

Summary of Products and Services

Provided by Warren Munroe

ANALYSIS

OF

POPULATION:

ESTIMATES AND PROJECTIONS

FOR

SELECTED CENSUS AREAS AND YEARS

2012

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Analysis of Population
SELECTED CENSUS AREA POPULATION ANALYSIS:
ESTIMATES AND PROJECTIONS

Population estimates and projections are referred to when considering opening or closing of public and private facilities, official community plans, as well as, transportation and electrical generations needs etc. This package provides an overview of the contents of a population analysis including methods and data, assumptions, considerations, as well as charts and tables and a discussion of results.

Methods and Data

These population analyses examine population estimates in order to develop population projections. Thirty to forty year population projections for a selected census area, whether a Census Division, Census Subdivision, or Aggregated Census Subdivisions, are based on Statistics Canada's Census counts from 1996, 2001, 2006, and 2011.¹

The Annual Demographics Estimates Compendium from the Demography Division of Statistics Canada, providing components of population change since 1986, to the Census Division level (adjusted for undercount), along with Vital Statistics² births and deaths 1996 to 2010, are also utilized to test population change coefficients³.

Referring to these datasets, coefficients are calculated in order to project the number of those under four years of age, as well as coefficients to calculate population changes due to net migration and death. These projections age the number of people per five year age groups by five years.⁴

The number of people under one to four years of age (0 to 4), are projected as a ratio of the number of females of reproductive age.⁵

The differences between the number of people aged five years from one census, to compare with the next census five years later, (1996 compared to 2001, 2001 with 2006, and 2006 with 2011) are used to calculate coefficients to project net migration and death.

For the ratio between males and females, the projection uses an average of ratios calculated using 1996 to 2011 census counts per five year age group.

¹ Census counts are not adjusted for undercount. Revisions at the Census Division level are planned for release in 2013. Error is usually estimated to be approximately 3 to 4%.

² In BC, Vital Statistics numbers are provided to the Local Health Area level; therefore, may not match census boundaries. However, BC Vital Statistics also provides data for municipalities, matching incorporated census subdivision areas.

³ The methods for projections may vary depending on quality (e.g. boundary changes or low population numbers) and access to estimates data.

⁴ For example 2016, 2021 ... 2041 etc. Five year age groups are used because single year of age for small populations is too spurious and is unduly impacted by random rounding imposed on the census outputs.

⁵ Determined by bivariate analysis of estimates by age, e.g., the number of females 20 to 34 years of age.

Assumptions

This projection is developed with reference to the recent historical estimates for a selected census area, as opposed to forecasting a Province/Territory's total population, then giving the selected area a reasoned portion. This projection can be considered to be a "ground up", rather than a "top down" approach.

For many areas with relatively small populations, a high proportion of those 15 to 19 years of age, move out by the next census year. Indeed, for many areas, more 20 to 29 year olds move out than in.

The population projection assumes that the absolute number of people whose age is 20 to 29⁶ will not drop below previous lows seen between 1996 to 2011; rather, the number of people whose age is 20 to 29 are assumed to stay at values between the high and low numbers for this age group between 1996 to 2011.

For many areas, if the model did not build in this parameter, the projection would drive down the number of 20 to 29 year olds to zero, impacting all other age groups. This age group is particularly important because it includes females of reproductive age. Charts can also be created removing this assumption highlighting the importance of this age group.

Therefore, this approach assumes the geographic region, and in particular, the selected census area, provides enough economic and social activity opportunities to sustain a minimum number of people in this age group for the duration of the projection.

All else is assumed to remain within recent (1996 to 2011) parameters; therefore, shocks (such as possible rapid changes in energy costs or environmental conditions) are not taken into consideration.

Considerations

Boundary changes since 1996 require additional consideration, and may reduce the scope of the analysis.

Statistics Canada qualifies the accuracy of the counts; for example, many areas have between 5 % to 10% error. Error for low populations is relatively high.

Projections can also be done to 2051, when the baby boom ages out of the population pyramid, and are recommended.

Alternative scenarios can be run taking into consideration variations in economic cycles, (booms and busts) as well as variations in the number of females of reproductive age. The numbers for this age group (particularly those 20 to 29) can be set to the average of, or to vary between, the numbers from 1996 to 2011. Inviting variation into the projection helps remove the impression conveyed by the resulting population pyramid, that the future will be smooth. Projections inviting variability are recommended.

