADL.
Activity restrictions	Need for assistance with instrumental activities of daily living or limitations in activities in the home, school, work, or other leisure time activities.	Same as for ADL.
Long-term disability and handicap	Long-term disability and handicap as defined by the respondent.	Respondents may interpret disability and handicap differently, including concepts of abnormal body function or disease status.
Self-rated health status	Respondents' own evaluations of their health.	Respondents may use different criteria for evaluating their health, such as future expectations, health behaviour, etc.

Exhibit TS1: Health Status Measures (Cont'd)

Combined measures of morbidity and mortality		
Measure	**What it Captures**	**Limitations**
Health-adjusted life expectancy	Life expectancy in good health. Health status is measured using utility-based measures such as the Health Utilities Index.	Calculation requires several different data sources each with their own limitations. Currently, difficult to compare results to other countries.
Disability-free life expectancy	Life expectancy without disability. Health status is measured using long-term disability. DFLE is the most common health expectancy measure.	Comparisons between different studies often difficult since different definitions of long-term disability are commonly used.

Disease-specific measures		
Measure	**What it Captures**	**Limitations**
Cause-deleted life expectancy	Potential life expectancy if individual diseases are eliminated. Provides an intuitive and realistic measure of the impact on a population's health if a disease is reduced. Deaths at younger ages will have a larger impact on life expectancy than older deaths.	May overestimate the impact of reducing disease for chronic conditions since a person may more likely have other potential fatal diseases.
Cause-deleted health expectancy	Potential health expectancy if individual diseases are eliminated. Useful for comparing diseases with varying measures of mortality and morbidity.	In this report, relies on self-report of chronic conditions and likely underrepresents acute conditions. Comorbidity is considered for only those respondents with no leading cause of disability.
Cause-deleted hospitalization	Potential hospital use if selected conditions are eliminated.	The actual impact on hospitalization change based on many factors such as the availability of hospital services.

Exhibit TS2: Disease Classification

Disease Grouping	ICD-9 Codes (excluding V codes)	ICD-9 V Codes (included in 1996/97 National Population Health Survey (NPHS) and Ontario Health Survey (OHS))	NPHS-specific V Codes	Chronic conditions (from NPHS and OHS)
Ischemic and Other Heart Disease	390-398; 410-414; 415-429	V151, V421, V433, V450, V472, V533		• heart disease (ccc6_1l)
Cerebrovascular Disease, Hypertensive Disease and Other Circulatory Disorders	401-405; 430-438; 440-448; 450-459			•high blood pressure (ccc6_1f); •stroke (ccc6_1o)
Cancer (excluding benign neoplasms)	140-209; 230-239	V581		•cancer (ccc6_1m)
Diabetes Mellitus	250			•diabetes (ccc6_1j)
Diseases of the Respiratory System	460-519			•asthma (ccc6_1c); •chronic bronchitis/emphysema (ccc6_1h); •sinusitis (ccc6_1i)
Diseases of the Musculoskeletal System	710-739	V424, V436, V437, V495, V537	VA00-VU17 and rac6_5 =>5	•arthritis/rheumatism (ccc6_1d); •back problems (ccc6_1e)
Mental Disorders (including suicide)	290-319; E950-959	V401, V402, V409, V611, V623, V628		•depression (mhc6dp =>.90)
Accidents and Injuries	800-999; or E800-E949; E960-E999		VA00-VU17 and rac6_5 =< 4	
Diseases of the Digestive and Genitourinary Systems	520-579; 580-629	V420, V442, V443, V451, V473, V536, V568		•stomach or intestinal ulcers (ccc6_1n); •urinary incontinence (ccc6_1p); •Crohn's or colitis (ccc6)1q)
Diseases of the Nervous System and Sense Organs	320-389	V410, V411, V412, V413, V414, V415, V425, V430, V438, V532		•migraine (ccc6_1g); •epilepsy (ccc6_1k); •Alzheimer's (ccc6_1r); •cataracts (ccc6_1s); •glaucoma (ccc6_1t)
All Other Causes	All Others: 001-139; 210-229; 240-249; 251-289; 630-709; 740-799	V222, V434, V458, V534, V538, V660		•food allergies (ccc6_1a); •other allergies (ccc6_1b); •thyroid problems (ccc6_1u); •other (ccc6_1v)

