

# **Application of the United Nations Human Development Index to Registered Indians in Canada, 2006–2016**

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## Executive Summary

### Purpose

In this report, we present an updated application of the United Nations Development Program's (UNDP) Human Development Index (HDI) to Registered Indians<sup>1</sup> in Canada in 2006 and 2016. We use a modified HDI methodology to compare Registered Indians populations to other Canadians<sup>2</sup> on the three HDI components: life expectancy, education and income. We also place 2006 and 2016 Registered Indian populations among countries ranked by their HDI scores.

### Background

The HDI has been published by the UNDP since 1990, and provides a framework for examining countries' progress on three dimensions: a long and healthy life, knowledge, and material standard of living. Canada is regularly at the top of the international HDI rankings, among the countries with "very high" levels of human development. Previous applications of the HDI to Registered Indians found substantial gaps in HDI scores. The UNDP has changed its methods several times since the previous Registered Indian HDI (Cooke and Beavon, 2003, Cooke et al., 2004). This report uses different data sources and methods and therefore cannot be compared to previous HDI scores or rankings.

### Methods

We use life expectancy estimates provided by Statistics Canada and 2006 and 2016 Census data to calculate HDI scores for Registered Indians and other Canadians, by province/region. Indicators are also presented by sex/gender.

- *Health* is measured by life expectancy at birth.
- *Education* is measured by mean years of schooling of those 25 and older and the percentage 15 to 34 attending school.
- *Income* is measured by per capita individual annual income.

These indicators are scaled and combined in an overall HDI using an adaptation of the UNDP's methodology. In order to rank the Registered Indian population among

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<sup>1</sup> Registered Indians are persons who are registered under the Indian Act of Canada.

<sup>2</sup> For the purposes of this analysis, the 'other Canadians' population includes non-status First Nations, Metis, Inuit and non-Indigenous Canadians.

countries, separate “adjusted HDI” scores are presented. These are adjusted to be comparable to the ones used by the UNDP in its international rankings. A sensitivity analysis was conducted to examine the implications of particular methodological choices on the education and life expectancy index scores, the HDI and the international rankings. Although the choice of indicators affected the HDI scores, they had fairly small implications for the gap in HDI scores between Registered Indians and other Canadians. Alternative indicators for education and alternative life expectancy estimates had larger impacts on the international ranking of the Registered Indian populations.

## Main Findings

The gap in national HDI scores between Registered Indians and other Canadians remained stable between 2006 and 2016. The Registered Indian HDI score increased from 0.71 in 2006 to 0.73 in 2016, while the HDI for other Canadians increased from 0.82 to 0.84.

The lowest Registered Indian HDI scores were in Manitoba and Saskatchewan, while the highest were in Quebec, the Atlantic region and the Territories. Registered Indian HDI scores increased slightly or were stable for in all provinces except Manitoba. Of the three index components, health (measured by life expectancy) contributed the greatest to the gap between Registered Indians and other Canadians (44%). The income and education indices each contributed about 27% to the gap.

The indicator on which there was the most improvement for the Registered Indian population was per capita income. Life expectancy for Registered Indians increased, but the gap with other Canadians widened slightly. For both Registered Indians and other Canadians, mean years of schooling and the percentage 15 to 34 attending school increased slightly.

The international ranking places the 2016 Registered Indian population at 52<sup>nd</sup> among countries while Canada ranked 12<sup>th</sup>. This places the Registered Indian population among countries with “very high” human development. The 2006 Registered Indian population would place 63<sup>rd</sup> among the 189 countries ranked. The off-reserve Registered Indian population would rank 42<sup>nd</sup> among countries in 2016, among those with “high” human development. This is an improvement from 47<sup>th</sup> in 2006. The 2016 on-reserve Registered Indian population would rank roughly 78<sup>th</sup>, while in 2006 it would rank 89<sup>th</sup>.

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## Introduction

*Human Development Report* has been published by the United Nations Development Program (UNDP) since 1990, providing a statistical picture of the economic and social conditions in the world's countries. An important part of this report is the UNDP's Human Development Index (HDI), a composite measure of population well-being. The annual ranking of countries by their HDI scores has been a useful tool for examining countries' progress in improving standards of living, as well as for identifying ongoing international disparities on these measures.

Canada has consistently been at or near the top of these rankings, identified as one of the countries with a "very high" level of human development. In the most recent set of rankings, published in 2018, Canada was 12<sup>th</sup> among 189 countries (UNDP, 2018). Not all Canadians enjoy the same high levels of well being, however. Previous research has used HDI scores to describe the degree of disparity between First Nations and other Canadians (Beavon and Cooke, 2003). The HDI has also been used to examine changes in the relative conditions of Registered Indians and other Canadians (Cooke, Beavon and McHardy, 2004) as well as Indigenous peoples in Australia, New Zealand and the United States (Cooke, Mitrou, Lawrence, Guimond, & Beavon, 2007).

The purpose of this project is to update the estimates of the Human Development Index for Registered Indians and other Canadians, and to examine how the composite HDI and its component measures have changed for these populations over the past decade. We calculate HDI scores for Registered Indians<sup>3</sup> living on and off reserve, and for the non-registered Canadian population (hereafter "other Canadians") for the years 2006 and 2016<sup>4</sup>. We also produce estimated HDI rankings of these populations, in order to

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<sup>3</sup> Registered Indians are persons who are registered under the Indian Act of Canada.

<sup>4</sup> For the purposes of this analysis, the 'other Canadians' population includes non-status First Nations, Metis, Inuit and non-Indigenous Canadians.

position them among countries as listed in the 2017 HDI rankings by the UNDP (UNDP, 2018)

### Methodology: The HDI concept

The introduction of the HDI in 1990 represented an expanded concept of international development. Whereas much of the previous literature had focussed on per capita gross domestic product as a key measure of a country's ability to provide a decent standard of living for its population, the first *Human Development Report* widened the scope to consider other dimensions of well-being. Based on Amartya Sen's "capability approach" (Sen, 2001), the HDI considered three dimensions: a long and healthy life, knowledge and a decent standard of living. The HDI equally weights these dimensions and combines them in to a single, summary measure.

The calculation of the HDI has changed several times since its first publication in 1990. This has included changes to the indicators used, as well as to the way that they are combined into the HDI composite index. However, the general form of the HDI has remained similar.

The component indicators of the HDI are scaled so that they reflect a country's position between minimum and maximum values. The resulting dimension indices range from 0 to 1.

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

Two of the three dimensions, health and material standard of living, have a single indicator. Life expectancy at birth has been used as an overall measure of the health of a population since the first *Human Development Report*. For most of the history of the report, per capita Gross Domestic Product (GDP), expressed in Purchasing Power Parity (PPP) dollars to allow international comparison, has been the indicator of a

country's average material standard of living. Because of the decreasing marginal utility of income, the HDI discounts the income indicator. The discounting approach has changed several times, but has used a log formula since the early 2000s. In the 2010 *Human Development Report*, the income indicator was changed to per capita Gross National Income (GNI).

The original HDI used only adult literacy as a measure of knowledge, but a second education indicator was added in 1991. This was mainly because only those in younger age ranges typically attain formal education, and the changes to the average level of formal education in a population are therefore limited by demographic age structure. The HDI has since included both “stock” and “flow” measures of education. Stock measures, such as adult literacy rates, are intended to capture the average level of knowledge in the population, and can be expected to change slowly over time. However, “flow” measures, such as enrolment rates, can be expected to be more sensitive to policy changes. For most of the history of the HDI, the stock measure has been given a weight of 2/3 within an education index, and the flow measure a weight of 1/3. The most recent revision of the HDI weighs each of these education indices equally, however (UNDP, 2018).

These three indices; health (life expectancy), material standard of living (income) and knowledge (education) are given equal weights in a combined HDI score. Before 2010, these scores were combined using the arithmetic mean of the three indicators. In 2010, a new formula using the geometric mean was adopted, with the rationale that this avoided the problem of perfect substitutability of the indicators<sup>5</sup> (UNDP, 2018).

$$HDI = (I_{Health} \cdot I_{Education} \cdot I_{Income})^{1/3}$$

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<sup>5</sup> The HDI's previous use of the arithmetic mean to combine the three indices meant that the same magnitude of change in any of the three indices had the same effect on the overall HDI. If a country's education, income or life expectancy index increased by .10, its HDI would increase by .10/3. By using the geometric mean, the effect on the HDI of a change in one of the indicators becomes proportional to its level. Using this method, a 1% increase in one of the indices results in the same increase in the HDI as a 1% increase in either of the other indices.

In choosing indicators for a revised application of the HDI to Registered Indians and other Canadians we sought to identify measures that are as closely aligned as possible with the UNDP's HDI measures, to facilitate ranking the Registered Indian population populations among countries in the *Human Development Report*. The previous application to the Canadian context used Census education and income data, as well as publicly available life expectancy estimates. The changes to the UNDP's HDI methodology and to the available Census data required that these measures be reconsidered.

## Indicators and data sources

Table 1 presents indicators used to calculate the HDI in the 2007 and 2018 *Human Development Reports*. These are the years that most closely correspond to the 2006 and 2016 Canadian Census data. It also presents the indicators used in the previous applications of the HDI to Registered Indians, as well the indicators used for this revision of these measures.