Shocks, such as rapid changes in environmental conditions or energy costs, could be introduced into the projection to see the results, but are to be considered separately.

Also variations in factors that influence migration, such as transportation can be introduced.

⁶ Or other age group to be determined with analysis of estimates.

For coastal areas dependent on ferry services, changes in costs and or service would impact the projection.⁷

Results

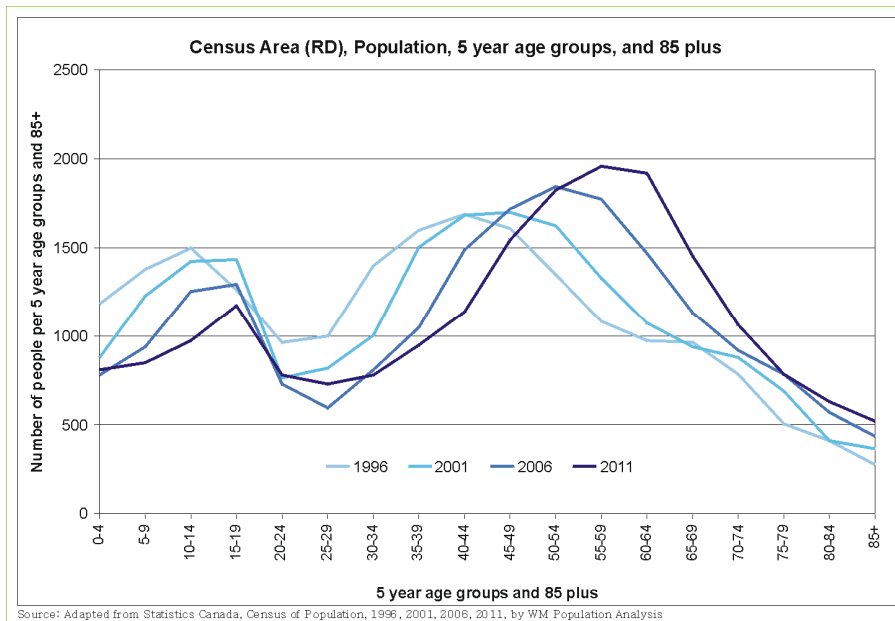
This section describes the population analysis findings referring to topics such as factors influencing migration by broad age groups and sex, including families, fertility, changes to age distributions, males / females ratios, dependency ratios⁸, care for children and elders, aging, change in number of people of working age, deaths and births, etc. Results also include the following types of charts and table:

List of Charts and Tables provided with Population Analysis,

POPULATION ANALYSIS of ESTIMATES

Part A: Age Distribution

Figure 1: Age Distribution by 5 year age groups, 1996, 2001, 2006, 2011



⁷ Transportation changes can help explain migration changes. For Coastal Regions, changes in ferry fees are important to consider. A proper study of the impact of rising ferry fees on population has yet to be done. From the Review of the Coastal Ferry Act – January 2012, “Traffic forecasting has been a serious challenge, and has not been a reliable tool for predicting future demand.”

⁸ Working age can vary. For example, children can include those 0 to 14, or 0 to 19 thus changing working ages.

Part B: Census Population counts aged 5 years

Figure 2: 1996 Census Population counts aged 5 years to compare with 2001 Census Population counts, Line Chart