Exhibit TS3: Life Table Example 1: Use of Abridged Life Table to Calculate Life Expectancy and Health-adjusted Life Expectancy for Ontario Females, 1996/97

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Age Interval	Age Group (yrs)	M_x	l_x	q_x	d_x	L_x	T_x	e_x	$mHUI_x$	L'_x	T'_x	e'_x (HALE)
1	<1	0.004736	100000	0.00472	472	99590	8140888	81.4	0.9746	97060	7411194	74.1
2	1-4	0.000237	99528	0.00095	94	397891	8041298	80.8	0.9746	387785	7314134	73.5
3	5-9	0.000108	99434	0.00054	54	497032	7643407	76.9	0.9857	489929	6926349	69.7
4	10-14	0.000127	99381	0.00063	63	496765	7146375	71.9	0.9676	480660	6436420	64.8
5	15-19	0.000258	99318	0.00129	128	496282	6649610	67.0	0.9485	470734	5955760	60.0
6	20-24	0.000274	99190	0.00137	136	495610	6153328	62.0	0.9459	468778	5485026	55.3
7	25-29	0.000312	99054	0.00156	155	494900	5657718	57.1	0.9505	470383	5016248	50.6
8	30-34	0.000430	98900	0.00215	213	493988	5162818	52.2	0.9449	466769	4545865	46.0
9	35-39	0.000667	98687	0.00333	328	492664	4668830	47.3	0.9374	461838	4079096	41.3
10	40-44	0.001097	98359	0.00547	538	490555	4176166	42.5	0.9241	453312	3617259	36.8
11	45-49	0.001770	97820	0.00882	862	487118	3685611	37.7	0.9088	442698	3163946	32.3
12	50-54	0.002811	96958	0.01396	1354	481676	3198493	33.0	0.8939	430580	2721248	28.1
13	55-59	0.004820	95604	0.02383	2278	472667	2716816	28.4	0.8719	412095	2290668	24.0
14	60-64	0.007698	93326	0.03782	3530	458512	2244149	24.1	0.8778	402463	1878573	20.1
15	65-69	0.012051	89796	0.05860	5262	436617	1785637	19.9	0.8810	384677	1476110	16.4
16	70-74	0.019983	84535	0.09543	8067	403716	1349020	16.0	0.8593	346921	1091433	12.9
17	75-79	0.033405	76467	0.15487	11842	354508	945304	12.4	0.8408	298074	744512	9.7
18	80-84	0.060156	64625	0.26283	16986	282360	590797	9.1	0.7907	223250	446438	6.9
19	85-90	0.104039	47639	0.42152	20081	193015	308437	6.5	0.7386	142561	223188	4.7
20	90+	0.204658	27558	1.00000	27558	115423	115423	4.2	0.6985	80627	80627	2.9

Columns 1-9 comprise the standard abridged period life table. Column 9 gives the life expectancy estimates for females in Ontario in 1996/97 (the first row is life expectancy at birth). Columns 10-13 comprise the adjustment for health-related quality of life (HRQOL). Years of life lived are adjusted using a weight, in this case mean Health Utilities Index scores. The final column is life expectancy adjusted for health status, or HALE.

Components of the Abridged Period Life Table

Age Interval (Col 1) An abridged life table usually has 19 or 20 age intervals (depending on whether the oldest age group is 85+ or 90+).

Age Group (Col 2) These are the actual ages (in complete years) included in each interval.

M_x (Col 3) This is the age-specific mortality rate—obtained from mortality and population data.

l_x (Col 4) The stationary cohort population at the beginning of each age interval. Most begin with 100,000 at age 0.

q_x (Col 5) The conditional probability that an individual entering the interval will die in that interval, based on Chiang's method (see below). This is a crucial part of the life table and is based on the number of years in the interval and assumptions about when in the interval individuals will die. See http://www.cehip.org for exact formula.

d_x (Col 6) Number of deaths in the interval ($d_x = q_x \times l_x$).

L_x (Col 7) Number of years lived in the interval. Based on the number of years in the interval, the number entering the interval, and the proportion of the interval lived by those who died in the interval (based on Chiang—see references below).

T_x (Col 8) Total number of years lived beyond the beginning of the age interval.

e_x (Col 9) Life expectancy at the beginning of the interval ($e_x = T_x / l_x$).