Table 1: Indicators used for the UNDP and Registered Indian HDI

2007 UNDP Indicator	2018 UNDP Indicator	Previous Registered Indian HDI Indicator (Beavon and Cooke, 2003)	Revised Registered Indian HDI Indicator
<b>Health</b>			
Life expectancy at birth (years) Min: 25 Max: 85	Life expectancy at birth (years) Min: 20 Max: 85	Life expectancy at birth (years) Min: 25 Max: 85	Life expectancy at birth (years) Min: 20 Max: 85
<b>Education 1 (stock)</b>			
Adult literacy (%) Min: 0 Max: 100	Mean years of schooling of those 25+ (years) Min: 0 Max: 15	Percent 15+ with Grade 9 or higher Min: 0 Max: 100	Mean years of schooling of those 25+ (years) Min: 0 Max: 15
<b>Education 2 (flow)</b>			
Gross primary, secondary and tertiary enrolment (%) Min: 0 Max: 100	Expected years of schooling (years) Min: 0 Max: 18	Percent 20+ with high school or higher Min: 0 Max: 100	Percent 15–34 attended school Min: 0 Max: 100
<b>Material standard of living</b>			
GDP per capita (\$PPP) Min: 100 Max: \$40,000	GNI per capita (2011 \$PPP) Min: 100 Max: \$75,000	Mean annual income per capita (\$CDN) Min: 100 Max: \$40,000	Mean (per capita) annual income (\$CDN) Min: 100 Max: \$75,000

### Life expectancy index (long and healthy life)

The HDI has consistently used life expectancy at birth as a measure of population health. The minimum and maximum “goal post” values have changed, however. Before

2010, the UNDP used “theoretical” minimum and maximum values of 25 and 85 years, respectively. In the 2010 *Human Development Report*, the minimum was revised to 20, and remains in the most recent HDI (UNDP, 2018).

The previous application of the HDI to the Registered Indian population used publicly available life expectancy estimates for Registered Indians and all Canadians, and the same minimum and maximum values as the UNDP’s HDI. In a revised Registered Indian HDI, we again use life expectancy at birth, with the new minimum and maximum values.

The use of published estimates of life expectancy at birth in previous versions of the Registered Indian HDI posed some problems. The available estimates for Registered Indians were generated using data from the Indian Register<sup>6</sup>, which is subject to late reporting of events (births, deaths, and moves) and also reflects a population that is somewhat different from the self-identified Registered Indian population in the Census. The years of the estimates also did not correspond exactly to the years for which the HDI was being calculated, and so linear interpolation was used to adjust them. Because of the relatively small size of the Registered Indian population, life expectancy at birth was not published separately for all regions, by on/off reserve residence. For the purposes of the HDI, various assumptions were made, such as applying the national on/off reserve difference in life expectancy to all provinces. Lastly, in order to estimate life expectancy for other Canadians, the published Canadian life expectancy estimate was adjusted downward by the relative size of the Registered Indian population and the difference in life expectancy between the two populations. However, this adjustment did not take the age structures of the two populations into account.

For this project, we use life expectancy indicators produced specifically for these HDI estimates by Statistics Canada. These used newly available linked Census and vital

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<sup>6</sup> The Indian Register is an administrative database that records those who are registered under the *Indian Act*.

statistics data, including births and death. The 2006 and 2011 Canadian Census Health and Environment Cohort (CanCHEC) was used to produce mortality rates for the population 1 year and older. The 2006 Canadian Birth-Census Cohort (CanBCC) was used to calculate infant mortality rates. Extrapolation was used to produce mortality rates for 2006 and 2016, and life table methods were used to estimate life expectancy at birth. Due to small numbers, separate life expectancy estimates could not be produced for on- and off-reserve geographies for all regions.

### Education index (knowledge)

As described above, the education index includes two indicators. Before 2010, the UNDP used national adult literacy rates as a measure of the “stock” of knowledge in the population, with a theoretical minimum of 0% and maximum of 100%. In adapting the HDI to Registered Indians, the percent of those aged 15 and higher with at least Grade 9 was used as a similar measure of the proportion of the population with a basic level of education. However, since the 2006 Census, the Census education question has been focussed on identifying completed levels of education, and the count of people with Grade 9 or lower has not been available.

After 2010, the UNDP changed this measure to the mean number of years of schooling attained by the population aged 25 and older. This measure is calculated from Census educational attainment data, by multiplying the proportion with a given level of education by the official length of time for that level (UNESCO, 2013).

With the new *Highest Certificate, Diploma or Degree* measures in the Census, it is possible to estimate mean years of schooling in a way similar to the method used in the *Human Development Report* (UNESCO, 2013). We assigned typical program lengths to each of the levels of educational attainment provided by this variable. Those with less than high school (no degree, certificate or diploma) were assigned 10 years of schooling, those with high school or equivalent 12 years, those with trades, other certificates, or university degree below bachelors 14 years, a bachelor's degree 15

years, a master's degree 17 years, and an earned doctorate 21 years. These were multiplied by the population with each level and summed to estimate the aggregate years of schooling. Dividing this by the total population 25 and older produced the estimated mean years of schooling.

The second education indicator has been a measure of the “flow” of education into the population. The pre-2010 HDI used gross primary, secondary and tertiary enrolment ratios. These were defined as “ratios”, not “rates”, because they were calculated by taking the total numbers enrolled in these levels, and dividing those by the population in the appropriate age ranges. This approach made it possible for ratios to be higher than 1, as the numerators were not age-specific and could include enrollees who were outside of the typical age range for a particular level of schooling.

In Canada, nationally comparable school enrolment data classified by Indigenous identity or registration status are not available. The previous Registered Indian HDI therefore used a measure from the Census. Rather than attempting to capture the “flow” of education, this measure was another “stock” measure and aimed to capture the degree to which the population had completed a higher level of education, in this case, high school, or any post-secondary (whether completed or not).

In the 2010 HDI, the UNDP changed this second education measure to a new “flow” indicator, which was retained in the most recent version of the index (UNDP, 2018). This measure is calculated as the sum of age-specific primary, secondary and tertiary enrolment rates, and can be interpreted as the number of years a child entering school could be expected to remain in school, assuming that the enrolment rates remained constant. The minimum is 0 and the maximum is 18 years.

The Census asks respondents whether they had attended school, including elementary, junior high or high school, or post-secondary schooling, during the previous year. These data can be used to create an indicator of the “flow” of education into the population.



We propose the percentage of youths and young adults who had attended school (secondary or tertiary) over the previous year, with minimum 0 and maximum 100. However, previous research has found that Indigenous peoples tend to complete education at somewhat older ages than do other Canadians (e.g. Hull, 2005). To avoid disadvantaging the Registered Indian population in the estimation of this indicator, we therefore propose that this be calculated for the population aged 15 to 34.

#### Income index (material standard of living)

As described above, the *Human Development Report* used per capita GDP (in Purchasing Power Parity dollars) for most of its history, but changed in 2010 to per capita GNI. The minimum and maximum values also changed in that year. Previously, this indicator had used \$0 as a minimum level of GDP and \$40,000 as the maximum. In 2010, the HDI used empirically derived minimum and maximum values, taking the 1980 GNI for Zimbabwe (\$163) as the minimum and GNI for the United Arab Emirates (\$108,211) as the maximum. In the most recent HDI, however, the HDI again used “theoretical” minimum and maximum values of \$100 and \$75,000 in 2011 PPP\$ (UNDP, 2018).

GDP or GNI is included in the HDI because these are proxy measures of average income in a country. The previous Registered Indian HDI application used mean total individual income from the Census. Because the intention was for the indicator to measure the average material standard of living of the population, it was calculated for the entire population, of all ages, with or without income, using minimum and maximum values from the HDI of the time (\$0 and \$40,000).

Although the UNDP’s income indicator has changed since the previous Registered Indian HDI, per mean income remains an appropriate measure of the material standard of living in the Canadian context. We retained this indicator for the current application, again using individual total income data from the Census, but with the maximum value

used in the 2018 HDI (\$75,000). Income data for 2005 and 2015 were adjusted to 2011 dollars using the historical annual Consumer Price Index (Statistics Canada, 2018).

### Adjustments to rank Canadian populations on the international HDI

In addition to using the HDI framework to compare the relative conditions of Registered Indians and other Canadians, an important goal of this project is to place these Canadian populations in an international HDI ranking. Although the international rank is not necessary for comparing Canadian populations on the HDI and its component indices, placing these populations among countries in terms of their HDI scores has been useful for providing a qualitative description of the degree of difference between the populations. For example, presenting the Aboriginal identity population in Canada as ranking among countries with “medium” levels of human development, with an HDI score near to those of countries like the Czech Republic and Argentina (Cooke et al, 2007), while Canada was among the “very highly developed” countries, gives some sense of the qualitative disparity between populations.

In order to rank Canadian populations on an International HDI, it was necessary to make the indicators used in this report more directly comparable to those used by the UNDP and published in the *Human Development Indices and Indicators: 2018 Statistical Update* (UNDP, 2018). An adjustment factor for each indicator was created by calculating the ratio of our indicator score for the total Canadian population to the Canadian indicator score published by the UNDP, and used in their international rankings. Both the Registered Indian and the non-Indigenous indicators were then multiplied by these ratios, and the resulting values were used to estimate an “international” HDI score for both populations.

The revised Registered Indian HDI retains this approach to creating indicators that are comparable to the international HDI scores published in the *Human Development Report*. Although the inherent assumptions might not be fully justified, the international ranking is only intended to provide an impression of the degree of difference in conditions between Registered Indians and other Canadians, and these assumptions do

not affect the utility of the unadjusted HDI measures in comparing these populations, or how the gaps between them changed between 2006 and 2016.

### Comparisons to previous Registered Indian HDI indicators

It is important to recognize that the indicators produced in this report are **not comparable to those previously published**. There are several reasons for this, which are summarized in Box 1.

