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Estimating Institutionalization and Homelessness for Status First Nations in Canada: A Method and Implications

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Abstract
We propose an accessible and repeatable method for calculating rates of institutionalization and homelessness by age and gender among Status First Nations in Canada. We calculate this measure by combining Census and administrative data—a method that could be estimated fairly easily over time. We estimate extremely high rates of institutionalization and homelessness, especially among young Status men. We estimate that, averaged over 2001 and 2006, 12% of the Status male population was either institutionalized or homeless. We show that this high rate of institutionalization and homelessness results in a distortion in the male–female gender ratio, which may have long-run implications for the continued legal existence of Status First Nations in Canada.

Keywords
First Nations, Status Indian, Registered Indian, homelessness, institutionalization, gender ratio

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Estimating Institutionalization and Homelessness for Status First Nations in Canada: A Method and Implications

There is a broadly recognized need to further develop indicators of Indigenous well-being. In Canada, specifically, there have been calls for a more complete set of well-being measures that can be assessed over time (Truth and Reconciliation Commission of Canada, 2015). Concurrently, there have been independent calls for a more complete and consistent counting of the homeless (Belanger, Awosoga, & Head, 2013; Schiff, Schiff, Turner, & Bernard, 2016) and institutionalized population (Millar & Owusu-Bempah, 2011).[1] In this article, we propose that current national census data and administrative data from Indigenous and Northern Affairs Canada can be used to construct national estimates of the rate of homelessness and institutionalization for the largest Indigenous population in Canada—Status First Nations—by gender and age. While our proposed measure cannot separately identify institutionalization and homelessness, it is easily accessible and repeatable and offers a meaningful measure of social marginalization.

Our method provides the first and most comprehensive estimates of institutionalization and homelessness among Status First Nations in Canada by gender and age and may, by extension, be useful for Indigenous people in other parts of the world.[2] Previous work on institutionalization and homelessness has either relied on specialized surveys in large, urban settings or focused on certain types of institutionalization or homelessness (see for example Belanger et al., 2013; Government of Canada, 2016; Schiff et al., 2016). Measures of institutionalization and/or homelessness have also largely been flow based; for example, these measures tend to focus on the number of homeless people who are housed in a shelter over a given time period. These flow-based measures are not able to account for the entire population of homeless individuals as it is only able to identify those that have taken advantage of these homeless shelters or other assistance centers. While there are benefits to these types of measures in specific contexts, our method has several advantages over such measures. First, we rely on pre-existing data sets that will be maintained into the foreseeable future, making our method both inexpensive and repeatable. Second, our method offers an inclusive measure of social marginalization available at the national level. Third, it enables the identification of national-level demographic patterns and trends that small sample-based studies may miss.

Given that current measures of homelessness and institutionalization for the Status First Nations population are often based on inconsistently collected sample data for limited time periods or regions, they are unable to provide consistent national counts over long periods of time. Alternatively, certain regions and/or areas may not be adequately represented in existing sample-based data, and the homeless or institutionalization incidence in rural or smaller urban areas may be completely ignored. Inaccurate or non-existent data on homelessness or institutionalization necessarily impacts service provision and

[1] The homeless and institutionalized population includes individuals in all forms of emergency shelters, individuals in group transitional housing, the unsheltered, and all institutionalized individuals such as those who are in prison, jail, group homes, or recovery facilities.

[2] While the details of the method we propose is specific to the Canada, it may prove useful anywhere Indigenous people are identifiable and systematically under counted in official censuses but are identifiable through other official or administrative records at the community, village, or tribal level. For instance, India has explicit laws and programs for the Scheduled Tribes and Castes, Australia has programs for Aboriginal peoples, and New Zealand for Māori peoples.

policy advocacy for vulnerable populations of First Nations peoples. The systematic undercounting of these populations can result in a systematic under allocation of resources to address their needs.

The methodology described here only allows us to provide our estimates of the *Status* First Nations population. Status First Nations are First Nations individuals who are recognized under Canada's Indian Act as "Indians" for the purposes of legal rights and entitlements. Who is eligible for Status is determined by a set of descendancy rules from the individuals first identified as members of an Indian band in the late 1800s. While these descendancy rules historically have been gender biased, legislative changes in 1985 and 2010 corrected some of the most obvious biases (See Hurley & Simeone, 2014 for a recent discussion). While the descendancy rules are not strictly based on blood quantum, they effectively operate as such. In our discussion, we relate how our findings may interact with the definition of Indian Status to have significant implications for the Status population.

In the next section, we will describe the Canadian context and discuss the institutions that have generated the data we used. In the following section, we will discuss the data itself. Next, we will discuss our method for estimating the number of Status women and men affected by institutionalization and homelessness. Then, we will present our main results, and, finally, we will expand upon these results, discuss their implications, and conclude.

Background: The Canadian Context, Registered First Nations Indian Status, and the Indian Register

As of 2011, the Status First Nations population in Canada was approximately 637, 660, which represents roughly 75 percent of the total First Nations population in the country and 2 percent of the total Canadian population (Statistics Canada, 2013a).[3] The remaining First Nations population does not have Indian Status under the Indian Act; however, both Status and non-Status First Nations are recognized as "Indians" under the Constitution Act 1982 (*Daniels v. Canada*, 2016). There are two other legally defined groups of *Aboriginal* peoples in Canada: the Inuit and the Métis. While there are legal infrastructures surrounding these groups as well, to our knowledge, they are not nearly as systematic and pervasive as those governing Status First Nations (Feir & Hancock, 2016). Ideally, we would measure these groups as well, but we are unable to do so using the method we propose in this article because comparable government data are not collected.

Since Confederation, the Canadian government has regarded Indigenous Peoples as wards of the state for whom it has the responsibility to manage, define, and document. In 1951, the Canadian government established a centralized Indian Register that consolidated all existing band membership data into a single list. Everyone who is classified as a Status Indian is on this list no matter where they live and regardless of whether they are institutionalized or not. In order to execute the will of a Status First Nations person or make arrangements for the administration of his or her estate, the death must be reported to the Indian Register. First Nations governments (called bands) are also required to submit death certificates as part their funding agreements with the Canadian government. Individuals on the

[3] The more accepted term in Canada is First Nations but, where applicable, we use the terms consistent with legislation and survey sources. Some Indigenous Peoples in Canada (approximately 25% of the population) may not meet the legal requirement for Status based on ancestry; yet, they still either ethnically, culturally, or politically identify as First Nations.