$mHUI_x$ (Col 10) Mean Health Utility Index scores for the age interval. Based on OHS survey data.

L'_x (Col 11) The number of years lived in the interval, weighted by health status ($L'_x = L_x \times mHUI_x$).

T'_x (Col 12) Adjusted number of years lived in the interval.

e'_x (Col 13) Health-adjusted life expectancy (HALE).

For more information, see: Chiang CL. The Life Table and its Applications. Malabar (FL): Robert E Krieger Publ Co, 1984. Manuel DG, Goel V, Williams JI. The derivation of life expectancy at the local level. *Chronic Dis Can* 1998;19(2):52-6.
Central East Information Partnership website: http://www.cehip.org

Exhibit TS4: Life Table Example 2: Use of Abridged Life Table to Calculate Cause-deleted Life and Health-adjusted Life Expectancy for Ontario Females, 1996/97 Cause 1 (Heart Disease) Deleted

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14	Col. 15
Age Interval	Age Group (yrs)	M_x	$Mc1$	M_{cdx}	l_{cdx}	q_{cdx}	d_{cdx}	L_{cdx}	T_{cdx}	e_{cdx}	$mHUI_{cdx}$	L'_{cdx}	T'_{cdx}	e'_{cdx} (HALE)
1	<1	0.004736	0.000036	0.004700						84.2	0.9746			76.1
2	1-4	0.000237	0.000012	0.000225						83.6	0.9746			75.5
3	5-9	0.000108	0.000004	0.000104						79.7	0.9857			71.7
4	10-14	0.000127	0.000008	0.000118						74.7	0.9506			66.8
5	15-19	0.000258	0.000007	0.000250						69.7	0.9487			62.1
6	20-24	0.000274	0.000004	0.000270						64.8	0.9460			57.4
7	25-29	0.000312	0.000013	0.000300						59.9	0.9498			52.7
8	30-34	0.000430	0.000021	0.000409						55.0	0.9456			48.1
9	35-39	0.000667	0.000044	0.000623						50.1	0.9377			43.4
10	40-44	0.001097	0.000073	0.001024						45.2	0.9248			38.9
11	45-49	0.001770	0.000126	0.001644						40.5	0.9069			34.4
12	50-54	0.002810	0.000302	0.002509						35.8	0.8957			30.2
13	55-59	0.004820	0.000669	0.004151						31.2	0.8723			26.0
14	60-64	0.007698	0.001296	0.006402						26.8	0.8786			22.2
15	65-69	0.012051	0.002351	0.009700						22.6	0.8806			18.4
16	70-74	0.019983	0.004774	0.015209						18.6	0.8616			14.8
17	75-79	0.033405	0.009250	0.024155						14.8	0.8416			11.5
18	80-84	0.060156	0.018376	0.041780						11.4	0.7866			8.5
19	85-90	0.104039	0.033415	0.070624						8.5	0.7380			6.1
20	90+	0.204658	0.067358	0.137300						6.0	0.6969			4.2

This example shows how cause-deleted life and health expectancies are calculated using the abridged period life table.

Components of the Abridged Period Life Table

Age Interval (Col 1) An abridged life table usually has 19 or 20 age intervals (depending on whether the oldest age group is 85+ or 90+).

Age Group (Col 2) These are the actual ages (in complete years) included in each interval.

M_x (Col 3) This is the overall age-specific mortality rate—obtained from mortality and population data.

$Mc1$ (Col 4) Is the age-specific mortality rate for heart disease.

M_{cdx} (Col 5) Is the overall age-specific mortality rate with heart-disease deleted ($M_{cdx} = M_x - M_{c1x}$).

l_{cdx} (Col 6) The stationary cohort population at the beginning of each age interval. Most begin with 100,000 at age 0.

q_{cdx} (Col 7) The conditional probability that an individual entering the interval will die in that interval, based on Chiang's method (see below). This is a crucial part of the life table and is based on the number of years in the interval and assumptions about when in the interval individuals will die. See http://www.cehip.org for exact formula.

d_{cdx} (Col 8) Number of deaths in the interval ($d_{cdx} = q_{cdx} \times l_{cdx}$).

L_{cdx} (Col 9) Number of years lived in the interval. Based on the number of years in the interval, the number entering the interval, and the proportion of the interval lived by those who died in the interval (based on Chiang—see references below).