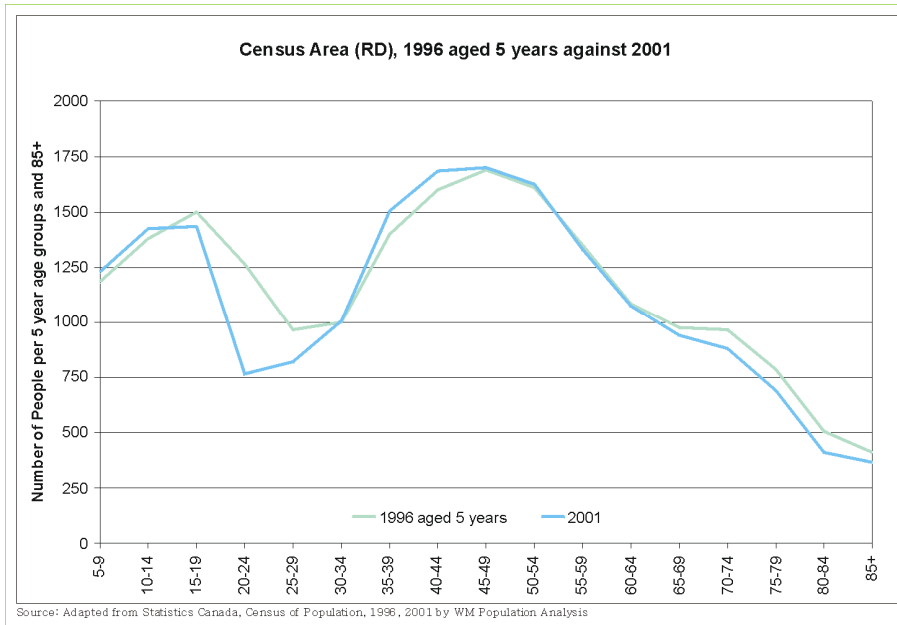


Figure 3: 2001 Census Population counts aged 5 years to compare with 2006 Census Population counts, Line Chart

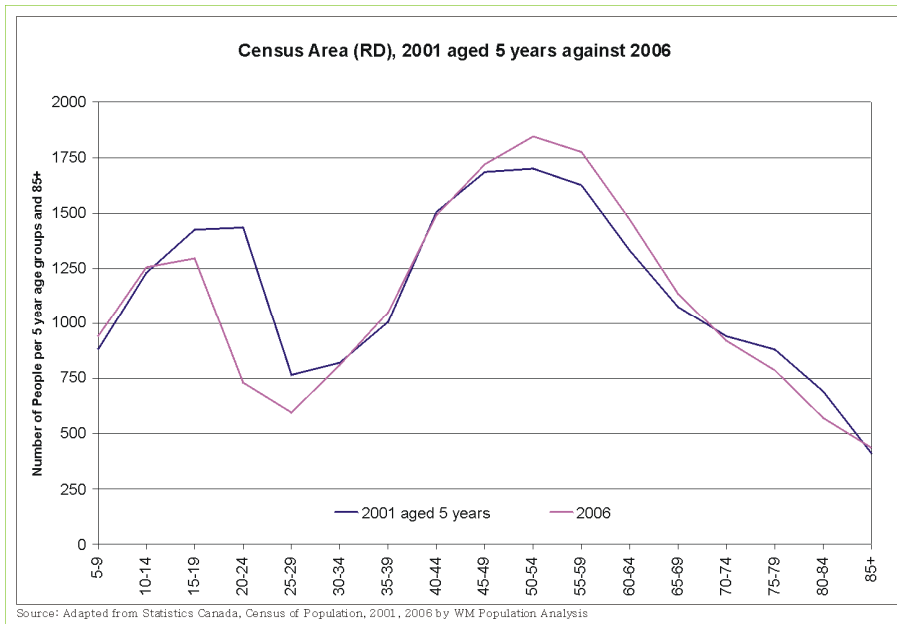
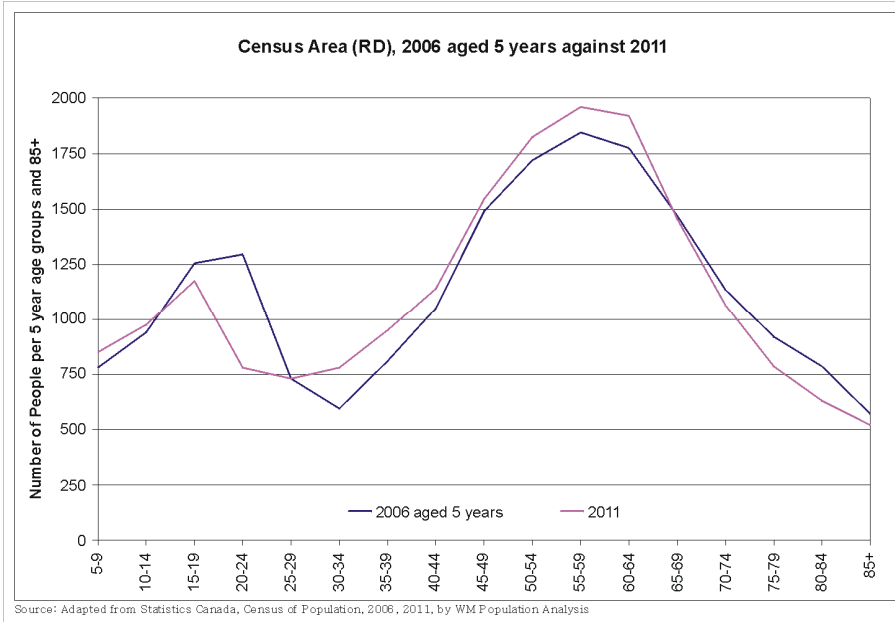