#### Box 1. Comparisons between the previous and revised Registered Indian HDI

The methodology of this report differs in several respects from the previous application of the HDI methodology to Registered Indians and other Canadian populations (Beavon and Cooke, 2003). This is because of changes to the Canadian Census data and the UNDP's method for calculating the HDI.

**The measures in this report are therefore not comparable to those previously published.**

Specific differences include

- different indicators (education, income),
- different methodology and data sources for calculating life expectancy,
- different minimum and maximum values for several of the indicators, and
- different method for combining the sub-indices in the composite HDI (geometric mean vs. arithmetic mean).

**The previous rankings of the Registered Indian population among countries (Beavon and Cooke, 2003; Cooke et al, 2014) also cannot be compared to the rankings produced in this report.** In addition to the differences noted above, the scored and relative positions of the countries listed in the *Human Development Report* have changed considerably, making comparisons between the previous and present rankings meaningless.

## Results

### Canadian HDI scores

In presenting the results, we refer to the HDI and component indicators that were calculated to compare the Canadian populations as the “Canadian” HDI scores. This is to distinguish them from the adjusted HDI scores that are used to rank the Canadian populations internationally. Table 2 presents the Canadian HDI and component scores at the national level, for Registered Indians and other Canadians. Note that these are calculated for specific age ranges or population definitions and therefore might not be comparable to results reported elsewhere (e.g. Statistics Canada 2019).<sup>7</sup>

As shown in Table 2, the Registered Indian population scored lower on the HDI and its component indicators than did other Canadians. The lower life expectancy, education and income of the Registered Indian population resulted in a Canadian HDI score of 0.73, compared to 0.84 for other Canadians<sup>8</sup>. Registered Indians living in reserve communities had National HDI scores that were lower than those living off reserve (0.69 vs. 0.76).

Table 2: 2016 National Canadian HDI and indicator scores, Registered Indians and other Canadians

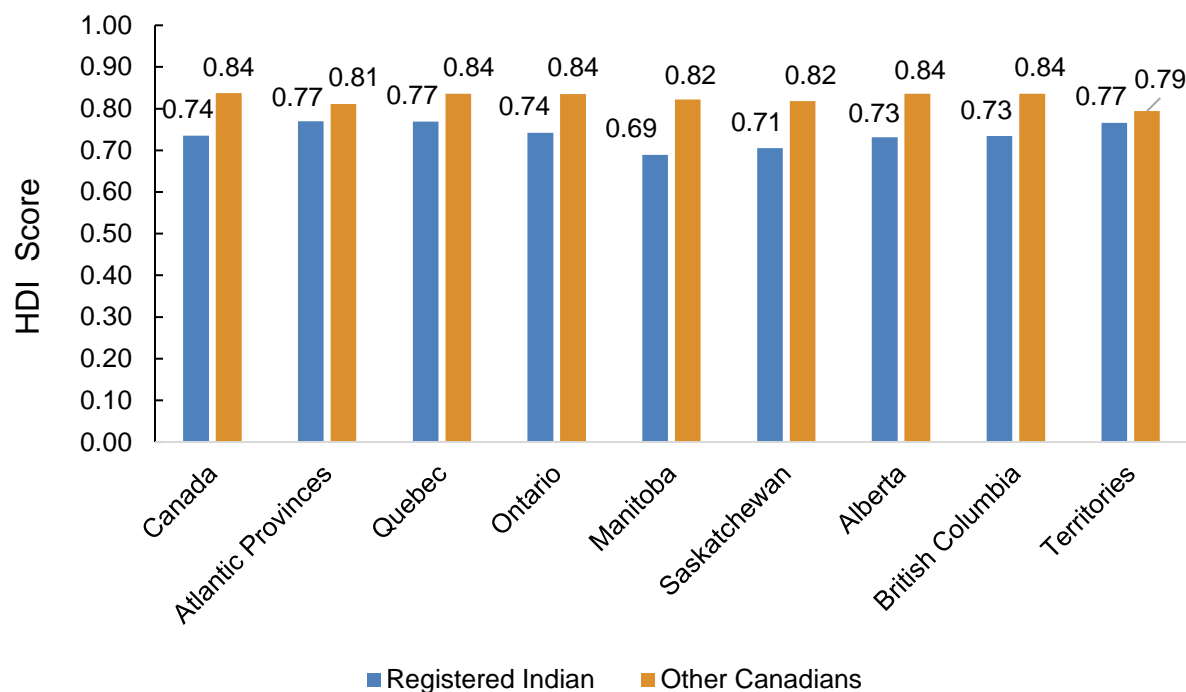
	Registered Indian			Other Canadians
	On reserve	Off reserve	Total	
Life expectancy at birth (years)	72.6	76.6	74.6	84.9
Life expectancy index	0.82	0.87	0.84	1.00
Percentage attending school (aged 15 to 34)	0.319	0.393	0.364	0.429
Mean years of schooling (aged 25 and older)	11.89	12.56	12.31	13.34
Education index	0.56	0.62	0.59	0.66
Mean (per capita) income (\$2011)	\$13,505	\$23,768	\$19,626	\$36,272
Income index	0.74	0.83	0.80	0.89
<b>HDI Score (Canadian)</b>	<b>0.69</b>	<b>0.76</b>	<b>0.73</b>	<b>0.84</b>

<sup>7</sup> Annual average or median income, for example, is usually reported for the population 15 and older with income. In Table 2, the mean (per capita) income shown is calculated by including the entire population in the denominator.

<sup>8</sup> For display purposes and ease of reading, all data points in the report text have been rounded to the nearest 100<sup>th</sup> or second decimal point. Thus, any discrepancies between the data in the text and in the figures and tables are due to rounding.

Figure 1 presents the 2016 Canadian HDI scores for provinces and regions. Because of small numbers, the Territories (Nunavut, Yukon and Northwest Territories) and Atlantic Provinces are grouped into regions.

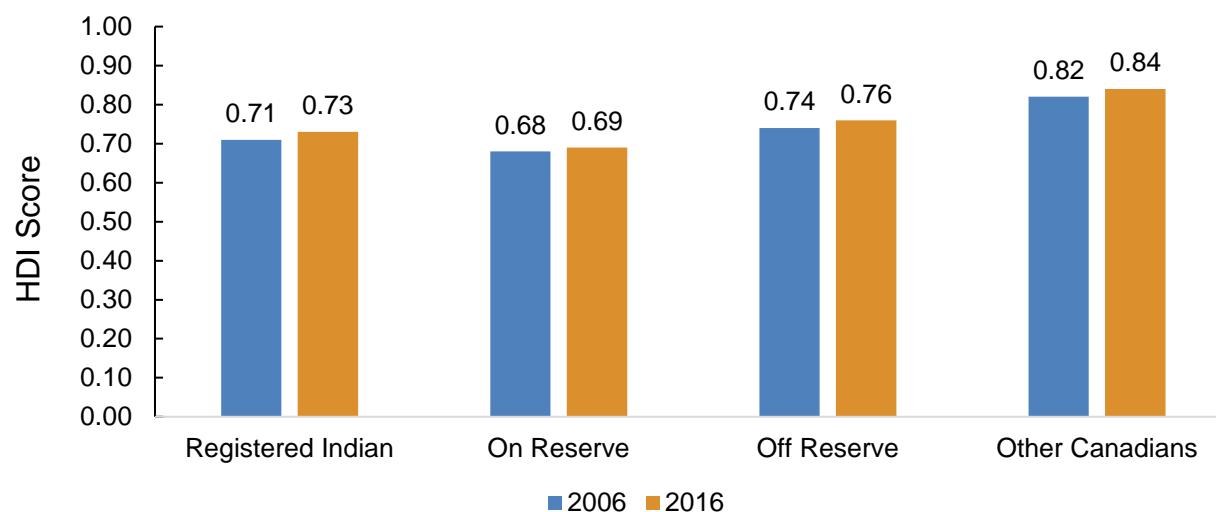
Figure 1: 2016 Canadian HDI scores by province/region, Registered Indians and other Canadians



The regions in which the HDI scores for the Registered Indian population were highest were in the Atlantic Region (0.77), Quebec (0.77), and the Territories (0.77). The lowest HDI scores for Registered Indians were in Manitoba (0.69) and Saskatchewan (0.70).

Figure 2 presents the change in national Canadian HDI scores, between 2006 and 2016. For both Registered Indians and other Canadians, HDI scores improved. The change for Registered Indians was from 0.71 to 0.73. By comparison, other Canadians' HDI score changed from 0.82 to 0.84. The Canadian HDI score for the on-reserve population changed from 0.68 in 2006 to 0.69 in 2016, and the HDI for the off-reserve population changed from 0.74 to 0.76.

Figure 2: 2006 and 2016 national Canadian HDI scores, Registered Indians and other Canadians



The provincial and regional HDI scores in 2006 and 2016 for the on-reserve Registered Indian population are presented in Figure 3. Scores for the Atlantic region and the Territories could not be disaggregated by on- and off-reserve residence due to small numbers<sup>9</sup>, and therefore are not shown.