T_{cdx} (Col 10) Total number of years lived beyond the beginning of the age interval.

e_{cdx} (Col 11) Life expectancy with heart disease deleted.

$mHUI_{cdx}$ (Col 12) The heart disease-deleted mean Health Utility Index (mHUIcdx) scores are calculated using the formulas contained elsewhere in this report.

L'_{cdx} (Col 13) The number of years lived in the interval, weighted by health status ($L'_x = L_x \times mHUI_x$).

T'_{cdx} (Col 14) Adjusted number of years lived in the interval.

e'_{cdx} (Col 15) Health-adjusted life expectancy (HALE) with heart disease deleted.

For more information, see: Chiang CL. The Life Table and its Applications. Malabar (FL): Robert E Krieger Publ Co, 1984. Manuel DG, Goel V, Williams JI. The derivation of life expectancy at the local level. *Chronic Dis Can* 1998;19(2):52-6.
Central East Information Partnership website: http://www.cehip.org

Appendix A: Measures of Health Expectancy by Health Planning Region and District Health Council in Ontario, 1990 and 1996/97

District Health Council	Life Expectancy (years)				Health-adjusted Life Expectancy (years)				Disability-free Life Expectancy (years)	
	1990	95% Confidence Interval	1996/97	95% Confidence Interval	1990	95% Confidence Interval	1996/97	95% Confidence Interval	1996/97	95% Confidence Interval
South West Planning Region										
• Essex, Kent and Lambton	77.1	77.0-77.3	77.8	77.7-78.0	70.9	70.5-71.2	71.2	70.8-71.5	68.2	67.4-69.0
• Grey, Bruce, Huron, Perth	77.6	77.4-77.8	78.1	77.9-78.4	71.1	70.7-71.5	72.2	71.7-72.6	68.8	67.8-69.9
• Thames Valley	77.4	77.3-77.6	78.2	78.0-78.4	70.9	70.5-71.3	71.8	71.3-72.2	69.3	68.2-70.4
Region	**77.3**	**77.2-77.5**	**78.0**	**77.9-78.1**	**70.9**	**70.7-71.2**	**71.7**	**71.4-71.9**	**68.8**	**68.2-69.3**
Central South Planning Region										
• Grand River	77.0	76.8-77.3	77.7	77.5-78.0	70.8	70.4-71.1	71.3	70.8-71.8	67.5	66.3-68.6
• Hamilton-Wentworth	77.2	77.0-77.4	78.2	78.0-78.4	70.4	69.8-70.9	71.6	71.1-72.0	68.8	67.7-69.9
• Niagara Region	77.7	77.5-77.9	78.5	78.3-78.7	70.7	70.2-71.2	71.8	71.3-72.3	68.4	67.2-69.5
Region	**77.3**	**77.2-77.5**	**78.2**	**78.1-78.3**	**70.6**	**70.3-70.9**	**71.6**	**71.3-71.9**	**68.4**	**67.8-69.1**
Central West Planning Region										
• Halton-Peel	79.2	79.0-79.3	80.3	80.2-80.4	73.1	72.7-73.6	73.8	73.4-74.2	72.4	71.7-73.2
• Waterloo Region-Wellington-Dufferin	78.1	78.0-78.3	79.0	78.9-79.2	70.8	70.4-71.2	72.9	72.5-73.2	70.8	70.0-71.5
Region	**78.8**	**78.6-78.9**	**79.8**	**79.7-79.9**	**72.2**	**71.9-72.5**	**73.4**	**73.1-73.7**	**71.9**	**71.3-72.4**
Toronto Planning Region										
• Toronto	78.3	78.2-78.4	79.5	79.5-79.6	72.0	71.7-72.3	72.9	72.6-73.2	71.9	71.2-72.5
Region	**78.3**	**78.2-78.4**	**79.5**	**79.5-79.6**	**72.0**	**71.7-72.3**	**72.9**	**72.6-73.2**	**71.9**	**71.2-72.5**
Central East Planning Region										
• Durham, Haliburton, Kawartha and Pine Ridge	77.8	77.7-78.0	78.7	78.6-78.8	71.2	70.8-71.5	72.2	71.9-72.6	69.2	68.4-70.0
• Simcoe-York	78.3	78.1-78.4	79.7	79.6-79.9	72.0	71.7-72.4	73.6	73.3-73.9	71.2	70.4-71.9
Region	**78.1**	**78.0-78.2**	**79.2**	**79.2-79.3**	**71.6**	**71.4-71.9**	**73.0**	**72.7-73.2**	**70.3**	**69.8-70.9**
East Planning Region										
• Champlain	77.8	77.7-77.9	79.3	79.1-79.4	71.6	71.2-72.0	72.9	72.6-73.2	70.7	70.0-71.4
• Quinte, Kingston, Rideau Valley	76.7	76.5-76.9	77.4	77.2-77.6	70.0	69.5-70.4	71.0	70.6-71.3	67.7	66.7-68.7
Region	**77.4**	**77.3-77.5**	**78.6**	**78.5-78.7**	**70.7**	**70.4-71.0**	**72.2**	**72.0-72.4**	**69.7**	**69.1-70.3**
North Planning Region										
• Algoma, Cochrane, Manitoulin, Sudbury	75.6	75.4-75.8	76.7	76.5-76.9	69.5	68.3-69.8	69.4	69.0-69.8	66.4	65.6-67.3
• Muskoka, Nipissing, Parry Sound and Timiskaming	76.5	76.2-76.7	76.8	76.5-77.1	68.8	68.3-69.2	70.1	69.5-70.6	66.7	65.6-67.9
• Northwestern Ontario	75.7	75.4-76.0	76.3	76.1-76.6	68.5	68.1-69.0	69.0	68.2-69.8	67.8	66.7-68.9
Region	**75.9**	**75.7-76.0**	**76.6**	**76.5-76.7**	**68.6**	**68.3-68.8**	**69.5**	**69.2-69.8**	**66.8**	**66.3-67.4**
Overall Ontario										
Total	**77.7**	**77.7-77.8**	**78.8**	**78.7-78.8**	**71.2**	**71.1-71.3**	**72.3**	**72.2-72.4**	**70.1**	**69.9-70.3**