Figure 4: 2006 Census Population counts aged 5 years to compare with 2011 Census Population counts, Line Chart



Part C: Population Signatures by Census Area

Figure 5: Population Signature chart showing the difference between the 1996 Census Population counts aged 5 years to compare with 2001 Census Population counts, Bar Chart

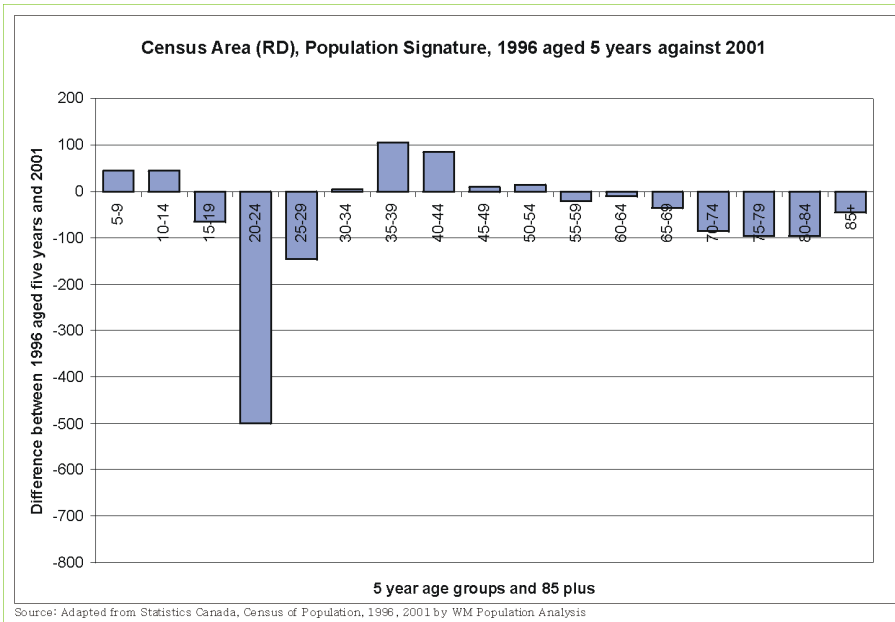


Figure 6: Population Signature chart showing the difference between the 2001 Census Population counts aged 5 years to compare with 2006 Census Population counts, Bar Chart