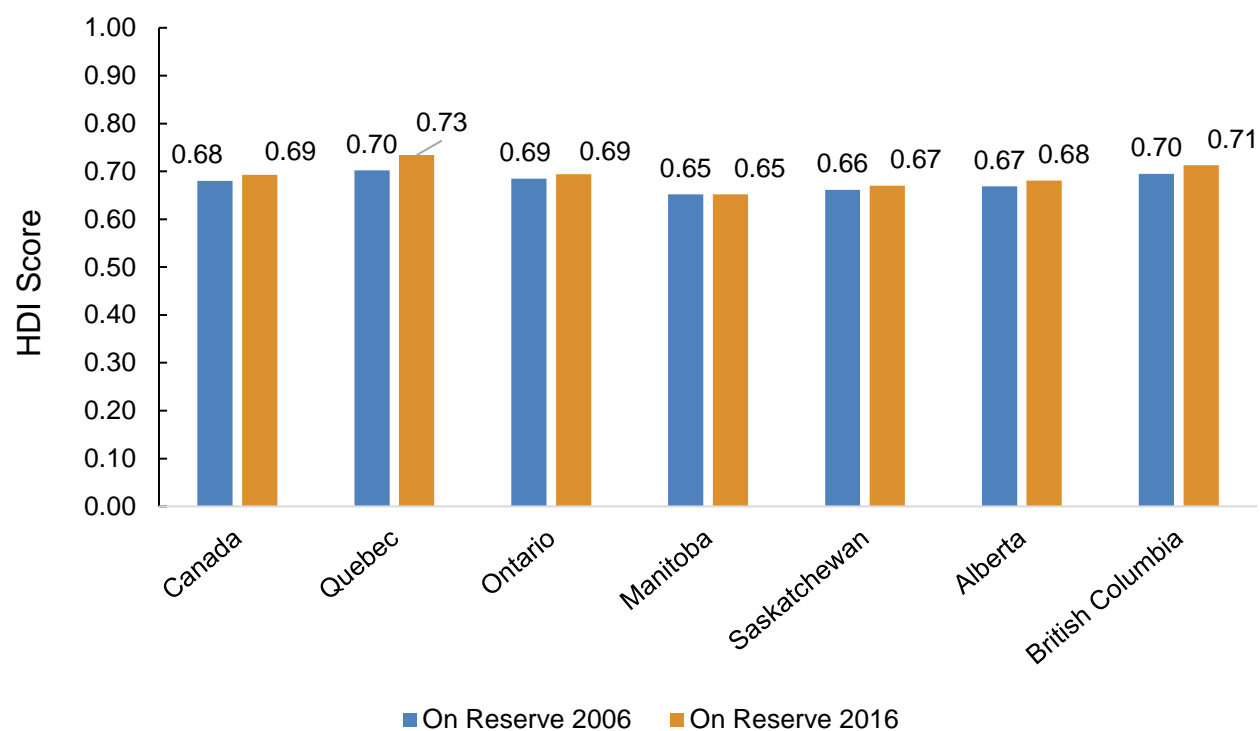
Most regions saw small improvements in HDI scores over the decade. The largest improvement in the on-reserve HDI score was in Quebec, where the HDI score rose from 0.70 to 0.73. Manitoba saw no change in the on-reserve HDI score (0.65).

In 2016, the biggest gaps between the on-reserve Registered Indian population and those off reserve were in Alberta (0.08) and Manitoba (0.08). The smallest were in British Columbia (0.03), followed by Saskatchewan (0.06).

The HDI scores for the off-reserve Registered Indian population also increased in most regions, between 2006 and 2016. The largest increases were in Alberta and Quebec. (Figure 4).

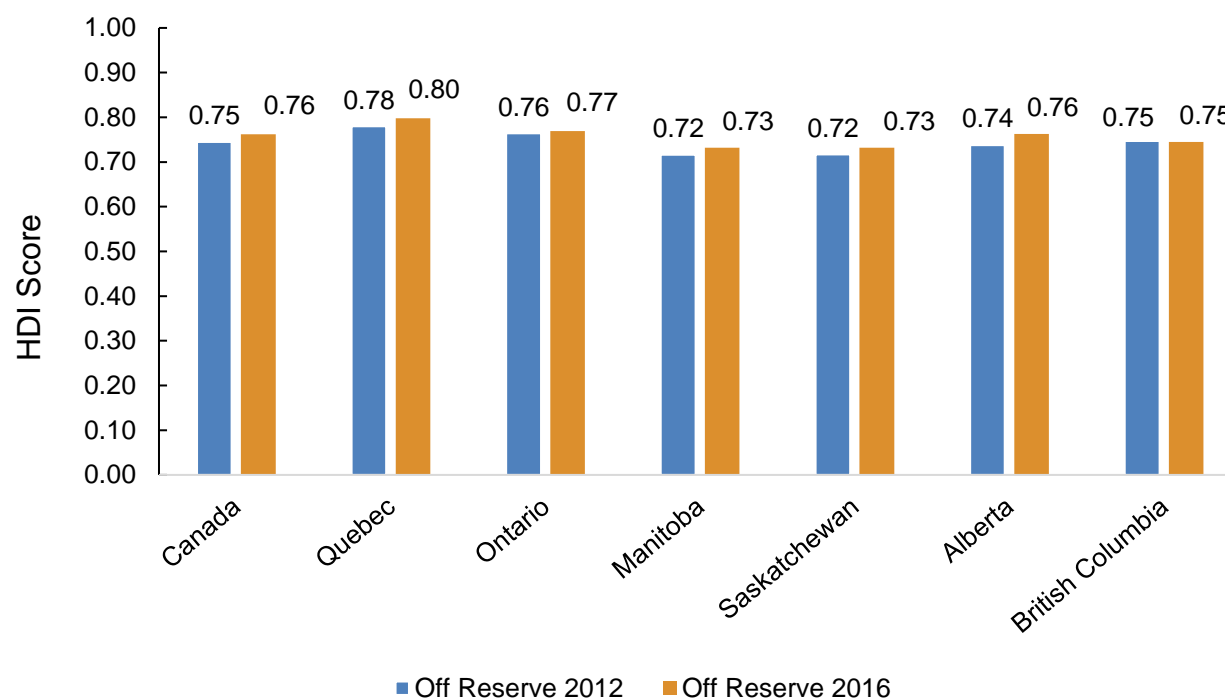
<sup>9</sup> The small size of Registered Indian populations in the North and Atlantic region make it impossible to accurately estimate life expectancy separately by on- and off-reserve residence. Because the life expectancy index is not available for these geographies, we cannot present HDI scores.

Figure 3: 2006 and 2016 Canadian HDI scores by province/region, Registered Indian population on reserve



Note: On- and off-reserve estimates for Territories and Atlantic are not available separately due to small numbers. Those regions are included in the total Canadian estimates.

Figure 4: 2006 and 2016 Canadian HDI scores by province/region, Registered Indian Population off reserve



Note: On- and off-reserve estimates for Territories and Atlantic are not available separately due to small numbers. Those regions are included in the total Canadian estimates.

### Changes and gender differences in HDI indicator scores

Although the HDI can provide an overall picture of the relative well being of populations and how it has changed, the composite measure obscures what might be different patterns of change for each indicator. Moreover, the previous Registered Indian HDI applications found substantial differences between men and women on some indicators (Cooke et al., 2004). It is therefore important to examine each of the life expectancy, education and income indicators by gender.

#### Life expectancy

As described above, life expectancy at birth was estimated for this project by Statistics Canada. It is therefore important to note that the estimates presented here are not comparable to those that have been previously published.



Table 3 presents the estimated life expectancy at birth for the Registered Indian population as well as other Canadians. In 2006 there was difference of 9.4 years between other Canadians (83.0 years) and the total Registered Indian population (73.6 years). Life expectancy increased for both of these populations between 2006 and 2016. However, the improvement was greater in other Canadians than among Registered Indians (1.9 years vs. 1.0 years). As a result, although the life expectancy of Registered Indians increased to 74.6 years in 2016, the gap between Registered Indians and other Canadians widened, to 10.3 years.

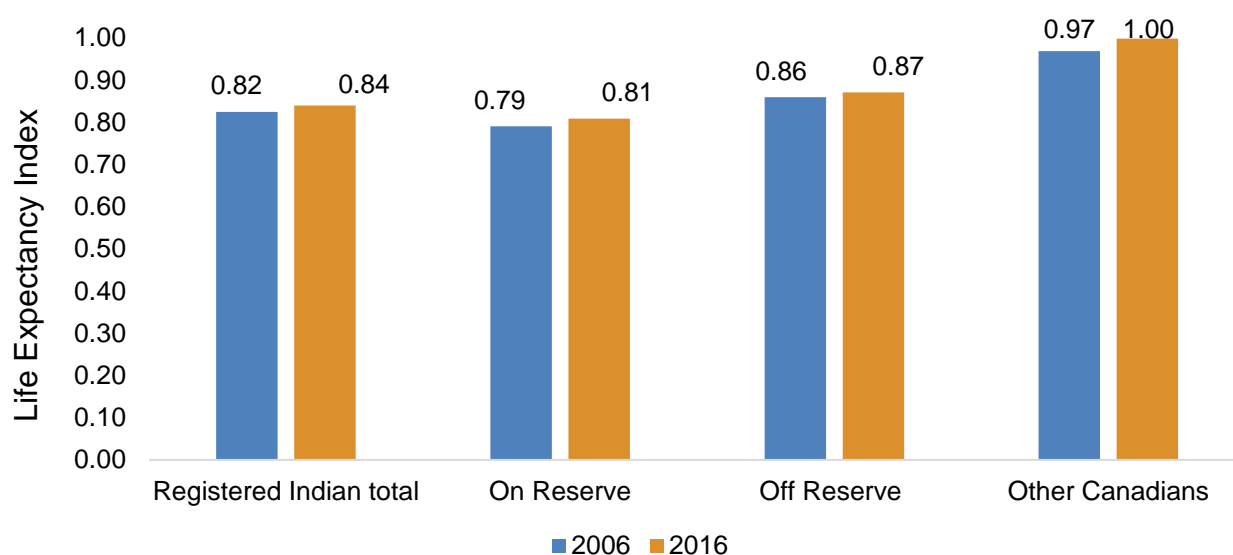
Life expectancy among Registered Indians living off reserve was higher than among those living on reserve, in both 2006 and 2016. Improvements were seen in both on- and off-reserve populations, however, the estimated life expectancy at birth for Registered Indians on reserve increased by 1.2 years over the decade, from 71.4 to 72.6 years. Among those living off reserve, life expectancy increased by 0.7 years, from 75.9 to 76.7 years, narrowing the difference between the on- and off-reserve population to 4.1 years (Table 3).