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death certificates as part their funding agreements with the Canadian government. Individuals on the Register are also required to report if they leave the country or move. The Indian Register provides an official record identifying all Status First Nations persons in Canada (Indigenous and Northern Affairs Canada, 2010).[4] Indigenous and Northern Affairs Canada (INAC) is the Canadian federal department that currently oversees the Indian Register and is responsible for enacting the terms and regulations set out under the Indian Act.

The legal definition of Status Indian confers certain rights and benefits. For example, among First Nations, Indian Status confers the right to live on reserve, vote in band elections, receive money from one's band, and own or inherit property on reserve (Furi & Wherrett, 2003). Historically, Indian Status has also limited other rights and access to benefits that are available to non-Status peoples in Canada. For example, First Nations have been subject to forced education programs (e.g., the Indian Residential School System), forced removals and relocations, prohibitions against using their traditional languages, restrictions on their self-governance, and restricted access to and control of their lands and natural resources. Furthermore, the legislation that determined who could be registered as a Status Indian was explicitly biased against women who married non-Status men until the mid-1980s (Brownlie, 2006; Furi & Wherrett, 2003; Government of Canada, 2011; Hurley & Simeone, 2014).[5]

Differences in living conditions between Indigenous and non-Indigenous peoples are well-documented in Canada and elsewhere in the world.[6] Status Indians, especially those living on reserve, have poorer health and lower average incomes than non-Indigenous people, Métis, and Inuit populations (Pendakur & Pendakur, 2011; Tjepkema, Wilkens, Senécal, Guimond, & Penney, 2009). However, current estimates of homelessness and institutionalization are incomplete as they often do not provide national coverage or detailed information that is organized by demographic characteristics (Belanger et al., 2013; Schiff et al., 2016; Truth and Reconciliation Commission of Canada, 2015). Incomplete measures of homelessness and institutionalization (specifically by age and gender) may have significant impacts on our understanding of the social and economic dynamics experienced by Status First Nations peoples. Research or policy that fails to account for the relatively large population of young males who are homeless or institutionalized, for example, will be overestimating the vitality of the population.

To our knowledge, there are two national data sources that have estimated Indigenous homelessness in Canada. Both have their weaknesses and neither provides a complete picture; however, one omits non-urban settings in its analysis and the other omits institutionalized populations. First, Belanger et al.

[4] It is worth noting that Indian Status is a legal construction that may or may not have any bearing on Indigenous Peoples own political or communal identities (Cornet, 2007). However, the benefits associated with Indian Status are non-trivial. For example, Status may confer exemption from certain federal income taxes, potential eligibility for treaty payments, and participation in band-level programs and services.

[5] The grandchildren of women who had lost their Status under the old legislation were differentially treated until 2010 (Hurley & Simeone, 2014); however, the treatment did not differ by the gender of the children. These Status women (and their children) had their status returned in 1985, but it took until 2010 for Indian Status to be granted to their grandchildren.

[6] See Feir and Hancock (2016) for a list of citations documenting this for Canada. For the American case, see Akee and Taylor (2014) and Greenfeld and Smith (1999). For Australia, see Pink and Allbon (2008). Schulhofer-Wohl and Todd (2015) have identified counties in the US that have mortality rates for American Indians that exceed national averages.

(2013) collected data from 18 Canadian cities with homeless counts that included individuals with self-reported Indigenous identity. Their findings suggested that nearly 7 percent of Indigenous people in cities experience homelessness, while less than one percent of the general population experiences homelessness. This leads to the conclusion that 1 in 15 Indigenous persons in urban centers experiences homelessness—roughly 20,358 individuals in 2006. However, as Schiff et al. (2016) have pointed out, these counts do not include any rural areas or smaller cities in which Indigenous homeless population counts could be non-trivial.

The second notable data collection effort, undertaken by Employment and Social Development Canada, is the National Shelter Study (Government of Canada, 2016). This study collected anonymous information from 1.9 million people who stayed in one of over 200 emergency shelters (out of approximately 400) across Canada over a 10-year period. In 2014, it used a stratified cluster sample of emergency shelters to estimate the demographics of users. They estimated that between 38,080 and 45,820 separate Indigenous individuals used a shelter in that year. Note that this estimate is a flow (a count of how many people used an emergency shelter in that year) and not a stock, as in Belanger et al. (2013), which may be thought of as a snapshot at a specific time point. Thus, these estimates are not comparable.

The flow versus stock data distinction is also important for thinking about the available institutionalization data. For example, to our knowledge, incarceration data that includes Indigenous identity is only available on the number of sentenced admissions to provincial or territorial custody, rather than on the number of incarcerated individuals at any given moment.[7] The sentenced admissions data would only provide the incarceration of flow into correctional facilities, but it would not provide any information on the existing number of incarcerated Status First Nations peoples (i.e., the stock measure). In the absence of a base year measure of the stock of people in provincial or territorial custody by Indigenous identity, there is no way to identify the number of Indigenous people incarcerated in any given year. Raw admissions data may potentially count the same individuals multiple times if they are sentenced more than once (Brzozowski, Taylor-Butts, & Johnson, 2006). In addition, regional reporting standards for the Indigenous identity of individuals entering the system are not collected consistently or systematically by all districts or provinces (Millar & Owusu-Bempah, 2011). While available statistics suggest that Indigenous Peoples are heavily overrepresented in the correctional system (Perreault, 2009), to our knowledge, there are no comprehensive national statistics by age and gender that capture the number of Status First Nations (or Indigenous individuals in general) institutionalized federally, provincially, in city jails, and in transitional homes.[8]

For both measures of homelessness and institutionalization, there is significant room for improvement in accounting for the Indigenous population in Canada. While the recent studies mentioned above fill serious data gaps, we see our work as offering a more comprehensive, easily repeatable metric of marginalization for Status First Nations in Canada. Existing studies provide a relatively narrow

[7] While there is information on the number of incarcerated individuals by gender and age on the Census day, there is currently no information on Aboriginal identity (Kong & Beattie, 2005).
[8] The Adult Correctional Services Survey has collected flow data (mentioned above) and the Integrated Correctional Services Survey collected more detailed demographics, but both include all jurisdictions (Perreault, 2009).

accounting of homelessness. For example, in the Government of Canada (2016), the sample is based solely on emergency homeless shelters and does not include women shelters and transitional housing. In addition, neither study mentioned above reports full breakdowns of homelessness by age and gender,[9] nor are they able to include populations in transitional housing and more broadly at risk of homelessness. Our proposed method is inclusive of a broader definition of institutionalization and is also able to disaggregate these counts by age group and gender. Indeed, it is these differences that are the most important for researchers and policymakers. As we will show, the disparities in the incarceration and homeless population at various ages suggests a need for targeted interventions and policies.