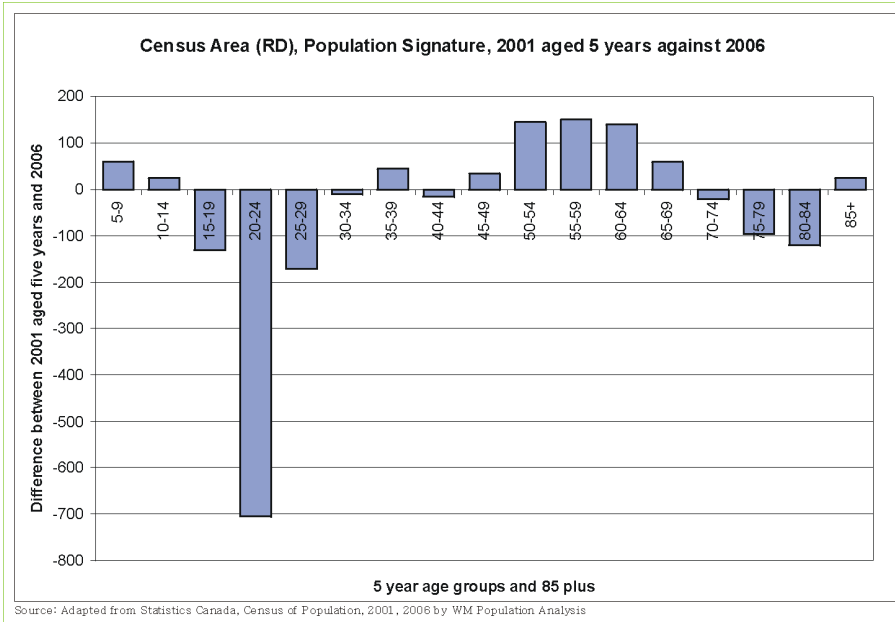
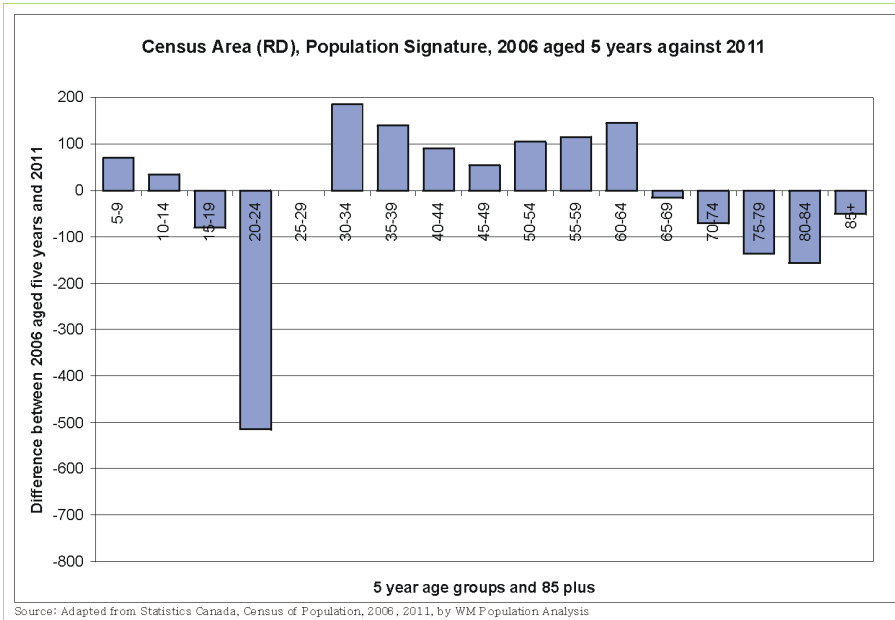


Figure 7: Population Signature chart showing the difference between the 2006 Census Population counts aged 5 years to compare with 2011 Census Population counts, Bar Chart



Part D: 0 to 4 years of age by # of Females by age⁹.