Data Source: Office of the Registar General; Statistics Canada; 1996/97 Ontario Health Survey; 1990 Ontario Health Survey

Appendix B: Measures of Mortality by Health Planning Region and District Health Council in Ontario, 1990 and 1996/97

District Health Council	Population		Total Deaths		Crude Death Rate Per 100,000 Population	
	Population 1990	Population 1996/97	Number of Deaths 1990	Number of Deaths 1996/97	Rate 1990	Rate 1996/97
South West Planning Region						
• Essex, Kent and Lambton	584,280	610,025	4,668	5,048	799	828
• Grey, Bruce, Huron, Perth	283,380	293,975	2,557	2,806	902	954
• Thames Valley	553,430	587,140	4,213	4,591	761	782
Region	**1,421,090**	**1,491,140**	**11,437**	**12,444**	**805**	**835**
Central South Planning Region						
• Grand River	219,280	230,415	1,809	2,019	825	876
• Hamilton-Wentworth	465,790	484,105	3,702	3,964	795	819
• Niagara Region	403,640	416,455	3,332	3,722	826	894
Region	**1,088,710**	**1,130,975**	**8,843**	**9,705**	**812**	**858**
Central West Planning Region						
• Halton-Peel	1,058,710	1,253,305	4,366	5,463	412	436
• Waterloo Region-Wellington-Dufferin	588,810	648,400	3,674	4,201	624	648
Region	**1,647,530**	**1,901,705**	**8,040**	**9,664**	**488**	**508**
Toronto Planning Region						
• Toronto	2,380,040	2,477,490	16,651	17,351	700	700
Region	**2,380,040**	**2,477,490**	**16,651**	**17,351**	**700**	**700**
Central East Planning Region						
• Durham, Haliburton, Kawartha and Pine Ridge	690,790	775,825	4,555	5,422	659	699
• Simcoe-York	791,730	968,140	4,290	5,232	542	540
Region	**1,482,520**	**1,743,965**	**8,846**	**10,653**	**597**	**611**
East Planning Region						
• Champlain	962,720	1,038,840	6,408	6,884	666	663
• Quinte, Kingston, Rideau Valley	460,170	491,020	4,042	4,607	878	938
Region	**1,422,890**	**1,529,860**	**10,450**	**11,491**	**734**	**751**
North Planning Region						
• Algoma, Cochrane, Manitoulin, Sudbury	435,690	434,040	3,077	3,404	706	784
• Muskoka, Nipissing, Parry Sound and Timiskaming	214,170	218,645	1,890	2,120	882	970
• Northwestern Ontario	249,930	254,115	1,876	2,023	751	796
Region	**899,790**	**906,800**	**6,843**	**7,546**	**761**	**832**
Overall Ontario						
• Women	5,230,700	5,671,715	33,713	38,491	645	679
• Men	5,111,870	5,510,220	37,398	40,362	732	733
Total	**10,342,570**	**11,181,935**	**71,110**	**78,853**	**688**	**705**