To be clear, our measure is not a perfect substitute for those offered by other studies. First, previous analysis has focused on all peoples of Indigenous identity, while our measure is only available for Status First Nations. However, in the context of these other results, our work sheds light on the comprehensiveness of these other measures. Specifically, our method inherently includes all individuals in all forms of emergency shelters (like shelters for domestic violence), those individuals in group transitional housing, the unsheltered, and all institutionalized individuals such as those who are in prison, jail, group homes, or recovery facilities. Since we know the proportion of all Indigenous Peoples in Canada who are Status First Nations, our estimates could give us a basis for estimating rates among the Indigenous population more generally.

While individuals experiencing different forms of institutionalization and forms of homelessness are all in fundamentally different circumstances, these situations are not disconnected. For example, the definition of homeless often also includes those at risk of homelessness (Gaetz, Donaldson, Richter, & Gulliver-Garcia, 2013) and it is well documented that those who have been incarcerated are at greater risk of homelessness and that residential instability is a risk factor in re-incarceration (Bird et al., 2010; Brown et al., 2008; Metraux & Culhane, 2004; Metraux, Roman, & Cho, 2007; Walsh, MacDonald, Rutherford, Moore, & Krieg, 2011). In addition, all these phenomena have been linked to the historic institutionalization of large numbers of Status First Nations children in residential schools and involvement in the child welfare systems in Canada (Patrick, 2014; Rand, 2011).

Description of Primary Data Sources

The two primary sources of data are administrative data from the Indian Register and from the Canadian Census of the Population long-form questionnaire. The Indian Register data are collected by INAC and is available to researchers; the Census of the Population long-form data are available publicly online. While here we use the confidential-use long-form census data available in Canada's Research Data Centers (RDC) and confidential Indian Register data for as much accuracy as possible, in principle appropriately categorized public data could be used. Below, we describe the two data sources and indicate who is and is not included in each data source. It is these systematic differences in coverage that allow us to use these data to infer the size of the homeless and institutionalized population by gender and age.

[9] Canada (2016) does offer relative rates of homeless between Indigenous and non-Indigenous peoples in four broad age categories: children (0-15 years old) are 9.2 times more likely to use a shelter than non-Indigenous people, youth (16-24 years old) are 6.4 times more likely, adults (25-64 years old) are 12.9 times more likely, and seniors (65+ years old) are 20.5 times more likely).

The Indian Register Population Counts

We use confidential administrative data from the Indian Register at INAC. The data are Indian Register population counts for all Status First Nations for each year from 1975 to 2015 in 5-year age groups,[10] gender, place of residence (on or off reserve) and First Nation citizenship. Thus, all Status First Nations will be included in the register whether they are institutionalized, homeless, or living outside of Canada.

While the Indian Register should contain the official count of Status First Nations, there are often delays in the reporting of births or deaths that may lead to some discrepancies in the data. The register relies on band governments[11] to report births or deaths to the federal government (i.e., INAC). In cases where registered members live off reserve, or are hard to trace, band authorities may not receive their birth or death certificates. Because of the delay in reporting births averages about 3 years, we view our information in this age range as quite poor. We also exclude individuals over the age of 65 since previous work suggests underreporting of deaths in this age range (Akee & Feir, 2016). For these reasons, we focus on ages 5 to 64, as we believe that within these ranges, the reported births and deaths represent a reasonably accurate picture of actual events and therefore an accurate count of the Status First Nations population at a point in time.

The 2001 and 2006 Censuses and the 2011 National Household Survey

We use the 2001 and 2006 confidential long-form Census to establish the Status First Nations population counts. The 2001 and 2006 Canadian Censuses enumerate all households and provide a snapshot of the Canadian population on census day. We do not use the more recent 2011 Canadian Census data (known as the National Household Survey) because the survey methodology and completion requirements changed dramatically in that enumeration.[12] However, the mandatory long form Census has been re-instituted as of the 2016 Census and thus our method should apply to future censuses as they become available.

The Canadian Census contains a long and a short-form survey. All households and communal dwellings receive the short-form which collects only the most basic demo- graphic information such as gender and age. While the short-form Census is distributed to everyone in the population including those in

[10] The 5-year age groups are not available for 1987 and 1989.

[11] A First Nations Indian band is defined "as a body of Indians for whose collective use and benefit lands have been set apart or money is held by the Crown, or who have been declared to be a band for the purpose of the Indian Act. Many Indian bands have elected to call themselves a First Nation and have changed their band name to reflect this" (Statistics Canada, 2013b, p. 22).