Figure 8: 0 to 4 years of age per 100 Females 20 to 39, 1986 to 2006, CD level

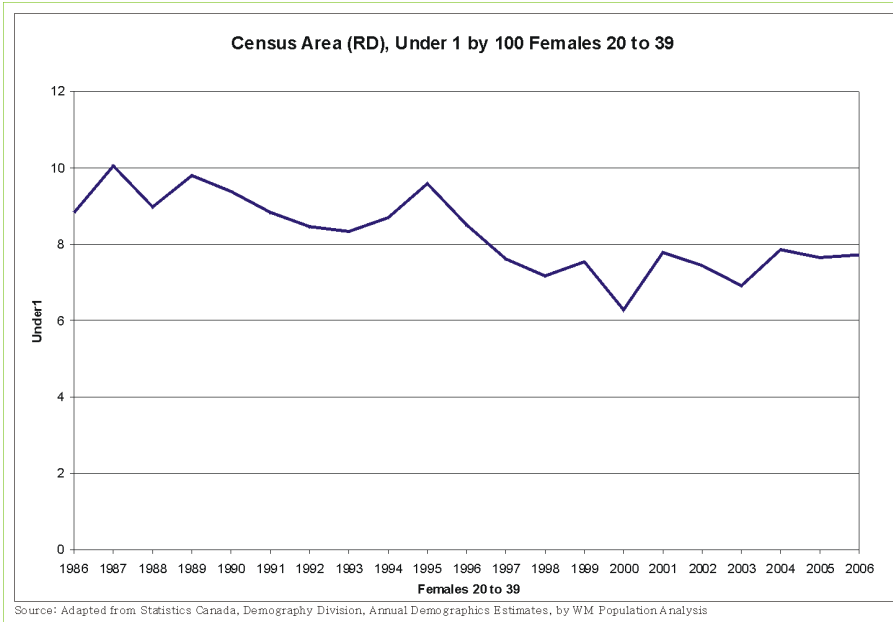
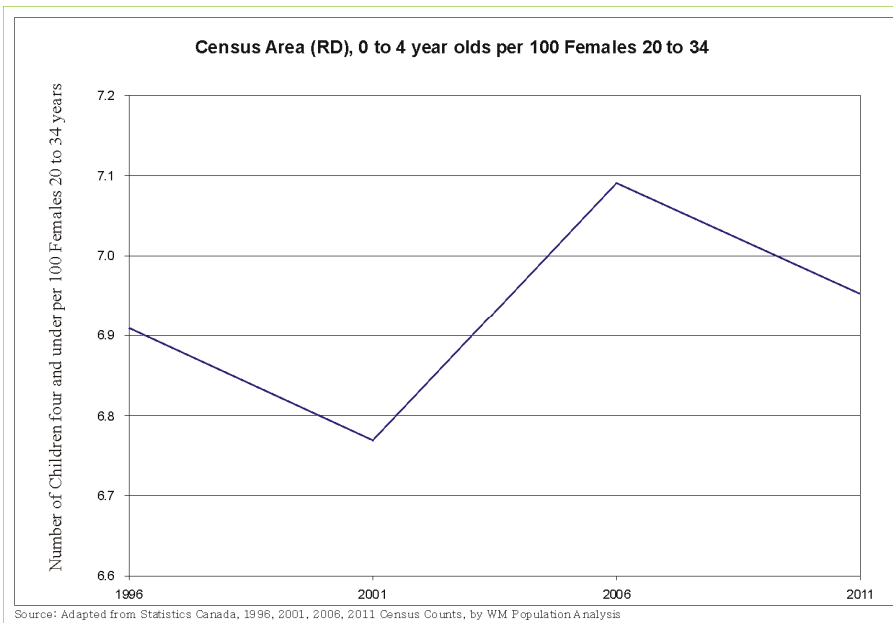


Figure 9: Number of children, 0 to 4 years of age per 100 Females 20 to 34, 1996, 2001, 2006, 2011