Females had longer estimated life expectancy at birth than males, in all populations. Among other Canadians, the male-female gap in life expectancy remained constant over the period, at 5.9 years. Among Registered Indians living on reserve the gap narrowed. This narrowing was greatest on reserve, where the life expectancy of Registered Indian men increased by 1.5 years between 2006 and 2016, compared to 0.6 years among women. Among those living off reserve, the gender gap widened, as life expectancy of off-reserve men increased by 0.1 years and that of women increased by 1.3 years.

Table 3: Estimated life expectancy at birth, Registered Indians and Other Canadians, 2006 and 2016

		2006	2016	Change (2016-06)
<b>Registered Indian</b>	Male	70.7	71.9	1.2
	Female	76.3	77.2	0.9
	Total	73.6	74.6	1.0
On Reserve	Male	68.5	70.0	1.5
	Female	74.8	75.4	0.6
	Total	71.4	72.6	1.2
Off Reserve	Male	73.7	73.8	0.1
	Female	77.7	79.0	1.3
	Total	75.9	76.6	0.7
<b>Other Canadians</b>	Male	80.0	82.0	2.0
	Female	85.9	87.9	2.0
	Total	83.0	84.9	1.9

Figure 5: Canadian life expectancy index scores, Registered Indians and other Canadians, 2006 and 2016



The impact of these changes on the life expectancy index in the Registered Indian HDI is shown in Figure 5. Although the index scores for both Registered Indians and other Canadians increased between 2006 and 2016, other Canadians index score increased

more (0.03 vs. 0.02). Note that the 2016 score for other Canadians is very close to the maximum of 85 years in the HDI methodology, resulting in a life expectancy index score of 1.0.

## Education

Table 4 presents the first of the two education indicators that are combined to form the education index. In 2006, the estimated mean years of schooling for Registered Indians was 12.0 years, compared to 13.1 years for other Canadians. The mean years of schooling for both populations increased by 0.3 years. The mean years of schooling for Registered Indians in 2016 was 12.3 years in 2016. For other Canadians it was 13.3 years.

Both on- and off-reserve populations saw small improvements in the mean years of schooling. For both populations, female Registered Indians had slightly higher mean years of schooling than males. This gender gap widened slightly in both populations.

Both Registered Indians and other Canadians had a decrease in the second education indicator, the percent aged 15 to 34 attending school (Table 5). In 2006, the percentage in this age range attending school among other Canadians was 43.4%, compared to 37.9% of Registered Indians. In 2016, these had fallen, to 42.9% for other Canadians and 36.4% of the Registered Indian population. However, the change was similar for both populations.

Table 4: Estimated mean years of schooling, Registered Indian and Other Canadians aged 25 and older, 2006 and 2016

		2006	2016	Change (2016-06)	% Change
<b>Registered Indian</b>	Male	11.9	12.2	0.3	2.1
	Female	12.1	12.4	0.3	2.6
	Total	12.0	12.3	0.3	2.4
On Reserve	Male	11.6	11.7	0.2	1.5
	Female	11.7	12.0	0.3	2.6
	Total	11.6	11.9	0.2	2.1
Off Reserve	Male	12.2	12.4	0.2	1.5
	Female	12.4	12.7	0.3	2.2
	Total	12.3	12.6	0.2	1.9
<b>Other Canadians</b>	Male	13.1	13.3	0.2	1.5
	Female	13.0	13.3	0.4	2.8
	Total	13.1	13.3	0.3	2.2

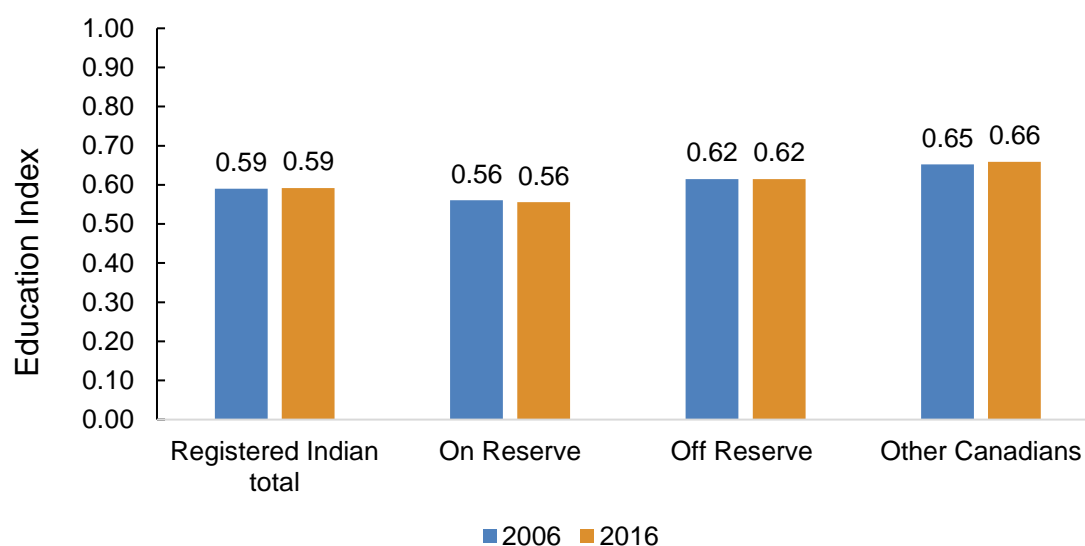
Table 5: Percent aged 15 to 34 attending school, Registered Indians and other Canadians, 2006 and 2016

		2006	2016	Change (2016-06)	% Change
<b>Registered Indian</b>	Male	36.4%	34.1%	-0.02	-6.1
	Female	39.3%	38.6%	-0.01	-1.8
	Total	37.9%	36.4%	-0.01	-3.8
On Reserve	Male	32.9%	30.2%	-0.03	-8.1
	Female	36.5%	33.7%	-0.03	-7.8
	Total	34.7%	31.9%	-0.03	-8.0
Off Reserve	Male	39.8%	36.9%	-0.03	-7.4
	Female	41.7%	41.5%	0.00	-0.4
	Total	40.8%	39.3%	-0.02	-3.7
<b>Other Canadians</b>	Male	42.1%	41.4%	-0.01	-1.7
	Female	44.7%	44.4%	0.00	-0.8
	Total	43.4%	42.9%	-0.01	-1.2

Among Registered Indians, the percentage attending school was higher off reserve than on reserve. This also fell slightly from 2006 to 2016, when 31.9% of the on-reserve population 15 to 34 and 39.3% of the off-reserve population in that age range were attending school. Among both on reserve and off reserve populations, females were more likely to attend school than males. Among those on-reserve, this gap remained fairly constant between 2006 and 2016, while the gender gap widened slightly among those on- reserve (Table 5).

These two education indicators are combined with equal weights to form the education index. As shown in Figure 6, the on-reserve Education Index scores were unchanged, while the off-reserve scores increased slightly, from 0.61 to 0.62. Overall, the Registered Indian scores on the Education Index remained at 0.59. Other Canadians' scores increased slightly, from 0.65 to 0.66.

Figure 6: Canadian education index scores, Registered Indians and other Canadians, 2006 and 2016



### Per capita annual income

The average (per capita) incomes of both Registered Indians and other Canadians increased substantially between 2005 and 2015. As shown in Table 6, the average

annual incomes of Registered Indians rose from \$14,349 in 2005 to \$19,626 in 2015, in constant 2011 dollars. Other Canadians' incomes were considerably higher, but increased slightly less, from \$31,438 to \$36,272.

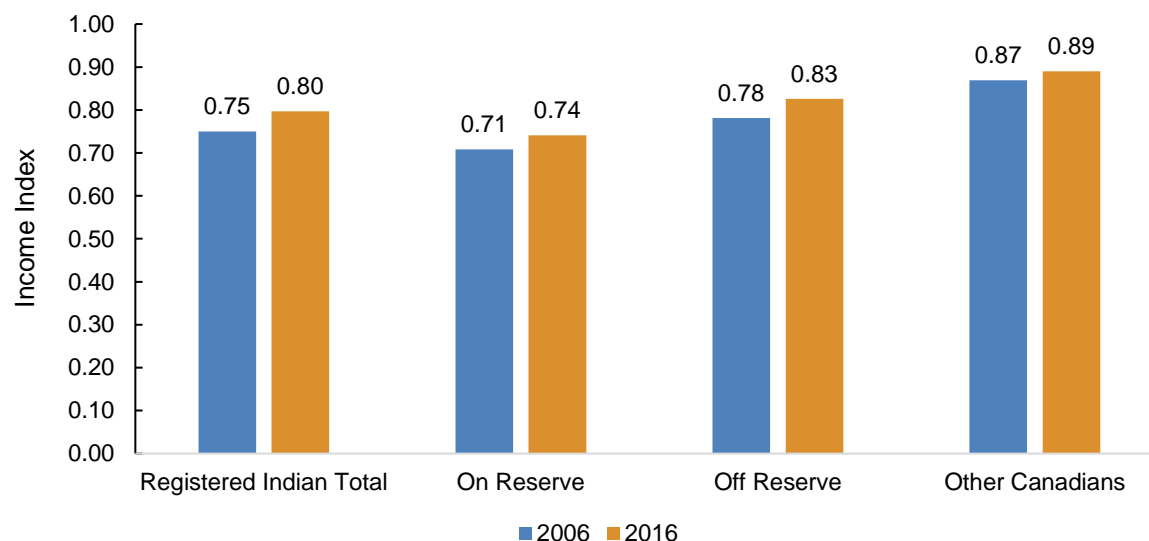
Average incomes were higher off reserve than on reserve, and this gap widened between 2005 and 2015. The average per capita income of on-reserve Registered Indians was only \$10,820 in 2005, and rose to \$13,505 in 2015 – a difference of \$2,686. Among Registered Indians living off reserve, average income was \$17,619 in 2005 and this increased by \$6,149 to \$23,768 in 2015.