[12] The National Household Survey (NHS) in 2011 was entirely optional and replaced the mandatory Canadian Census questionnaire in 2011. Approximately one-third of Canadians were invited to participate in the NHS, while 100 percent of First Nations living on reserve were invited to participate. The response rate for the NHS was only 69 percent (with a weighted response rate of 77%), while it had been approximately 94 percent for the long-form Census (Statistics Canada, 2012). Additionally, there was a change in the eligibility for Indian Status starting in 2011, which would confound any comparisons with previous Status First Nations populations. These factors work in conflicting directions and would affect our estimates of institutionalization and homelessness in unknown ways. Thus, due to the lower response rate, the possibility of selection bias, and the change in the Status First Nations population, we do not use the 2011 NHS in the analysis that follows other than to compute gender ratios; its inclusion does not affect the results.

institutions and shelters, the long-form Census is distributed to only 20% of households off First Nations Indian reserves and outside remote areas. The population counts are weighted upwards according the likelihood of being sampled based on the short-form. The long-form Census is provided to 100% of the households on First Nations Indian reserves and in other remote areas. The long-form includes a rich set of information on households including whether the individuals are being categorized as Status First Nations. We use Census years that ask whether each person in the household is a Treaty Indian (equivalent to being a Registered Indian) as defined by the *Indian Act* of Canada. A Treaty Indian is someone who is a member of a First Nation who has a treaty with the Crown. Treaty or Registered Indians are also called Status First Nations which is the term that has been used throughout this paper (Statistics Canada, 2013a). Since the long-form Census is not administered to those residing in institutions such as correctional institutions, shelters, institutions for people with psychiatric conditions, or long-term care facilities, it does not include a count of Status First Nations residing in these places. People without a fixed-address also do not receive the long-form Census (or short-form for that matter). As such, the Census count of Status First Nations will miss those who are located in institutions or are without a fixed-address.

While censuses are intended to enumerate the entire population, an individual may not be included for a number of reasons. First, individuals may decide not to complete the Census form, or they may misreport information on the form. In both 2001 and 2006, not responding and misreporting information were illegal in Canada and we assume that any information reported in the Census data for these years is accurate. Those who do not complete their census forms or who misreport face fines up to 500 dollars or 3 months in prison. One exception to this is the non-participation of a number of entire First Nations Indian reserves, most noticeably in Ontario. A number of reserves and settlements refused enumerators entry to their communities in 2001 and 2006 based largely on sovereignty grounds and thus entire reserves were not enumerated. The size of these communities by gender and age can be inferred from INAC administrative data and we account for the non-enumerated reserves in the analysis that follows.

Individuals who have migrated abroad will also not be enumerated and counted in the Census. While there are many potential destinations for Canadians, the United States is the most frequent. Examining the migration flow of Canadians to the US indicates that these migrants are highly educated and tend to be concentrated in the knowledge-based industries (Dion & V′ezina, 2010). Given the average characteristics of both groups, it is unlikely that Status First Nations men comprise a large proportion of migration from Canada to the US. While we cannot speak directly to the characteristics of the Status population living in the United States or elsewhere, we will form some estimates of the degree to which Status peoples may migrate to the US using some administrative records from INAC by gender and using estimates of immigration rates by age to infer the size of this population.

Third, and most importantly for our purposes, the long-form Census excludes individuals with no fixed-address and does not collect information on individuals living in shelters or in other institutions. This means Status First Nations men or women in these institutions or who are homeless will not be included in official Census population counts.

Methods: Estimating the Institutionalized and Homeless Population

Our analysis focuses on identifying two combined areas of marginalization for Status First Nations in Canada: institutionalization and homelessness. While we are not able to separately identify these outcomes, we believe that this analysis is an improvement over the current accounting of this marginalized population. We show that there is a direct mathematical relationship between the Status First Nations population reported in the Indian Register and the Census data. While the Indian Register includes all individuals who are Status First Nations regardless of whether they are institutionalized or homeless, the long-form Census data does not. Therefore, the Census data is a subset of the Indian Register data for the Status First Nations population in Canada.

In order to account for these population counts, let us define $\eta^{R}_{a,g,t}$ and $\eta^{C}_{a,g,t}$ as the Indian Register and Canadian Census population counts, respectively, which are allowed to vary by gender, age, and time period. Note that for our purposes $a \in [0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60]$, where each number denotes the lower bound of each age group; $g \in [male, female]$; and, $t \in [2001, 2006, 2011]$. We do not estimate the institutionalized or homeless for those over the age of 65 or under the age of 5.

Given this, we can express the relationship between the population counts in these two data sets as:

$$\eta^{R}_{a,g,t} = \eta^{C}_{a,g,t} + \eta^{H}_{a,g,t} + \eta^{A}_{a,g,t} + \eta^{NE}_{a,g,t} \qquad (1)$$

In other words, this equation says that the count of Status First Nations in age group a for gender g at time t in the Indian Register data is equal to the equivalent group in the Census data with the addition of the counts of people who are homeless or incarcerated, those who migrated abroad, and those who were not enumerated in the Census. These three additional measures are denoted by $\eta^{H}_{a,g,t}$, $\eta^{A}_{a,g,t}$, $\eta^{NE}_{a,g,t}$, respectively. Thus, given administrative data for both those Status First Nations people living abroad and the population sizes of those reserves that did not participate in the Census by gender and age group, simple algebra implies we can infer $\eta^{H}_{a,g,t}$ given the Indian Register and Census population counts.[13] In the appendix we discuss how we construct estimates of those living abroad ($\eta^{A}_{a,g,t}$) and those not enumerated in the Census using administrative data. Once we have these estimates, we are able to infer the number of institutionalized and homeless individuals by gender and age group by re-arranging Equation 1 into the following:

$$\widehat{\eta^{H}_{a,g,t}} = \eta^{R}_{a,g,t} - \eta^{C}_{a,g,t} - \widehat{\eta^{A}_{a,g,t}} - \widehat{\eta^{NE}_{a,g,t}} \qquad (2)$$

where the estimates of the variables in Equation 1 are denoted with the hat symbol (^). We use Equation 2 to estimate of the institutionalized and homeless population. In the Results section and in the Appendix, we also show how our estimates of the homeless and institutionalized population would change if we allowed for varying degrees of non-compliance in filling out the long-form Census.

[13] In the Appendix, we describe an additional potential component—overcount of Status First Nations in the Indian Register due to non-reporting of deaths to federal agencies. Our analysis does not change substantially due to the addition of this component. See Appendix Table A1 for these estimates.

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Therefore, the accuracy of our measure is based on the underlying accuracy of the existing administrative and Census data. It is our intention to use these two well-established data sources to create a simple and transparent method for counting the Status First Nations population.

Estimates of Institutionalization and Homelessness for Status First Nations in Canada

Table 1 reports the estimates constructed using Equation 2 and averaged over 2001 and 2006 under various assumptions regarding Census participation rates. Note that homeless includes individuals who are without a fixed address; they may live in automobiles or in a variety of locations with friends and relatives over time. The final two columns of Table 1 assume full compliance with the Census; the next two columns assume a 95 percent compliance rate (which is approximately the compliance rate of the population as a whole); and the last two columns assume a 90 percent response rate. Appendix Table A3 repeats the assumptions about response rates, but now assumes that only band members who lived on reserve (and are from a First Nation that decided not to participate in the Census enumeration) did not fill out the long-form Census.

