

## **Quality of Life Data and Mapping Notes**

The following document is organized into four sections to provide additional information on the theory behind the Atlas of Canada geographical model of QOL, the methodology, and the rationale for the selection of indicators.

### **Theoretical Background**

The theoretical framework behind the Atlas of Canada quality of life model is found in the paper: Quality of Life in Saskatoon 1991 and 1996: A Geographical Perspective.

### **The Atlas of Canada QOL Model**

The Atlas of Canada quality of life model (Figure 1) was developed based on other geographic quality of life models. Indicators were collected to measure individual domains or aspects of life. These domains are further categorized into three environments: physical environment, social environment and economic environment. The physical environment represents the environment in which people live, whereas the social and economic environments represent those in which people engage in, and benefit from, social and economic activity, respectively.

	Domain	Indicators
<b>Map 1</b>	<b>Physical Environment</b>	<b>Environment Quality</b> <ul style="list-style-type: none"> <li>▶ Density of dwellings requiring major repairs (inverse)</li> <li>▶ Air quality: measured as total particulate matter emissions (inverse)</li> </ul>
		<b>Personal Security</b> <ul style="list-style-type: none"> <li>▶ Incidence of personal crime (percentage; inverse)</li> <li>▶ Incidence of property crime (percentage; inverse)</li> </ul>
		<b>Housing</b> <ul style="list-style-type: none"> <li>▶ Percentage of population living in housing requiring major repairs (inverse)</li> <li>▶ Average number of persons per room (inverse)</li> <li>▶ Percentage of household incomes with owner's major payments (or gross rent) for shelter being greater than or equal to 30 per cent of household income (inverse)</li> </ul>
		<b>Accessibility to Services</b> <ul style="list-style-type: none"> <li>▶ Distance from centre of census subdivision to nearest hospital (inverse)</li> </ul>
<b>Map 2</b>	<b>Social Environment</b>	<b>Leisure and Recreation</b> <ul style="list-style-type: none"> <li>▶ Number of leisure-related commercial activities per thousand people (direct)</li> <li>▶ Number of libraries per thousand people (direct)</li> </ul>
		<b>Social Opportunity and Mobility</b> <ul style="list-style-type: none"> <li>▶ Ratio of female median income to male median income (direct)</li> <li>▶ Male participation rate in workforce (direct)</li> <li>▶ Female participation rate in workforce (direct)</li> </ul>
		<b>Participation in Democratic Process</b> <ul style="list-style-type: none"> <li>▶ Percentage of the population that participated in the 1997 federal elections (direct)</li> </ul>
		<b>Social Stability</b> <ul style="list-style-type: none"> <li>▶ Ratio of percentage of population living in owned housing to percentage of population living in rental housing (direct)</li> <li>▶ Percentage of population living at the same address they lived at five years earlier (direct)</li> <li>▶ Percentage of population who were living at a different address than the one they lived at five years earlier (inverse)</li> </ul>
		<b>Education</b> <ul style="list-style-type: none"> <li>▶ Ratio of percentage of population with trade/college or university education to percentage of population less than Grade 9 education (direct)</li> </ul>
		<b>Access to Health Services</b> <ul style="list-style-type: none"> <li>▶ Number of physician specialists per thousand people (direct)</li> <li>▶ Number of family physicians per thousand people (direct)</li> </ul>
		<b>Health Status</b> <ul style="list-style-type: none"> <li>▶ Incidence of low birth weight per thousand people (inverse)</li> <li>▶ Incidence of breast cancer per thousand people (inverse)</li> </ul>
<b>Map 3</b>	<b>Economic Environment</b>	<b>Household Finances</b> <ul style="list-style-type: none"> <li>▶ Average owner's major payments (inverse)</li> <li>▶ Percentage of income from government transfer payments (inverse)</li> <li>▶ Ratio of households in lowest income category to those in highest income category (inverse)</li> <li>▶ Percentage incidence of low income families (inverse)</li> </ul>
		<b>Employment/Paid Work</b> <ul style="list-style-type: none"> <li>▶ Unemployment rate (inverse)</li> <li>▶ Ratio of individuals working part year, part time to individuals working full year, full time (inverse)</li> <li>▶ Average employment income (direct)</li> </ul>

**Figure 1.** The Atlas of Canada Quality of Life Model

## Indicators

To measure each domain, several indicators have been selected to best represent that aspect of quality of life. Each indicator has been assigned a direction, either inverse or direct. An inverse relationship to quality of life implies that a high value of this indicator has a negative influence on quality of life. A direct relationship implies that a high value of this indicator has a positive influence on quality of life.