Data Source: Office of the Registar General; Statistics Canada

Appendix C: Measures of Mortality by Health Planning Region and District Health Council in Ontario, 1990 and 1996/97

District Health Council	Age Standarized Mortality Rate, Per 100,000 Population (all cause, all ages)*				Age Standarized Mortality Rate, Per 100,000 Population (all cause, age 0-64 years)*			
	1990	95% Confidence Interval	1996/97	95% Confidence Interval	1990	95% Confidence Interval	1996/97	95% Confidence Interval
South West Planning Region								
• Essex, Kent and Lambton	790	767-812	760	739-781	215	203-228	195	183-207
• Grey, Bruce, Huron, Perth	749	720-778	729	702-756	212	193-230	187	175-199
• Thames Valley	774	751-798	736	715-757	211	198-224	191	175-208
Region	**774**	**760-788**	**743**	**730-757**	**213**	**205-221**	**191**	**184-199**
Central South Planning Region								
• Grand River	789	752-825	775	741-809	221	200-242	195	175-214
• Hamilton-Wentworth	782	757-807	737	714-760	219	205-234	194	181-208
• Niagara Region	756	730-782	724	700-747	206	191-220	185	171-199
Region	**774**	**757-790**	**740**	**725-754**	**214**	**205-224**	**191**	**182-199**
Central West Planning Region								
• Halton-Peel	684	663-705	623	607-640	159	151-168	141	134-148
• Waterloo Region-Wellington-Dufferin	734	710-758	702	681-724	186	174-198	162	151-172
Region	**704**	**689-720**	**655**	**642-668**	**169**	**162-176**	**148**	**142-154**
Toronto Planning Region								
• Toronto	713	702-724	651	641-660	204	198-210	175	169-180
Region	**713**	**702-724**	**651**	**641-660**	**204**	**198-210**	**175**	**169-180**
Central East Planning Region								
• Durham, Haliburton, Kawartha and Pine Ridge	748	726-770	712	693-730	197	186-209	169	159-179
• Simcoe-York	727	705-749	652	634-670	177	167-187	147	139-155
Region	**737**	**722-753**	**681**	**668-694**	**186**	**179-194**	**157**	**150-163**
East Planning Region								
• Champlain	746	728-764	673	657-689	208	198-218	167	159-175
• Quinte, Kingston, Rideau Valley	800	775-825	783	760-806	239	224-254	201	188-214
Region	**765**	**750-780**	**713**	**700-726**	**218**	**210-227**	**178**	**171-185**
North Planning Region								
• Algoma, Cochrane, Manitoulin, Sudbury	868	837-900	818	790-845	262	246-279	225	211-240
• Muskoka, Nipissing, Parry Sound and Timiskaming	820	783-857	807	773-842	236	214-257	223	203-244
• Northwestern Ontario	842	803-880	814	778-850	259	237-280	239	219-260
Region	**847**	**827-868**	**814**	**796-832**	**255**	**244-266**	**229**	**219-239**
Overall Ontario								
• Women	701	693-708	674	668-681	150	146-153	133	129-136
• Men	799	791-808	727	720-735	259	254-264	219	215-223
Total	**749**	**744-755**	**701**	**696-705**	**205**	**202-208**	**176**	**173-179**

Notes:

* standardized to Ontario 1996 population

Data Source: Office of the Registar General; Statistics Canada

Appendix D: Measures of Health-related Quality of Life by Health Planning Region and District Health Council in Ontario, 1990 and 1996/97