Determining the true size of the Status population that is institutionalized and homeless depends heavily on which Census response rate we choose. Given that the Census non-response rate was approximately 94 percent for the general population (Statistics Canada, 2012) and we have already accounted for non-enumerated reserves and settlements, we believe that the most accurate estimates are given by the first four columns. However, we can glean further information on the most plausible estimates from other less comprehensive studies.

For example, we can infer a lower bound estimate of homelessness using the data compiled by Belanger et al. (2013). They use data collected from homeless population counts in 18 Canadian cities to estimate the urban Indigenous homeless population. The study counted a total of over 20,360 homeless people of Indigenous identity. If one assumes that 50 percent of these individuals were Status First Nations (which is the same rate as in the general Indigenous population; Statistics Canada, 2007) and 47.5 percent were men (Gaetz et al., 2013), then this would mean there are approximately 4,835 Status homeless men and 5,345 Status homeless women in these cities alone. These lower bound numbers exceed our lowest estimate for the number of Status First Nations women and girls who are institutionalized or homeless. This suggests that our lower bounds on institutionalization and homelessness are likely a conservative estimate, at least for women.

Table 1. Estimates of the Institutionalized and Homeless Population Among Status First Nations

	Average of 2001 & 2006		Assuming 95% Response Rate		Assuming 90% Response Rate	
Age Group	Male	Female	Male	Female	Male	Female
05 to 09	1,205 (170)	1,330 (65)	*	*	*	*
10 to 14	2,760 (445)	2,370 (315)	990 (585)	675 (230)	*	*
15 to 19	4,015 (130)	3,735 (885)	2,475 (75)	2,255 (720)	770 (310)	615 (535)
20 to 24	6,880 (430)	4,165 (315)	5,730 (300)	2,910 (195)	4,455 (150)	1,525 (60)
25 to 29	6,570 (730)	3,605 (210)	5,530 (720)	2,420 (185)	4,375 (705)	1,095 (150)
30 to 34	6,285 (55)	3,340 (550)	5,240 (45)	2,130 (555)	4,080 (30)	780 (565)
35 to 39	5,885 (460)	3,575 (315)	4,835 (430)	2,350 (320)	3,665 (400)	985 (325)
40 to 44	4,660 (260)	3,170 (625)	3,680 (120)	2,005 (785)	2,595 (35)	705 (960)
45 to 49	3,085 (335)	2,870 (60)	2,270 (145)	1,900 (140)	1,365 (70)	820 (365)
50 to 54	1,675 (20)	2,250 (105)	1,045 (160)	1,500 (270)	345 (320)	670 (455)
55 to 59	1,065 (240)	1,870 (190)	590 (350)	1,305 (325)	60 (475)	680 (475)
60 to 64	955 (130)	1,360 (305)	625 (60)	935 (235)	255 (15)	465 (155)
Total	**45,050 (1,555)**	**33,640 (1,005)**	**32,415 (440)**	**20,010 (85)**	**18,375 (795)**	**4,860 (1,295)**

Note. The estimated population numbers are calculated using Equation 2 under various assumptions of non-reporting to the Census. The results are averaged over 2001 and 2006. The average estimated population size rounded to the nearest five is listed in the first row with its standard deviation below it in parenthesis. * indicates a negative number, which have been suppressed. All estimates assume no response from individuals who live on reserves that did not participate in the Census.

We can also infer a lower bound on institutionalization using data from Juristat[14] and other surveys. First, we use survey data from admissions to provincial custody on Indigenous identity and gender (Statistics Canada, n.d.a) to infer the percentage of Status First Nations who are admitted to custody under the assumption that 50 percent of individuals who identified as Indigenous were Status First Nations (Statistics Canada, 2007). From that, we estimate the percentage of Status First Nations who are incarcerated by multiplying the percentage of Status First Nations we inferred were admitted to custody by the total number of youth and adults incarcerated federally or provincially (collected from Statistics Canada, n.d.b, n.d.c). We acknowledge that this is a strong assumption— if Indigenous Peoples serve longer sentences, then they will make up a larger percentage of the incarcerated population than the percentage admitted to custody captures. However, under the above assumptions, averaging between 2001 and 2006 suggests that 2,765 Status First Nations men and 340 Status First Nations women were incarcerated in this time period. This does not account for anyone in local city jails.[15] This suggests that provincial and federal incarceration may account for only a small part of our estimates.

Two patterns are noticeable in Table 1 regardless of which assumptions are maintained about the response rate. These patterns are depicted in Figure 1 where we show the estimated rate of institutionalization and homelessness gender and 5-year age groups for Status First Nations, assuming full compliance with the long-form Census. This figure is based on data from the final two columns in Table 1.

The first observable pattern is that institutionalization and homelessness for the Status First Nations population peaks around the ages of 20 to 44. This result holds broadly for both males and females in the population.

The second pattern that emerges, and is perhaps most striking, is that the magnitude of institutionalization and homelessness differ dramatically by gender (as shown in Figure 1). While men and women below the age of 19 are institutionalized or homeless in similar numbers and women are institutionalized or homeless at slightly higher numbers after 50, between the ages of 20 to 44 we find that Status First Nations men are far more likely than Status First Nations women to be counted as institutionalized or homeless. In this age range, Status First Nations men are almost twice as likely as Status First Nations women to be either homeless or institutionalized. This has non-trivial implications for the population which we discuss in the following section.

[14] This publication of the Statistics Canada agency provides timely data and statistics related to Canadian justice and public safety matters such as crime, victimization, and correctional services.

[15] The estimated flow of custodial admissions to the provincial system among Status First Nations was approximately 18,890 males and 2,320 females averaged between 2001-2002 and 2005-2006. These numbers count admissions rather than individuals. Re-offenders may be counted multiple times.