Among those living on reserve, the average income of women was higher than those of men, and this gender gap increased slightly between 2005 and 2015. In 2015, on-reserve women had an average income of \$14,466 compared to \$12,553 among men, a difference of \$1,913. Among those off reserve, men had higher incomes. Average income among male off-reserve Registered Indians was \$26,614 in 2015, \$5,359 higher than that of off-reserve females (\$21,255), a gap that had increased over the decade.

Table 6: Per capita annual income, Registered Indians and other Canadians, 2005 and 2015 (\$2011)

		2005	2015	Change (2015-05)	% Change
<b>Registered Indian</b>	Male	14,803	20,705	5,901	39.9
	Female	13,927	18,620	4,694	33.7
	Total	14,349	19,626	5,277	36.8
On Reserve	Male	10,455	12,553	2,098	20.1
	Female	11,192	14,466	3,273	29.2
	Total	10,820	13,505	2,686	24.8
Off Reserve	Male	19,231	26,614	7,383	38.4
	Female	16,244	21,255	5,011	30.8
	Total	17,619	23,768	6,149	34.9
<b>Other Canadians</b>	Male	38,642	43,082	4,440	11.5
	Female	24,496	29,658	5,162	21.1
	Total	31,438	36,272	4,834	15.4

Figure 7: Canadian income index scores, Registered Indians and other Canadians, 2006 and 2016



As shown in Figure 7, the impact of increasing per capita income on the income index scores was greatest for Registered Indians, for whom the income index increased by 0.047 (0.750 to 0.797), compared with and 0.021 increase among other Canadians (0.869 to 0.890).

#### Contributions of the components to the HDI gap

The use of the geometric mean in the calculation of the HDI complicates an analysis of the contribution of each of the indices to the overall HDI gap, because the degree to which a given improvement in any of the indices affects the overall HDI depends on the level of those indices. In order to estimate the contribution of each of the indices, Table 7 presents the change in the estimated Registered Indian HDI and the HDI gap that would result from each of the indices for Registered Indians reaching parity with other Canadians. An improvement in Registered Indian life expectancy compared to other Canadians levels would result in the greatest reduction of the gap, by 43.6%. Equality on the education measures or the income measure would each reduce the gap by about 27%, if the levels on the other indicators are held constant.

Table 7: Effects of equality in life expectancy, education and income indices on the HDI gap

	<b>Registered Indian Total (R.I.)</b>	<b>Other Canadians (O.C.)</b>	<b>Gap (O.C.-R.I.)</b>	<b>Gap improvement 2006–16 (%)</b>
Life Expectancy Index	0.84	1.00	0.16	
Education Index	0.59	0.66	0.07	
Income Index	0.80	0.89	0.09	
HDI	0.74	0.84	0.10	
HDI with equal life expectancy	0.78	0.84	0.06	43.6
HDI with equal education	0.76	0.84	0.08	26.6
HDI with equal income	0.76	0.84	0.07	27.4

### Adjusted HDI scores for international ranking

In order to place Registered Indian populations among countries ranked by HDI scores, we used the HDI rankings for the year 2017, which use data for years 2016/17, and which are published in the UNDP's *2018 Statistical Annex* (UNDP, 2018). We adjusted each of our Canadian HDI estimates for each of the indicators by the ratio of the total Canadian population value on our indicators, to the total Canadian value published by the UNDP (2018). The resulting adjusted values are in Table 8. In order to examine the effects of the changes in 2006 and 2016 scores on the HDI rankings, we place both the 2006 and 2016 Registered Indian populations on the 2017 international HDI rankings.

Table 8: Adjusted 2016 HDI and Component Index Scores for 2017 International Ranking

	<b>Life expectancy Index</b>	<b>Education Index</b>	<b>Income Index</b>	<b>HDI</b>
Registered Indian	0.81	0.80	0.823	0.811
Other Canadians	0.97	0.90	0.919	0.928
Registered Indian on-reserve	0.78	0.74	0.765	0.761
Registered Indian off-reserve	0.84	0.84	0.853	0.844



In 2017, Canada was ranked 12<sup>th</sup> among 189 countries, with a total HDI of 0.93 (Table 9). The UNDP refers to countries with HDI scores above 0.80 as having “very high” human development. Those between 0.750 and 0.799 are “high” human development countries. Countries with scores from 0.500 and 0.699 have “medium” levels of human development, while those with HDI scores 0.499 and below are “low” human development countries.

We estimate that the off-reserve Registered Indian population in 2016 would rank roughly 42<sup>nd</sup>, near countries such as Latvia and Chile. The improvement in HDI scores between 2006 and 2016 would result in the off reserve population moving up roughly five place rankings, from 47<sup>th</sup> place, near Croatia and Bulgaria (Table 8). In both 2006 and 2016, this would place the off-reserve Registered Indian population among “very high” human development countries.

Using this method, the 2016 total Registered Indian population would rank roughly 52<sup>nd</sup> among countries in the 2017 rankings. This is an improvement from 2006, when the Registered Indian population would rank roughly 63<sup>rd</sup>, close to countries like the Seychelles and Turkey. This improvement would result in the total Registered Indian population, moving from the “high” human development group of countries, into the “very highly” developed countries.

The 2016 on-reserve Registered Indian population would rank roughly 78<sup>th</sup> among countries, close to Bosnia–Herzegovina and Venezuela in that year. This would place this population among countries with “high” levels of human development. The improvement from 2006 would move the on-reserve population up roughly 11 places, from 89<sup>th</sup>, near Ukraine and Peru.

Table 9: 2017 HDI Rankings of select countries and Registered Indian populations, using adjusted HDI scores

	HDI Rank	Country	HDI Score
<b>Very High Human Development</b> (select countries ranked 1 to 58)	1	Norway	0.953
	2	Switzerland	0.944
	3	Australia	0.939
	4	Ireland	0.938
	5	Germany	0.936
	6	Iceland	0.935
	7	Hong Kong, China (SAR)	0.933
	7	Sweden	0.933
	10	Netherlands	0.931
	11	Denmark	0.929
	<b>12</b>	<b>Canada</b>	<b>0.926</b>
	13	United States	0.924
	14	United Kingdom	0.922
	15	Finland	0.920
	16	New Zealand	0.917
	19	Japan	0.909
	20	Austria	0.908
	39	Saudi Arabia	0.853
	41	Latvia	0.847
	<b>Registered Indian Off Reserve 2016</b>		<b>0.844</b>
	44	Chile	0.843
	45	Hungary	0.838
	46	Croatia	0.831
	<b>Registered Indian Off Reserve 2006</b>		<b>0.828</b>
	47	Argentina	0.825
	51	Bulgaria	0.813
	<b>Registered Indian Total 2016</b>		<b>0.811</b>
	52	Romania	0.811
	58	Barbados	0.800
<b>High Human Development</b> (select countries ranked 60–112)	60	Iran (Islamic Republic of)	0.798
	60	Palau	0.798
	62	Seychelles	0.797
	<b>Registered Indian Total 2006</b>		<b>0.792</b>
	63	Turkey	0.791
	66	Panama	0.789
	69	Trinidad and Tobago	0.784
	72	Saint Kitts and Nevis	0.778
	73	Cuba	0.777
	74	Mexico	0.774
	75	Grenada	0.772
	76	Sri Lanka	0.770
	77	Bosnia and Herzegovina	0.768
	<b>Registered Indian On Reserve 2016</b>		<b>0.761</b>
	78	Venezuela	0.761
	83	Thailand	0.755
	85	Algeria	0.754
	86	China	0.752
	86	Ecuador	0.752
	88	Ukraine	0.751
	<b>Registered Indian On Reserve 2006</b>		<b>0.750</b>
	89	Peru	0.750

Table 9, continued

	HDI Rank	Country	HDI Score
<b>High Human Development</b> (continued)	90	Colombia	0.747
	94	Dominican Republic	0.736
	95	Jordan	0.735
	97	Jamaica	0.732
	103	Dominica	0.715
	104	Samoa	0.713
	105	Uzbekistan	0.710
	106	Belize	0.708
	112	Moldova (republic of)	0.700
<b>Medium Human Development</b> (select countries ranked 113–151)	113	Philippines	0.699
	115	Egypt	0.696
	116	Viet Nam	0.694
	120	Iraq	0.685
	121	El Salvador	0.674
	122	Kyrgyzstan	0.672
	123	Morocco	0.667
	124	Nicaragua	0.658
	125	Cabo Verde	0.654
	125	Guyana	0.654
	127	Guatemala	0.650
	127	Tajikistan	0.650
	129	Namibia	0.647
	130	India	0.640
	140	Ghana	0.592
	150	Pakistan	0.562
	151	Cameroon	0.556
<b>Low Human Development</b> (select countries ranked 152–189)	152	Solomon Islands	.0546
	153	Papua New Guinea	0.544
	154	Tanzania (United Republic of)	0.538
	155	Syrian Arab Republic	0.536
	156	Zimbabwe	0.535
	157	Nigeria	0.532
	158	Rwanda	0.524
	159	Lesotho	0.520
	159	Mauritania	0.520
	161	Madagascar	0.519
	162	Uganda	0.516
	163	Benin	0.515
	164	Senegal	0.505
	170	Côte d'Ivoire	0.492
	176	Congo (democratic republic of)	0.457
	178	Yemen	0.452
	180	Mozambique	0.437
	184	Sierra Leone	0.419
	186	Chad	0.404
	187	South Sudan	0.388
	189	Niger	0.354

Notes: Country Rankings from UNDP (2018), which uses data from 2016/17.