District Health Council	Per cent with mean HUI = > .95*				% Self-rated Health = > Good*	
	1990	95% Confidence Interval	1996/97	95% Confidence Interval	1996/97	95% Confidence Interval
South West Planning Region						
• Essex, Kent and Lambton	70.1	68.3-71.8	69.1	67.2-71.0	87.9	86.7-89.2
• Grey, Bruce, Huron, Perth	69.4	67.7-71.2	72.2	69.9-74.6	90.7	89.2-92.2
• Thames Valley	66.9	64.7-69.1	69.2	66.6-71.8	90.8	89.3-92.3
Region	**68.7**	**67.5-69.9**	**69.9**	**68.5-71.2**	**89.6**	**88.8-90.5**
Central South Planning Region						
• Grand River	66.5	64.5-68.6	70.0	67.7-72.3	88.9	87.3-90.4
• Hamilton-Wentworth	68.5	65.7-71.3	68.8	66.4-71.1	89.6	88.0-91.2
• Niagara Region	65.5	62.9-68.0	68.9	66.3-71.5	89.2	87.5-90.9
Region	**67.0**	**65.4-68.6**	**68.9**	**67.4-70.4**	**89.4**	**88.5-90.4**
Central West Planning Region						
• Halton-Peel	71.5	69.2-73.9	73.4	71.5-75.3	91.2	90.0-92.5
• Waterloo Region-Wellington-Dufferin	62.7	60.7-64.6	71.7	69.9-73.6	91.2	90.1-92.3
Region	**68.2**	**66.5-69.9**	**72.7**	**71.3-74.0**	**91.2**	**90.4-92.1**
Toronto Planning Region						
• Toronto	70.1	68.5-71.8	70.5	68.9-72.2	89.5	88.5-90.5
Region	**70.1**	**68.5-71.8**	**70.5**	**68.9-72.2**	**89.5**	**88.5-90.5**
Central East Planning Region						
• Durham, Haliburton, Kawartha and Pine Ridge	66.8	64.8-68.9	70.1	68.3-71.9	90.0	88.9-91.1
• Simcoe-York	70.1	68.5-71.8	73.3	71.6-75.0	91.2	90.1-92.3
Region	**68.5**	**66.9-70.2**	**71.9**	**70.7-73.1**	**90.7**	**89.9-91.5**
East Planning Region						
• Champlain	70.4	67.9-72.9	70.3	68.6-72.1	90.3	89.3-91.4
• Quinte, Kingston, Rideau Valley	65.6	63.3-68.0	69.6	67.3-71.8	88.7	87.2-90.2
Region	**66.2**	**64.5-67.9**	**70.1**	**68.6-71.5**	**89.9**	**89.0-90.7**
North Planning Region						
• Algoma, Cochrane, Manitoulin, Sudbury	67.4	65.6-69.2	65.7	63.9-67.5	86.1	84.1-87.4
• Muskoka, Nipissing, Parry Sound and Timiskaming	61.4	59.4-63.4	66.5	63.7-69.2	88.3	86.5-90.0
• Northwestern Ontario	64.1	62.1-66.0	64.9	62.3-67.6	87.6	85.7-89.5
Region	**62.1**	**60.9-63.4**	**65.7**	**64.4-67.0**	**87.2**	**86.3-88.0**
Overall Ontario						
• Women	66.7	65.8-67.6	68.6	67.7-69.4	89.1	88.6-89.6
• Men	69.1	68.2-70.0	72.3	71.5-73.1	90.6	90.1-91.1
Total	**67.8**	**67.2-68.5**	**70.4**	**69.8-71.0**	**89.8**	**89.5-90.2**

Notes:

* all measures age (sex-specific estimates) or age-sex (overall, regional and DHC estimates) standardized to Ontario 1996 population

Data Source: 1990 Ontario Health Survey; 1996/97 Ontario Health Survey

Appendix E: Measures of Health-related Quality of Life by Health Planning Region and District Health Council in Ontario, 1996/97*