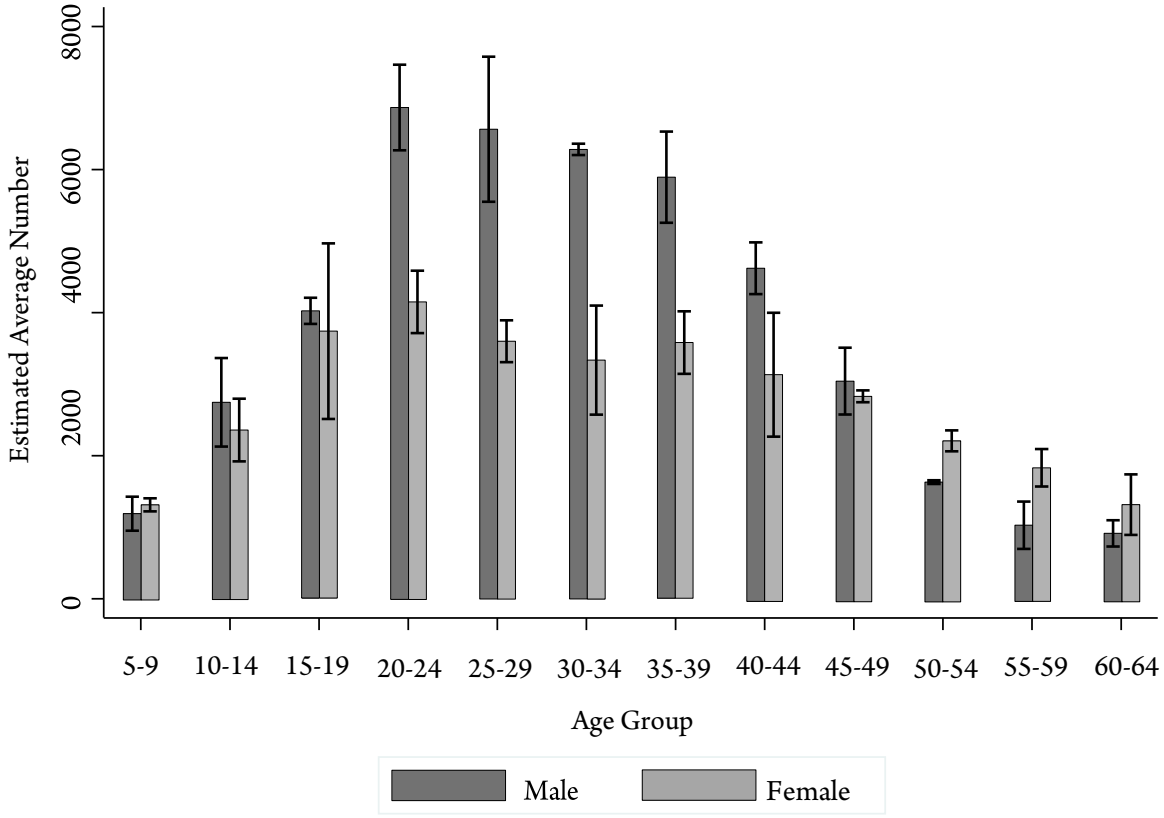

Figure 1. Estimated average number of Status First Nations by gender and age who were institutionalized or homeless between 2001 and 2006.

Discussion

Implications for the Gender Ratio, the Well-Being of Women, and the Continued Legal Existence of Status First Nations Populations

The high rates of institutionalization and homelessness among Status First Nations males compared to Status First Nations females between the ages of 20 to 44 produce gender imbalances in the housed and non-institutionalized population. There is evidence that gender imbalances in either direction (skewed towards males or towards females) can have significant negative societal consequence. Existing research from other countries suggests that gender imbalances can result in increased criminality, alcohol, drug and physical abuse, as well as a reduction in marital status and fertility levels.[16] Our results indicate that there are more Status First Nations men who are incarcerated or homeless than women, which may have significant implications for marital rates, female labor force participation, and female bargaining power (Angrist, 2002; Charles & Luoh, 2010; Chiappori et al., 2002; Mechoulan, 2011).

Our intention in this analysis was to provide a useful measure of homelessness and institutionalization for the First Nations population in Canada. An important component of this measure, and potential benefit, is that it provides an a more accurate estimate of on-reserve gender ratios since it identifies which age groups and gender groups are more likely to be homeless or institutionalized. As mentioned above, gender imbalances can lead to negative societal consequences and our measures may be useful in identifying the relationship between these ratios and existing conditions in First Nations communities in Canada.

Figure 2 contains the gender ratio for the Canadian population and the Status First Nations population in the 2001 and 2006 Census and in the 2011 National Household Survey. In each year, there are significant differences between the gender ratios in the Status population relative to the general Canadian population. However, these gender ratios are skewed in favour of women. In the figure below, there are approximately 93 Status males for every 100 Status females, while in general there are 97 males for every 100 females in Canada.

Since males tend to be born at higher rates than females and thus there are more males than females at young ages (Dyson, 2012), and the Status First Nations population is substantially younger than the Canadian population on average, we would expect the Status First Nations gender ratio to be *higher* than Canadian average. To illustrate how the gender ratio varies by age, we calculate the average gender ratio in 5-year age groups averaged over the Census years 2001, 2006 and 2011 for all of Canada and Status First Nations (Figure 3). The results indicate that there is relative parity in Canadians and Status First Nations gender ratios up to 19 years of age. Over this age, there is a drop in the Status First Nations male–female ratio. The ratio reaches 0.8 by retirement age, while it is still above 0.95 for the Canadian population in general. This means that there is a precipitous drop in the number of men relative to women by age cohort in this population.

[16] For evidence of the effect of gender ratios on marriage rates, single parenthood, female bargaining power, and labour force participation see Amuedo-Dorantes and Grossbard (2007), Angrist (2002), Brainerd (2007), Charles and Luoh (2010), Chiappori, Fortin, and Lacroix (2002), and Mechoulan (2011). For evidence regarding the effects of gender ratios on crime, see Edlund et al. (2013) and South, Trent, and Bose (2014).