Only select countries of a total of 189 are shown.

## Sensitivity Analysis

As any measure, the HDI estimates are potentially sensitive to the choices of measures included and the data sources used to estimate them. The indicators that were used in the Registered Indian HDI are conceptually similar to those used by the UNDP.

However, identifying appropriate values for these indicators requires a number of methodological choices to be made. This was particularly the case for the education measures, which required choices to be made about the number of years of schooling assigned to each level of education and the age ranges used, as well as life expectancy, the estimation of which involved important assumptions regarding infant mortality.

It is important to understand how much these particular choices might affect the HDI estimates presented in this report, and how different the results would be if other choices had been made. We therefore re-estimated the HDI scores using some alternative estimates of the education and life expectancy measures. Below we investigate some of these methodological choices, and present the results of a sensitivity analysis, comparing the HDI estimates using alternative measures or values on those measures to the ones presented above.

### Education Index

The education index used to estimate the HDI includes two indicators— mean years of schooling and the percentage attending school. The mean years of schooling indicator was estimated using the method described by UNESCO (2013), and data on educational attainment or completion. This method is straightforward: by assigning a number of years of completed education to each level of educational attainment, multiplying those by the number of people in each level, and summing these for all levels, we can arrive at an estimate of the total number of years of school completed. By dividing by the total population, we estimate the average number of years of education.

This method of estimating of the average number of years of schooling is potentially sensitive to the years of education that are assigned to each level of educational attainment. We assigned “typical” program lengths to most of the categories. High school was given 12 years, a university degree four years, university certificate below bachelor’s level two years, for example. However, a major limitation to this method is that Census data used for this report lack detailed information on the educational level of those with less than a secondary (high) school diploma. As of 2006, the Census does not ask about the last grade completed, and therefore all of those who did not complete high school or a higher certification are in a single category, having “no certificate, diploma or degree.” We assigned a value of 10 years of education to this category, although it includes people who have varying levels of secondary or primary education. This value was used for both the Registered Indian and other Canadian populations.

Table 10 shows the distribution of Registered Indians and other Canadians on this indicator in 2016. The proportion of Registered Indians with less than high school attainment is higher than the proportion for other Canadians, and therefore, to the degree that the assigned value of 10 years of education under- or over-estimates the actual average number of years for people in this category, it will affect the Registered Indian estimates more. If the average number of years of education for people in this category is less than 10, then using a value of 10 will increase the average years of education for Registered Indians more than other Canadians, thus reducing the observed gap between the two populations.

There are no known current national data on the number of years of schooling among those without a secondary school certificate that might be used in the place of the Census. The 2012 Aboriginal Peoples Survey dataset, however, includes a derived variable indicating the highest grade completed before leaving school, for those who did not complete high school but who have completed a secondary school equivalence program (Cloutier and Langlet, 2014). As Table 11 shows, the majority of off-reserve

Registered Indians aged 18 to 64 in 2012, who completed high school equivalency had left school in the upper years, with the highest proportion leaving in Grade 11.

Table 10: Highest degree, diploma or certificate, Registered Indian and other Canadians aged 25 and older, 2016

	<b>Registered Indian on reserve</b>	<b>Registered Indian off reserve</b>	<b>Other Canadians</b>
No certificate, diploma or degree	45.2%	27.5%	15.2%
Secondary (high) school diploma or equivalency certificate	18.9%	25.0%	24.1%
Apprenticeship or trades certificate or diploma	11.4%	11.8%	10.7%
College, CEGEP or other non-university certificate or diploma	15.8%	22.3%	20.8%
University certificate or diploma below bachelor level	3.3%	2.6%	3.1%
Bachelor's degree	4.7%	8.7%	19.7%
Master's degree	0.6%	1.9%	5.5%
Earned doctorate	0.1%	0.2%	1.0%
Total	100.0%	100.0%	100.0%

*Source: 2016 Census data.*

These data were only collected from Aboriginal people living off-reserve, and therefore do not provide any information for other Canadians or for the on-reserve Registered Indian population. They also apply only to those who had completed a high school equivalency program, and these individuals might have attended more years of school before leaving, than those who did not eventually complete such a program.

However, these data do provide some evidence on the average number of years of schooling for those with less than high school. Using a similar method as used to calculate the average years of education for the HDI, we can multiply the proportion in each of the categories in Table 11 by the number of years represented (with 0 years for Kindergarten and five years for Grades 1 to 5), to estimate a total number of years of schooling. Dividing by 100, this provides an estimated mean of 10.6 years for this

group. This adds support for assigning a relatively high value (10 or 11 years of schooling) to those with less than high school.

Table 11: Off-reserve Registered Indians aged 18 to 64 who did not complete high school, by highest grade completed before leaving school

Highest grade completed	Registered Indian off reserve
Kindergarten	0%
Grades 1 to 5	1%
Grade 6	3%
Grade 7	4%
Grade 8	11%
Grade 9	12%
Grade 10	22%
Grade 11	25%
Grade 12	22%
Total	100%

*Source: 2012 Aboriginal Peoples Survey*

In order to examine the effects on the HDI of the use of 10 years for this category, we re-calculated the Education Index and HDI scores in two alternative ways. Table 12 shows the effects of assigning a value of 5 years to those with less than secondary school completion, but using the same values for the other HDI indicators as were presented in the main report. Compared to the use of 10 years in calculating the mean years of education, this reduces the overall Registered Indian HDI from 0.74 to 0.71, and the HDI for other Canadians from 0.84 to 0.83. The result is that the difference in HDI scores between the two populations widens from 0.10 to 0.12.

Of course, it is possible that the average number of years completed before dropping out is different for Registered Indians and other Canadians. We do not have information that would allow us to estimate those differences, but Table 11 also shows a scenario in which a value of 5 years is used for Registered Indians (on and off reserve) and 10 years is used for other Canadians. In this case, the HDI difference widens to 0.13.

Table 12: Effects of alternative assumptions regarding mean years of education on the Education Index and HDI, 2016

	<b>Mean years of education</b>	<b>Education Index</b>	<b>HDI</b>
<i>10 years assigned to &lt;Grade 12</i>			
Registered Indian total	12.3	0.59	0.74
Registered Indian on reserve	11.9	0.56	0.69
Registered Indian off reserve	12.6	0.62	0.76
Other Canadians	13.3	0.66	0.84
<i>5 years assigned to &lt;Grade 12</i>			
Registered Indian total	10.6	0.54	0.71
Registered Indian on reserve	9.6	0.48	0.66
Registered Indian off reserve	11.2	0.57	0.74
Other Canadians	12.6	0.63	0.83
<i>10 years (Reference Population), 5 years (Registered Indians)</i>			
Registered Indian total	10.6	0.54	0.71
Registered Indian on reserve	9.6	0.48	0.66
Registered Indian off reserve	11.2	0.57	0.74
Other Canadians	13.3	0.66	0.84

The second indicator used to calculate the education index in this report is the proportion of those aged 15 to 34 attending school. As described in the Methods section above, this age range was selected because of the higher proportion of Indigenous people who return to education at older ages, and a desire to avoid misleadingly low estimates of educational attendance among Registered Indians.

The use of this age range might lead to another problem, however. By including those who are beyond the typical ages of even university attendance, we might observe changes in this measure over time because of changes in labour market conditions and the way that they affect people's choices regarding education and work. In particular,



we might see this indicator decrease during times of lower unemployment and more opportunities for work, as people choose to enter the labour market, rather than attend school. This would result in a lower education index and therefore lower HDI.

Conversely, some people might choose to return to school during times of higher unemployment. This would most likely affect older age groups and choices regarding post-secondary education.

Table 13: Percent attending school by age range, Registered Indians and other Canadians, 2006 and 2016

	<b>2006</b>	<b>2016</b>
<i>Ages 15 to 34</i>		
Registered Indian total	37.9	36.4
Registered Indian on reserve	43.4	42.9
Registered Indian off reserve	34.7	31.9
Other Canadians	40.8	39.3
<i>Ages 15 to 29</i>		
Registered Indian total	44.0	42.5
Registered Indian on reserve	53.0	53.5
Registered Indian off reserve	40.1	37.4
Other Canadians	47.8	45.9
<i>Ages 15 to 24</i>		
Registered Indian total	53.1	53.5
Registered Indian on reserve	66.9	70.1
Registered Indian off reserve	48.5	47.4
Other Canadians	57.6	57.6

In Table 12, we see some evidence of this. The percentage of those aged 15 to 34 who were attending school fell for the Registered Indians and Other Canadians between 2006 and 2016. However, when the age range is restricted to 29 years, we see that among the on-reserve population there was a slight increase in the percentage attending school. When the age range is further reduced to include those 15 to 24 only, school attendance increases for the total Registered Indian population and the population on reserve, although it falls slightly for those off reserve and is constant for other Canadians.