### The Atlas of Canada Quality of Life Indicators

The Atlas of Canada quality of life indicators described in this section have been selected in consultation with various experts in social indicators research under the direction of an advisory committee. Refer to Table 1 for the list of participants consulted in the making of this series of maps.

**Table 1:** Organizations and Individuals Consulted

Individual Consulted	Organization
Heather Clemenson, Manager, Rural Research and Analysis	Rural Secretariat, Agriculture and Agri-Food Canada
Sally Thornton, Director, Accountability Implementation	Health Canada
George Hack, Senior Analyst	Treasury Board of Canada Secretariat
Mike Ornstein, Director	Institute for Social Research, York University
John Engeland, Senior Researcher, Housing Finance and Affordability	Canada Mortgage and Housing Corporation
Joel DeBlock, Consultant	Building Understanding and Success
Mark Anielski, Green Economics Program Director	Pembina Institute for Appropriate Development
Andrew Jackson, Research Director	Canadian Council on Social Development
Ted Hildebrandt, Senior Planner	Halton Social Planning Council
Mark Winfield, Special Advisor, Organizational Strategies	Environmental Governance, Pembina Institute for Appropriate Development
Dr. Dave Bennett, Associate Professor	Department of Geography, Carleton University
Sandra Zagon, Quality of Life Project Manager	Canadian Policy and Research Network
Stephanie Jackson, Senior Policy Advisor	Health Canada
Marni Capp, Senior Policy Advisor	Federation of Canadian Municipalities
Andrew Sharpe, Executive Director	Centre for the Study of Living Standards
Henry Puderer, Chief, Geographic Areas Section	Statistics Canada
Dr. Jim Simmons	Centre for Commercial Activity, Ryerson University

The quality of life indicators have been classified according to the environment that they represent, and further divided into the domains they measure. Each indicator has been defined and a rationale given for its direction (specifically, whether it has a direct or inverse relation to quality of life).

## **Physical Environment**

The physical environment represents the external conditions under which people live, including aspects of service provision and external environmental conditions relating to housing, environmental quality and personal security.

### **Housing**

Housing is one of the basic needs for well-being. Poor quality of housing may have adverse effects on health and well-being.

#### Indicators

- Percentage of population living in housing requiring major repairs (inverse)
- Average number of persons per room (inverse)
- Percentage of household incomes with owner's major payments (or gross rent) for shelter being greater than or equal to 30 per cent of household income (inverse)

#### Rationale

Housing is one of the basic needs of all individuals, and the standard of housing impacts on physical health and well-being. Housing requiring major repairs inversely affects housing quality, while a high number of people per room inversely affects liveability. The third indicator measures affordability: a higher percentage of household income spent on rent or a mortgage impacts inversely on affordability.

Data source: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada.

### **Accessibility to Services**

Access to services affects well-being, social participation, education, health and employment.

#### Indicators

- Distance from centre of census subdivision to nearest hospital (inverse)

### Rationale

Accessibility is important to quality of life, as it creates the potential to take advantage of opportunities for upward social mobility, and to access health services, goods and services within the community.

Data source: Canadian Institute of Health Information. 1996. Special Tabulation. Ottawa: Canadian Institute of Health Information.

### Environmental Quality

The quality of the physical environment has effects on well-being, social participation and health.

#### Indicators

- Density of dwellings requiring major repairs per square kilometres (inverse)
- Air quality: measured as total particulate matter emissions (inverse)

### Rationale

Populations with high spatial concentrations (or densities (for example, the density of dwellings requiring major repairs) inversely influence quality of life, in terms of social behaviour and health, since they 1) inversely impact on the landscape, interfering with the ability to enjoy and appreciate the environment; and 2) result in concentrations of poor housing conditions, thus inversely impacting upon the environment and health. High levels of air pollution may severely impact health.

Data sources: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada. Environment Canada. 1995. Criteria Air Contaminant Emissions. Ottawa: Environment Canada, Pollution Data Branch.

### Personal Security

The quality of the physical environment has effects on well-being, social participation and health.

#### Indicators

- Incidence of personal crime (percentage; inverse)
- Incidence of property crime (percentage; inverse)

## Rationale

High crime rates inversely influence quality of life, since they have severe effects on social order and on well-being. They also may indicate social alienation.

Data source: Statistics Canada. 1996. Canadian Centre for Justice Statistics. Ottawa: Statistics Canada.

## Social Environment

The social environment represents the external conditions under which people engage in social activity within their community.