It is immediately obvious from this figure that the skew in the Status First Nations gender ratio relative to the general population is attributable to the population over the age of 19, and this skew in the gender ratio becomes more dramatic in older age groups. Between the ages of 25 to 54 there are about 8.5 non-institutionalized and housed men for every 10 non-institutionalized and housed women. Similar gender imbalances are observed in the African American population in the United States (Wolfers, Leonhardt, & Quealy, 2015) and have been shown to have significant effects on family formation and female well-being (Angrist, 2002; Charles & Luoh, 2010; Chiappori et al., 2002; Mechoulan, 2011). The skew observed in the above gender ratios by age group can be almost completely accounted for by institutionalization and homeless rates among Status First Nations men. These gender ratio imbalances could plausibly explain the high rates of out-marriage among Status First Nations women given the effect of the gender ratio imbalances on exogamy (Anderson & Saenz, 1994; Hwang et al., 1997; Pagnini & Morgan, 1990). Thus, the rates of institutionalization and homelessness of Status First Nations men could have implications for the continued existence of "Indians" as a political category in Canada.

Limitations and Conclusion

Institutionalization and homelessness are associated with social and economic deprivation. We construct a new measure for estimating the population experiencing homelessness and institutionalization among Status First Nations in Canada. We believe a reasonable estimate of the percentage of the Status First Nations population that was institutionalized or homeless between 2001 and 2006 is 8 percent, on average.[17] This estimate is extremely large when compared to the non-Indigenous population's institutionalization rate. In addition, since institutionalization and homelessness disproportionately affect men, these channels of marginalization result in a gender imbalance in the non-institutionalized and housed population. This gender imbalance has the potential to reduce the number of eligible Status First Nations partners and may have long-term implications for the legal existence of Status First Nations in Canada.

Status is defined under the Indian Act and has several conditions about how this Status is transmitted to the next generation. Generally, it is based on parental status, but, while there are no explicit blood quantum rules, there are implicit ones inherent in these rules. Thus, out-marriage tends to reduce the probability of transmission of Indian Status across generations. Any substantial revisions to the Indian Act in the future should take this into account.

[17] The estimate of 8 percent is constructed by adding the third and fourth column of the last row of Table 1 and dividing by the average population size between 2001 and 2006 (N= 630, 110), calculated from the Indian Register between the ages of interest.

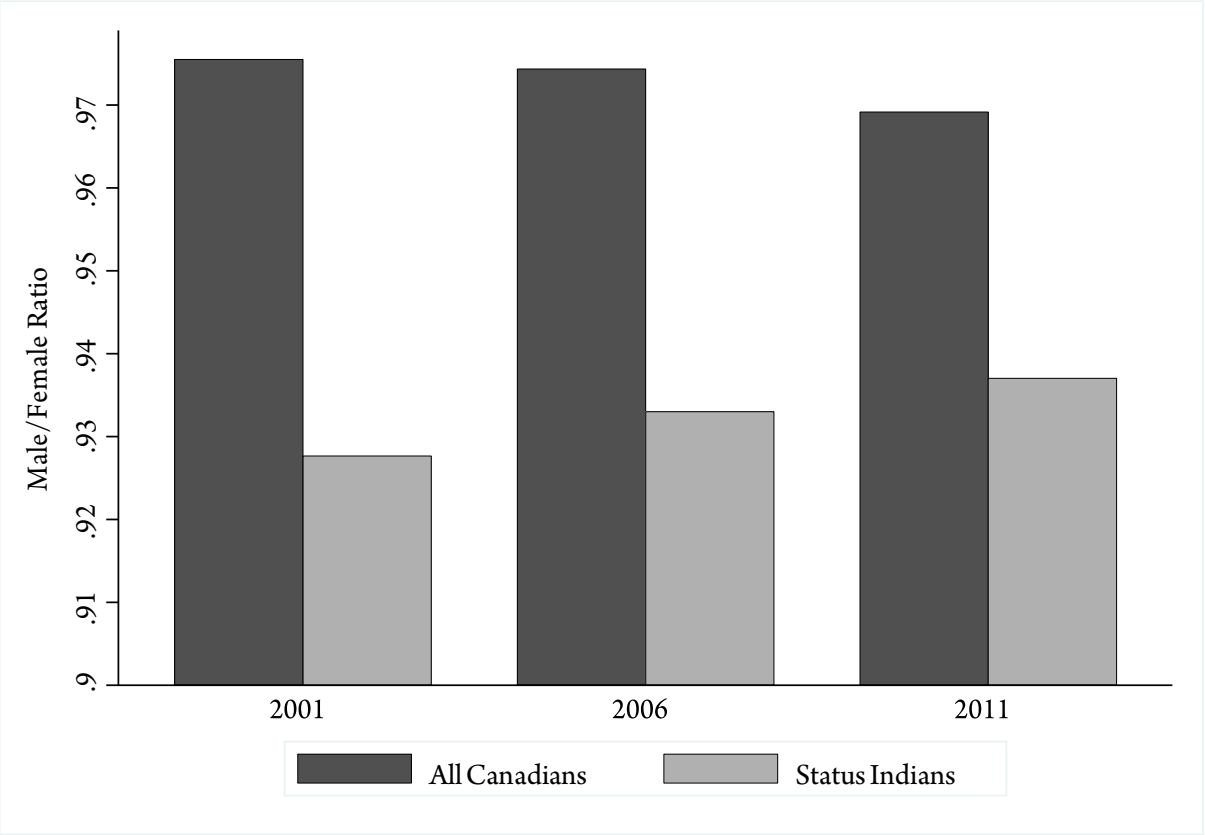

Figure 2. Male–female gender ratio in the Canadian population and the Status First Nations population from the 2001 and 2006 Census and the 2011 National Household Survey.