We again examine these effects by recalculating the education index and the HDI for these populations, using these three different age ranges in the definition of this indicator. Using the age range of 15 to 29 increases the HDI gap between other Canadians and the total Registered Indian population to 0.11 from 0.10, the gap that results from using a 15 to 34 age range. Using ages 15 to 24 further increases this gap to 0.12 (Table 13).

Table 14: Effects of alternative age ranges for the percent attending school indicator on the Education Index and HDI, 2016

	<b>Percent attending school</b>	<b>Education Index</b>	<b>HDI</b>
<i>Ages 15 to 34</i>			
Registered Indian total	36.4	0.59	0.74
Registered Indian on reserve	42.9	0.56	0.69
Registered Indian off reserve	31.9	0.62	0.76
Other Canadians	39.3	0.66	0.84
<i>Ages 15 to 29</i>			
Registered Indian total	42.5	0.62	0.75
Registered Indian on reserve	53.5	0.58	0.71
Registered Indian off reserve	37.4	0.65	0.78
Other Canadians	45.9	0.71	0.86
<i>Ages 15 to 24</i>			
Registered Indian total	53.5	0.68	0.77
Registered Indian on reserve	70.1	0.64	0.73
Registered Indian off reserve	47.4	0.71	0.80
Other Canadians	57.6	0.78	0.89

## Life expectancy Index

Identifying appropriate values of life expectancy at birth for the Registered Indian population was a major challenge for previous applications of the HDI. In this report, we addressed this by using life expectancy estimates that were specifically created for this application by Statistics Canada, using linked Census and vital statistics data. These estimates are an improvement over previous estimates used for the HDI. They used a consistent methodology to produce estimates for on- and off-reserve Registered Indians and other Canadians for 2006 and 2016, whereas previous attempts used a method of adjusting publicly-available estimates that were not produced for exactly the years nor populations of interest. Nonetheless, the new method does have some important limitations that are mainly due to the small size of the Registered Indian population and to the difficulty estimating infant mortality from the available data.

In order to examine the sensitivity of the HDI indicators to the specific estimates of life expectancy at birth, we re-calculated the life expectancy index and the HDI for two alternate levels of life expectancy for Registered Indians. As a scenario in which Registered Indian life expectancy is actually lower, we used 73 years for the total Registered Indian population, 71 years for those in reserve and 75 for those off-reserve (Table 15). This resulted in an HDI gap between other Canadians and Registered Indians of 0.11, compared to 0.10 using the estimates provided in the main analyses. As a higher life expectancy scenario, we used a value of 77.5 years for the total Registered Indian population, 75.0 for the on-reserve population and 80.0 for the off-reserve population. This narrowed the Other Canadian-Registered Indian HDI gap to 0.09.

Although they did result in changes to HDI scores, the sensitivity analysis reveals that the different measures we tested did not result in dramatic changes in the HDI gaps— the difference between Registered Indians and other Canadians. In order to show how these changes would affect the international ranking of the Registered Indian populations, we re-estimated the adjusted HDI values for three of the changes to the

HDI measures that we described above. Table 15 presents these adjusted HDI values and the international rankings that would result.

Table 15: Effects of alternative life expectancy at birth estimates on the Life Expectancy Index and HDI, 2016

	<b>Life expectancy at birth (years)</b>	<b>Life Expectancy Index</b>	<b>HDI</b>
<i>Statistics Canada estimates</i>			
Registered Indian total	74.6	0.84	0.74
Registered Indian on reserve	72.6	0.81	0.69
Registered Indian off reserve	76.6	0.87	0.76
Other Canadians	84.9	1.00	0.84
<i>Lower Registered Indian life expectancy</i>			
Registered Indian total	73.0	0.82	0.73
Registered Indian on reserve	71.0	0.79	0.69
Registered Indian off reserve	75.0	0.85	0.76
Other Canadians	84.9	1.00	0.84
<i>Higher Registered Indian life expectancy</i>			
Registered Indian total	77.5	0.89	0.75
Registered Indian on reserve	75.0	0.85	0.70
Registered Indian off reserve	80.0	0.87	0.76
Other Canadians	84.9	1.00	0.84

Changing the mean years of schooling indicator to use 5 years for Registered Indians and 10 years results in the total Registered Indian population's 2016 rank changing from 52 to 71. Changing the second education indicator to the percentage attending school among those aged 15 to 24, from 15 to 34, results in Registered Indians ranking 32<sup>nd</sup> among countries according to the HDI index scores. Lastly, changing the estimates of life expectancy at birth to the lower values presented in Table 14 results in the Registered Indian population being ranked 57<sup>th</sup> among countries.

This sensitivity analysis demonstrates that these particular choices made regarding assigning years of schooling to those with less than high school, and the age range for the school attendance indicator, do not affect the observed difference between Registered Indian and other Canadian scores on the HDI. Likewise, using alternative values for life expectancy at birth did not result in substantially different HDI gaps. However, they did affect the rankings of the Registered Indian populations among countries to a larger degree. This highlights the importance of being cautious in the interpretation of the international rankings. Instead, attention to the change in individual indicators for the Canadian populations, is likely to be more informative for understanding the overall conditions of Registered Indian populations.

Table 16: Effects of alternative measures for education and life expectancy on the 2016 HDI adjusted for international ranking

Scenario 1			Scenario 2		Scenario 3			
	Adjusted HDI	2016 Rank	Adjusted HDI	2016 Rank	Adjusted HDI	2016 Rank	Adjusted HDI	2016 Rank
Registered Indian total	0.811	52	0.792	71	0.869	32	0.803	57
Registered Indian on reserve	0.761	78	0.734	96	0.814	50	0.753	84
Registered Indian off reserve	0.844	42	0.829	47	0.905	20	0.836	46

**Scenario 1:** Education 1 indicator (mean years of schooling) changed to use 5 years for Registered Indians with less than high school, 10 years for other Canadians.

**Scenario 2:** Education 2 indicator (percent attending school) calculated for population 15 to 24.

**Scenario 3:** Life expectancy at birth for Registered Indians changed to 73.0 years (total), 75.0 years (off reserve), 71.0 years (on reserve)

## Conclusions

This report uses an adaptation of the UNDP's HDI methodology to understand how the relative conditions of Registered Indians and other Canadians has recently changed. The HDI approach provides a framework to examine how these two populations compare on life expectancy, education and income, and how the gaps between them have changed between 2006 and 2016.

Overall, the HDI scores for both populations increased over the period, and the gaps in HDI scores between Registered Indians and other Canadians decreased slightly. Among Registered Indians, there were improvements in total HDI scores for both the on- and off-reserve populations, although not uniformly across all regions.

Registered Indians as well as other Canadians saw improvements in life expectancy between 2006 and 2016, but the gap in life expectancy widened slightly. The mean years of schooling among those 25 and older also increased for both populations by roughly the same amount. The percentage 15 to 34 attending school increased slightly for both Registered Indians and other Canadians. Per capita income improved more for Registered Indians than for other Canadians, although important gaps remained.

In previous applications of the UNDP methodology, we estimated the position of the Registered Indian population if ranked among countries on HDI scores. In this paper we re-estimated this ranking, using 2016 data. We estimate that the Registered Indian population in 2016 would be among those countries identified by the UNDP as having "very high" human development, while the 2006 Registered Indian population would have ranked among those with "high" human development. The 2016 on-reserve Registered Indian population would be somewhat lower, among countries with "high" human development, but the rank of this population also would have improved between 2006 and 2016.

## Limitations

There are several important limitations to the data presented in this report. The most important is that changes in the methods and data make comparisons to previous applications of the HDI to Registered Indians in Canada impossible. Because of changes to the data available from the Census, it is not possible to create HDI indicators for 2006 and 2016 that could be compared to those that have been published for previous years.

Another important limitation is to the international rankings presented here. The sensitivity analysis shows that, although the difference between the HDI scores for Registered Indians and other Canadians is not very sensitive to choices made regarding the calculation of the education and life expectancy indicators, the HDI scores and therefore the international HDI rankings of Registered Indians are affected by these methodological choices. Interpretation of the ranking of Registered Indian populations among countries should therefore be made with a great deal of caution. Moreover, the methods used to adjust Canadian HDI scores for international comparison includes several assumptions that might not be met for all populations.

There are limitations to the use of these HDI measures for examining some differences. In particular, estimates of life expectancy were not available separately for on and off-reserve populations in the Atlantic region and Territories. The life expectancy index and the HDI are therefore not useful for examining on and off-reserve differences in these regions.

These data are subject to the general limitation that changes in the HDI and component indicators scores between years cannot be separated from differences due to changes in data quality. Unlike the 2011 Census/National Household Survey, the 2006 and 2016 Censuses were conducted using comparable enumeration and sampling methods. Nonetheless, changes to the way that people respond to the Census can result in

observed differences on the education and income indicators. This might include changes to the population that responds to the Census. In particular, the participation of First Nations individuals (both Registered and non-Status First Nations) and communities changes from Census year to Census year, and the estimates presented here have not been adjusted for incompletely enumerated First Nations reserves.

The population that identified as Registered Indian in the Census also changes between Census period. Although the Registered Indian population is legally defined and is therefore not as subject to individual “ethnic mobility” as the Aboriginal identity population (Caron-Malenfant et al., 2014), there might be changes in the likelihood of people reporting being registered under the *Indian Act* on the Census. As well, legislative changes such as the recognition of the Qalipu Mi’kmaq First Nation in 2014, as well as the implementation of *Bill S-3* would affect the size and composition of the Census Registered Indian population (Clatworthy, 2017) and may lead to unknown changes to the observed values on the education and income indicators.



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