### Social Opportunity and Mobility

The degree of social opportunity affects participation in democratic processes, which invokes a sense of contribution and belonging

#### Indicators

- Ratio of female median income to male median income (direct)
- Male participation rate in workforce (direct)
- Female participation rate in workforce (direct)

#### Rationale

Social opportunity directly influences quality of life, as it creates an environment where opportunities are possible. This is important for social change (or upward mobility) and for individual well-being and self-esteem. Use of participation rates in the work force is based on the assumption that the greater the rates of labour force participation, the greater the social opportunity.

Median income comparisons show social inequality in terms of the opportunity of women to participate in society, based on income earned for their participation in the workforce. Higher values indicate less social inequality between males and females.

Data source: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada.

## Leisure and Recreation

Leisure and recreational activities affect overall well-being and can have a direct bearing on health.

### Indicators

- Percentage of population with access to leisure-related commercial activities (direct)\*
- Percentage of population with access to libraries (direct)\*\*

### Rationale

Opportunity for and access to leisure and recreational activities directly influences quality of life, since they are necessary for individual health and well-being.

Data sources: Micromedia. 2003. Electronic Libraries in Canada Mailing List, 1996. Toronto: Micromedia. Statistics Canada. 1996 Business Registry. Special Tabulation. Ottawa: Statistics Canada.

\*Includes all restaurants, bars, hotels, motels and other recreation facilities (for example, campgrounds, sport complexes) from Statistics Canada's 1996 Business Registry.

\*\* Includes all public libraries and other libraries (including branches, university libraries, archives and government libraries) across Canada; does not, however, include libraries located in public schools.

### **Participation in the Democratic Process**

Voter participation in democratic processes invokes a sense of contribution and belonging.

### Indicators

- Percentage of the population that participated in the 1997 federal elections (direct)

### Rationale

Participation in democratic processes directly impacts on quality of life, since it indicates strong involvement in the democratic process (or sense of social belonging), as opposed to a low participation rate, which may be a sign of alienation from the democratic process.

Data source: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada.

### **Education**

Education is important for social mobility, participation and employment opportunity.

### Indicators

- Ratio of percentage of population with trade/college or university education to percentage of population less than Grade 9 education (direct)

### Rationale

High educational attainment level directly impacts quality of life, since it is closely linked to the ability to take advantage of employment opportunities and for social mobility.

Data source: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada.

### **Social Stability**

Stability is important for overall well-being and can be affected by adverse changes in the social environment.

### Indicators

- Ratio of percentage of population living in owned housing to percentage of population living in rental housing (direct)
- Percentage of population living at the same address they lived at five years earlier ('non-movers'; direct)
- Percentage of population who were living at a different address than the one they lived at five years earlier ('movers'; inverse)

### Rationale

Lack of social stability inversely influences quality of life, because it suggests a possible breakdown of the social order. Impacts on health and well-being may vary, but can potentially have detrimental long-lasting repercussions for society and the individual. Lower mobility (or change in residence) among the population through time implies greater social cohesion.

Data source: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada.

### **Access to Health Services**

Health resources make the production of health services possible.

### Indicators

- Number of physician specialists per thousand people (direct)
- Number of family physicians per thousand people (direct)

### Rationale

Access to health resources directly influences quality of life, as it directly impacts on quality of health care and the prolongation of life.

Data source: Canadian Institute of Health Information. Physician Data 1996. Ottawa: Canadian Institute of Health Information.

## Health Status

Health status refers to the state of health of a person, group or population.

### Indicators

- Incidence of low birth weight per thousand people (inverse)
- Incidence of breast cancer per thousand people (inverse)

### Rationale

The proportion of low-weight births is recognized as an important indicator of the health and well-being of a population, since there is a close relationship between low birth weight and infant mortality, and therefore an inverse influence on quality of life. High breast cancer rates relate to the distribution of risk conditions, which may suggest possible environmental factors that inversely influence quality of life.

Data source: Statistics Canada. 1996. Custom Tabulation. Ottawa: Statistics Canada.

## Economic Environment

The economic environment represents the environment in which people work, including aspects of economic status and finances.

### Household Finances

Household finances affect consumption and thereby impact on access to technology, travel and leisure.

### Indicators

- Average owner's major payments (inverse)

- Percentage of income from government transfer payments (inverse)
- Ratio of households in lowest income category to those in highest income category (inverse)
- Percentage incidence of low income families (inverse)

#### Rationale

The level of disposable income directly influences quality of life, as it may be a necessary condition in order to access such services as health, education and the basic necessities of life. Those households that spend a disproportionate amount on accommodation or receive a disproportionate amount of income through government transfer payments experience inverse impacts on quality of life, since they are less able to acquire a wide range of goods and services.