⁹ As mentioned, specific ages to be determined with analysis of estimates; therefore the independent variable, Female ages may change.

Figure 10: 0 to 4 years of age against # of Females 20 to 34, 1996, 2001, 2006, 2011, Scatterplot, with coefficient of determination R2

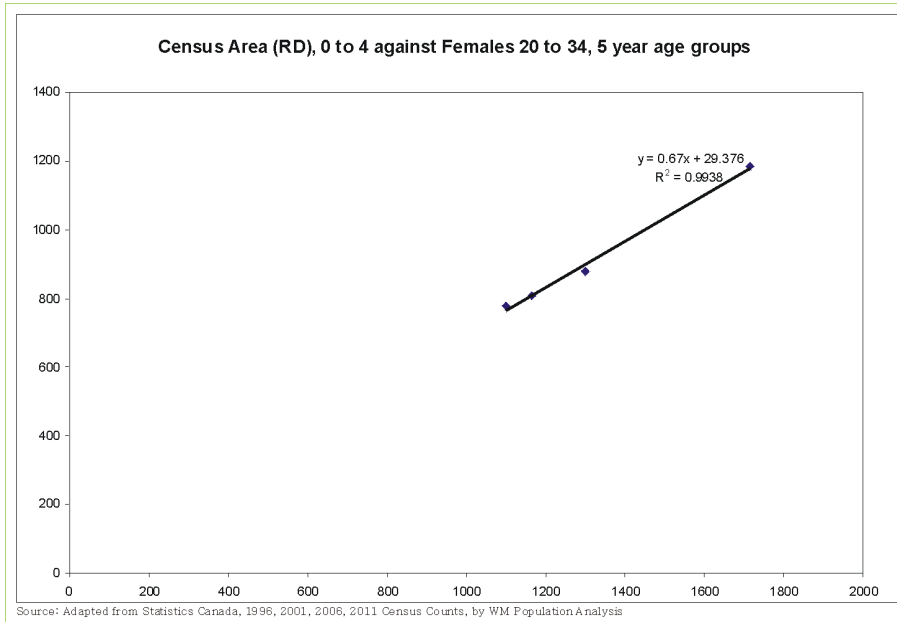
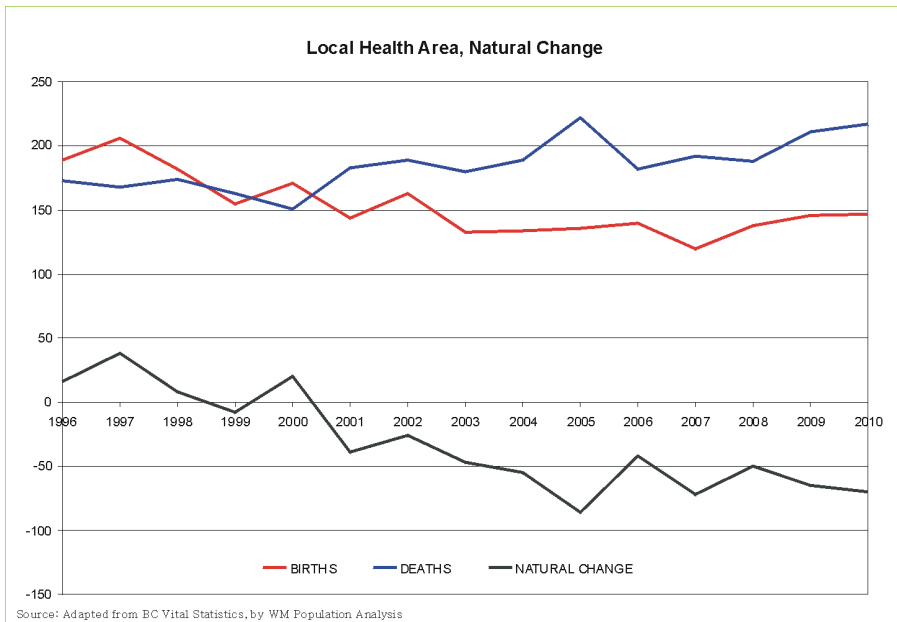