District Health Council	Need Assistance with Instrumental (IADL) and Basic (ADL) Activities of Daily Living %				Prevalence of Long Term Disability (%)		Prevalence of Activity Restrictions (%)	
	ADL	95% Confidence Interval	IADL	95% Confidence Interval	1996/97	95% Confidence Interval	1996/97	95% Confidence Interval
South West Planning Region								
• Essex, Kent and Lambton	3.0	2.3-3.7	10.2	9.0-11.3	12.0	10.7-13.3	13.4	12.1-14.8
• Grey, Bruce, Huron, Perth	2.5	1.8-3.3	9.7	8.2-11.2	10.9	9.2-12.6	12.8	11.0-14.5
• Thames Valley	2.2	1.5-3.0	9.4	8.0-10.9	10.4	8.8-12.0	11.8	10.2-13.4
Region	**2.6**	**2.2-3.1**	**9.8**	**9.0-10.6**	**11.1**	**10.3-12.0**	**12.6**	**11.7-13.5**
Central South Planning Region								
• Grand River	2.5	1.7-3.4	11.1	9.6-12.7	12.6	10.9-14.3	14.0	12.3-15.8
• Hamilton-Wentworth	1.6	0.9-2.3	8.0	6.8-9.2	10.8	9.3-12.3	12.1	10.5-13.7
• Niagara Region	2.6	1.8-3.5	11.1	9.4-12.8	12.0	10.3-13.6	13.3	11.5-15.1
Region	**2.2**	**1.8-2.7**	**10.0**	**9.1-10.9**	**11.7**	**10.7-12.7**	**13.1**	**12.0-14.1**
Central West Planning Region								
• Halton-Peel	2.3	1.7-2.9	7.3	6.2-8.3	7.9	6.7-9.0	10.2	9.0-11.5
• Waterloo Region-Wellington-Dufferin	2.1	1.5-2.6	8.9	7.8-10.0	9.2	8.0-10.4	11.7	10.4-12.9
Region	**2.2**	**1.8-2.7**	**7.9**	**7.1-8.6**	**8.3**	**7.5-9.2**	**10.8**	**9.9-11.7**
Toronto Planning Region								
• Toronto	1.9	1.4-2.4	7.3	6.5-8.1	7.3	6.4-8.2	9.2	8.2-10.2
Region	**1.9**	**1.4-2.4**	**7.3**	**6.5-8.1**	**7.3**	**6.4-8.2**	**9.2**	**8.2-10.2**
Central East Planning Region								
• Durham, Haliburton, Kawartha and Pine Ridge	2.5	1.9-3.1	10.8	9.7-11.9	11.5	10.3-12.7	13.1	11.9-14.3
• Simcoe-York	2.1	1.5-2.6	8.4	7.4-9.4	9.4	8.2-10.5	11.0	9.8-12.2
Region	**2.3**	**1.9-2.7**	**9.5**	**8.7-10.2**	**10.2**	**9.5-11.0**	**11.9**	**11.0-12.7**
East Planning Region								
• Champlain	2.1	1.6-2.6	9.2	8.3-10.1	9.4	8.4-10.3	11.9	10.9-13.0
• Quinte, Kingston, Rideau Valley	1.7	1.1-2.2	9.6	8.3-10.8	12.2	10.7-13.8	14.2	12.6-15.8
Region	**1.9**	**1.5-2.2**	**9.3**	**8.6-10.0**	**10.2**	**9.3-11.0**	**12.7**	**11.8-13.6**
North Planning Region								
• Algoma, Cochrane, Manitoulin, Sudbury	2.3	1.7-3.0	11.8	10.6-13.0	12.7	11.5-14.0	14.6	13.2-16.0
• Muskoka, Nipissing, Parry Sound and Timiskaming	3.1	2.2-3.9	10.9	9.2-12.6	12.9	11.1-14.7	14.1	12.2-15.9
• Northwestern Ontario	2.4	1.5-3.3	9.6	8.0-11.2	11.2	9.5-12.8	13.2	11.4-15.1
Region	**2.6**	**2.1-3.0**	**11.0**	**10.2-11.8**	**12.3**	**11.4-13.2**	**14.1**	**13.2-15.0**
Overall Ontario								
• Women	2.6	2.3-2.9	11.2	10.7-11.7	10.2	9.7-10.7	12.8	12.3-13.4
• Men	1.8	1.6-2.0	6.6	6.2-7.0	9.2	8.8-9.7	10.4	9.9-10.9
Total	**2.2**	**2.0-2.4**	**8.9**	**8.6-9.2**	**9.7**	**9.4-10.1**	**11.6**	**11.3-12.0**

Notes: * all measures age (sex-specific estimates) or age-sex (overall, regional and DHC estimates) standardized to Ontario 1996 population

Data Source: 1996/97 Ontario Health Survey

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