A high proportion of households with low incomes is an inverse influence on the purchasing of more basic needs, and may indicate a nonequitable distribution of access to goods and services among households.

Data source: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada.

#### **Employment/Paid Work**

Income from employment allows for the purchase of goods and services. Employment status may also affect esteem and well-being.

#### Indicators

- Unemployment rate (inverse)
- Ratio of individuals working part year, part time to individuals working full year, full time (inverse)
- Average employment income (direct)

#### Rationale

A high unemployment rate inversely impacts quality of life, since it may influence personal self-esteem, dignity and security; as well, have an impact on the purchasing of more basic needs. The greater the proportion of people working part year, part time relative to those working full-year, full time inversely influences quality of life, since it may indicate the lack of full-time employment opportunities. High average employment income directly influences quality of life, since it can indicate the ability of individuals to purchase a wider range of goods and services.

Data source: Statistics Canada. 1996 Census of Population. Ottawa: Statistics Canada.

## Methodology and Other Important Information

### Geographical Area

Statistics Canada census subdivisions are the geographic area used to map communities at the intra-urban scale, or between communities across Canada. Data not derived from the 1996 Statistics Canada census subdivision data have been geocoded (or referenced to the appropriate census subdivisions). Only census subdivisions with data for all the indicators have been mapped, and this number varies from map to map. Refer to the References and Links section for more information on the data sources for the individual indicators.

### Methodology

The standard score additive model has been used to map quality of life. This model uses z-scores to transform the data, which makes it possible to add and subtract the values of the indicators. For each census subdivision, the z-scores of the indicators used to assess quality of life were added (or subtracted) to calculate a total score for the economic, social and physical environments. For example, Table 2 shows a partial calculation of two indicators for the social environment for census subdivision A.

**Table 2.** Partial Calculation of Two Indicators for the Social Environment

Environment	Social Environment	Indicators
Domain	Participation	Health status
Selected indicator	Voter participation	Low birth weight
Indicator direction	direct (+)	inverse (-)
Census subdivision A	34%	10%
Z-score	-2.0	1.0

The (partial) Social Environment total score for Census Subdivision(A) =  $-2.0 - 1.0 = -3.0$

This methodology has several disadvantages, primarily because it assumes that quality of life can be determined by simple arithmetic. At the very least, however, the method is a useful starting point for a geographic description of quality of life at the intra-urban (census subdivision) level across Canada. Although there are alternative methods for mapping quality of life, this methodology is less complex and easier to understand than a more complex statistical procedure.

## Classification of Census Subdivisions (CSDs)

The census subdivisions were classified using a geographic classification called census metropolitan areas (CMAs) and census agglomerations (CAs) influenced zones, or MIZ. The MIZ classification was developed by Statistics Canada as a way of classifying census subdivisions on the basis of whether they are CMAs or CAs, and the degree to which the remaining census subdivisions are influenced by the CMA/CA. The classes are: strong MIZ, moderate MIZ, weak MIZ and no MIZ. For example, a census subdivision strongly influenced by a CMA/CA would be classified as a strong MIZ, whereas a census subdivision that was not greatly influenced would be classed as a weak MIZ. A rural area would be an example of a no MIZ census subdivision.

The five MIZ categories are further divided into north, north transition, south and south transition, based on their geographic location. This geographic classification was also used to further classify the census subdivisions. The CMA/CA MIZ class was further broken down into five population classes: 0 to 12 000, 12 001 to 50 000, 50 001 to 150 000, 150 001 to 330 000, and greater than 330 000 (Table 3).

**Table 3.0** Number of CSDs by CMA/CA, MIZ Categories and North/South Location, 1996 Census

Provinces and Territories	Census Subdivision 1996	Census Metropolitan Area and Census Agglomerations				
		Total	North	North Transition	South Transition	South
Newfoundland	381	32	2	0	17	13
Prince Edward Island	113	24	0	0	0	24
Nova Scotia	110	28	0	0	0	28
New Brunswick	283	66	0	0	0	66
Quebec	1599	312	0	0	50	262
Ontario	947	219	0	0	10	209
Manitoba	298	19	1	0	5	13
Saskatchewan	970	61	0	0	28	33
Alberta	467	94	13	12	54	15
British Columbia	713	188	0	2	36	150
Yukon Territory	35	5	0	5	0	0
Northwest Territories	68	1	1	0	0	0
Canada	5984	1049	17	19	200	813

**Source:** Rambeay, Sheila, and Kathleen Todd. 2000. Census Metropolitan Area and Census Agglomeration Influenced Zone (MIZ) with Census Data. Ottawa: Geography Division, Statistics Canada.