Figure 11: Local Health Area, Births, Deaths, and Natural Change, 1996 to 2010, Vital Statistics

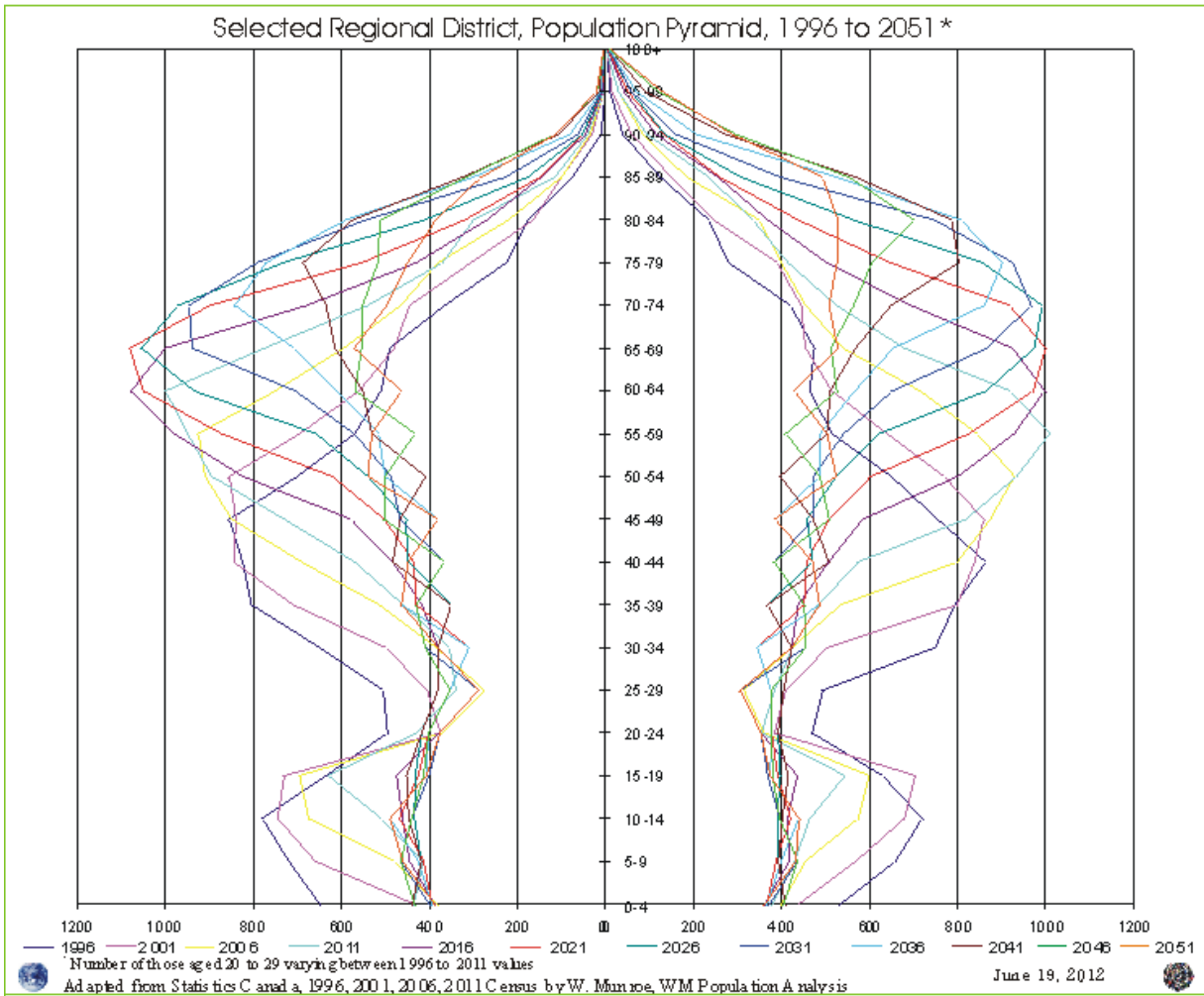


List of Charts and Tables provided with Population Analysis for Census Area (cont.)

POPULATION ANALYSIS of PROJECTION

Part E: Population Pyramid

Figure 12: Census Area Population Pyramid, 1996 to 2011 plus projections with 5 year increments to 2041 (or later years)



Part F: Population Projection Dependence Ratios

Table 1: Population Projection Dependence Ratios 1996 to 2041, 5 year increments:
 Total Population;
 Number of Children;
 Number of Adults of working age;
 Number of Elders per 10 adults of working age;
 Number of Children per 10 adults of working age;
 Number of Elders per 10 adults of working age;
 Number of Children plus Elders per 10 adults of working age

Table 1. Selected Regional District Population Projection, Dependency Ratios

Census Area - RD, Dependence Ratios	1996	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2051
Total Population counts	19935	19765	19600	19905	19641	19690	19724	19138	18619	18047	17281	16464
0-19, absolute	5330	4970	4270	3810	3401	3269	3314	3283	3297	3376	3371	3356
20-64, absolute	11675	11510	11485	11630	10751	9901	9099	8194	7974	7954	7948	7758
65+, absolute	2930	3285	3845	4465	5489	6520	7311	7662	7348	6717	5962	5350
Dependents, Total	8260	8255	8115	8270	8889	9789	10625	10945	10645	10093	9333	8706
Dependents per 10 working age	7.1	7.2	7.1	7.1	8.3	9.9	11.7	13.4	13.4	12.7	11.7	11.2
Children per 10 working age	4.6	4.3	3.7	3.3	3.2	3.3	3.6	4.0	4.1	4.2	4.2	4.3
Elders per 10 working age	2.5	2.9	3.3	3.8	5.1	6.6	8.0	9.4	9.2	8.4	7.5	6.9

Source: 1996 to 2011 numbers adapted from Statistics Canada, Census of Population, 1996, 2001, 2006, 2011 by WM Population Analysis. 2016 to 2051 numbers created by WM Population Analysis.

Sources

BC Vital Statistics: STATISTICAL SUMMARIES BY HEALTH REGION, LOCAL HEALTH AREA, AND COMMUNITY, BRITISH COLUMBIA, APPENDIX 1, for each year from 1996 to 2010 <http://www.vs.gov.bc.ca/stats/>

Statistics Canada, Demography Division, Demographic Estimates Compendium, 2006

Statistics Canada, Demography Division, Demographic Estimates Compendium, 2007 - 08

Statistics Canada, Demography Division, Demographic Estimates Compendium, 2008 - 09

Statistics Canada, Census of Population, Age Sex, Counts 1996, 2001, 2006, and 2011: <http://www12.statcan.ca/census-recensement/index-eng.cfm>