**Table 3.1** Number of CSDs by CMA/CA, MIZ Categories and North/South Location, 1996 Census

Provinces and Territories	Census Subdivision 1996	Strong Metropolitan Influence Zone				
		Total	North	North Transition	South Transition	South
Newfoundland	381	19	0	0	9	10
Prince Edward Island	113	29	0	0	0	29
Nova Scotia	110	3	0	0	0	3
New Brunswick	283	31	0	0	0	31
Quebec	1599	272	0	0	36	236
Ontario	947	196	0	0	4	192
Manitoba	298	17	0	0	9	8
Saskatchewan	970	54	0	0	24	30
Alberta	467	34	0	0	20	14
British Columbia	713	14	0	4	3	7
Yukon Territory	35	0	0	0	0	0
Northwest Territories	68	2	2	0	0	0
Canada	5984	671	2	4	105	560

**Source:** Rambeay, Sheila, and Kathleen Todd. 2000. Census Metropolitan Area and Census Agglomeration Influenced Zone (MIZ) with Census Data. Ottawa: Geography Division, Statistics Canada.

**Table 3.2** Number of CSDs by CMA/CA, MIZ Categories and North/South Location, 1996 Census

Provinces and Territories	Census Subdivision 1996	Moderate Metropolitan Influence Zone				
		Total	North	North Transition	South Transition	South
Newfoundland	381	153	2	3	57	91
Prince Edward Island	113	44	0	0	0	44
Nova Scotia	110	20	0	0	0	20
New Brunswick	283	93	0	0	0	93
Quebec	1599	588	0	6	83	499
Ontario	947	270	1	1	14	254
Manitoba	298	69	0	2	24	43
Saskatchewan	970	198	1	1	86	110
Alberta	467	79	0	6	28	45
British Columbia	713	58	0	3	10	45
Yukon Territory	35	1	0	1	0	0
Northwest Territories	68	0	0	0	0	0
Canada	5984	1573	4	23	302	1244

**Source:** Rambeay, Sheila, and Kathleen Todd. 2000. Census Metropolitan Area and Census Agglomeration Influenced Zone (MIZ) with Census Data. Ottawa: Geography Division, Statistics Canada.

**Table 3.3** Number of CSDs by CMA/CA, MIZ Categories and North/South Location, 1996 Census

Provinces and Territories	Census Subdivision 1996	Weak Metropolitan Influence Zone				
		Total	North	North Transition	South Transition	South
Newfoundland	381	73	5	8	22	38
Prince Edward Island	113	12	0	0	0	12
Nova Scotia	110	42	0	0	0	42
New Brunswick	283	66	0	0	0	66
Quebec	1599	190	14	10	44	122
Ontario	947	119	3	7	29	80
Manitoba	298	105	8	12	45	40
Saskatchewan	970	226	3	14	97	112
Alberta	467	128	0	24	44	60
British Columbia	713	96	3	12	25	56
Yukon Territory	35	12	5	7	0	0
Northwest Territories	68	27	27	0	0	0
Canada	5984	1096	68	94	306	628

**Source:** Rambeay, Sheila, and Kathleen Todd. 2000. Census Metropolitan Area and Census Agglomeration Influenced Zone (MIZ) with Census Data. Ottawa: Geography Division, Statistics Canada.

**Table 3.4** Number of CSDs by CMA/CA, MIZ Categories and North/South Location, 1996 Census

Provinces and Territories	Census Subdivision 1996	No Metropolitan Influence Zone				
		Total	North	North Transition	South Transition	South
Newfoundland	381	104	5	17	37	45
Prince Edward Island	113	4	0	0	0	4
Nova Scotia	110	17	0	0	0	17
New Brunswick	283	27	0	0	0	27
Quebec	1599	237	31	17	68	121
Ontario	947	143	21	14	44	64
Manitoba	298	88	18	16	29	25
Saskatchewan	970	431	7	41	131	252
Alberta	467	132	0	28	66	38
British Columbia	713	357	3	31	72	251
Yukon Territory	35	17	6	11	0	0
Northwest Territories	68	38	38	0	0	0
Canada	5984	1595	129	175	447	844

**Source:** Rambeay, Sheila, and Kathleen Todd. 2000. Census Metropolitan Area and Census Agglomeration Influenced Zone (MIZ) with Census Data. Ottawa: Geography Division, Statistics Canada.