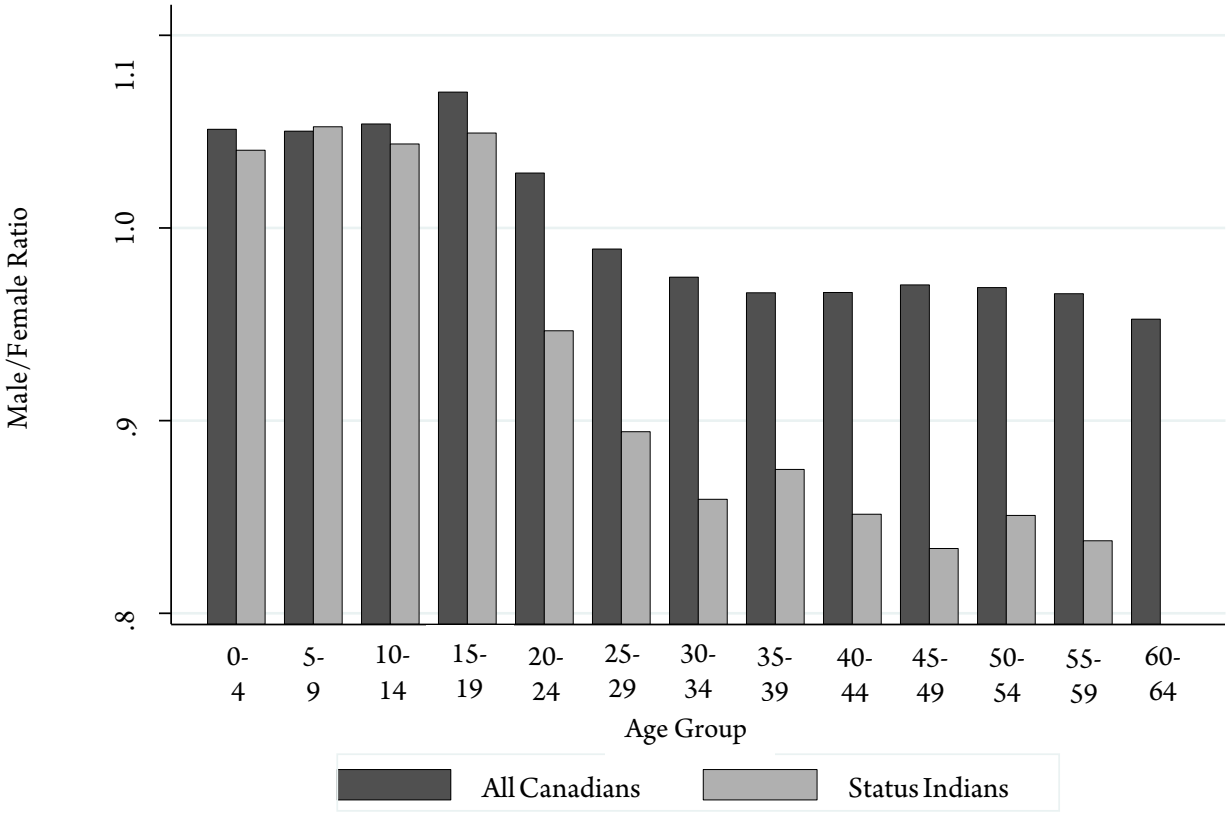

Figure 3. Male–female gender ratio by age group averaged across the 2001 and 2006 Census and the 2011 National Household Survey.

Our measures of homelessness and institutionalization are also useful for First Nations governments, provincial governments, and the federal government in assessing the extent of this on-going problem. Timely and accurate measures (as well as distribution over age groups) will enable more appropriate and targeted programs and policies that can help the affected populations. For instance, if the homeless or institutionalized population includes a relatively large number of elders in a single region or First Nations reserve, a set of policies aimed at elder care and elder housing may be implemented. This contrasts with regions that may tend to have higher rate of homelessness or institutionalization among youths. In this case, the appropriate policy may be a focus on alcohol or drug rehabilitation programs or employment training programs. More accurate measures mean better data for government officials and policy makers at all levels.

This work does not investigate the causes of high rates of institutionalization and homelessness among Status First Nations in Canada and provides only a very broad estimate of the number of individuals facing this form of marginalization. However, a large literature exists on both the intergenerational trauma experienced by Indigenous Peoples and the historic policies and practices that have contributed to their marginalization throughout the world.[18] Further work investigating the nuances of these measures would be valuable. It would also be useful to identify methods to separately estimate institutionalization and homelessness using these same data sources. If the short-form Census collected information on First Nations Status in collective dwellings and institutions, this could be corrected.

[18] Patrick (2014) has outlined a good deal of this literature in relation to Indigenous homelessness.

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Appendix

Non-Enumeration in the Census (Estimating $\eta^{NE}_{a,t}$)

We adjust the Indian Register counts by excluding population counts of Status Indians that did not participate in the Canadian Census. The confidential-use Census data allows us to identify the communities and bands that are not enumerated in the Census, and we are thus able to remove these individuals from the Indian Register data. In 2001, 30 reserves were not included in the Census and in the 2006 Census, 22 reserves were not included. Some of the excluded reserves are quite large, including the reserve with the largest population in Canada: Six Nations 40, which has over 25,000 members with approximately half living on reserve. The vast majority of individuals who chose not to participate are from the province of Ontario.

Table A2 reports the number of individuals excluded from the Indian Register. Depending on the year, we exclude as many as 48,350 individuals. In our estimates, we make various assumptions regarding response rates. While our baseline estimates assume only those living on reserve did not fill out the Census, in the Appendix we make the extreme assumption that all individuals who were members of bands who were associated with reserves that were not enumerated did not fill out the Census. We show these results for two reasons. First, it provides more conservative estimates of the homeless and institutionalized population. Second, it seems to be a plausible assumption given the observed response rates of communities when the Census is viewed as optional. The 2011 NHS is an optional survey and thus Statistics Canada published non-response rates by Census subdivision for this survey. These non-response rates can be matched to reserves. In the communities that did not participate in the Census the year before, response rates were extraordinarily low: sometimes as low as 6 percent. If band members interpret their reserves not participating in the Census as giving them legal immunity from filling out the census, then they may be less likely to participate.

Migration Abroad (Estimating $\eta^{A}_{a,t}$)

We also adjust the Indian Register data to account for individuals who are living outside of Canada. The Indian Register provides information on population counts by band, gender, place of residence, and year (but not age group) for Status Indians living outside of Canada. We use these counts to estimate the number of people with Status Indian who are included in the Indian Register data but would not be included in the Census since they are outside of the country. In order to estimate this by age group, we use recent reports on the age distribution of Canadians living in the United States to back out the Status Indian counts. Finnie (2006) reported that 1 in 1,000 Canadians leave Canada in a given year. While not strictly comparable, the Indian Register data suggest that in 2006 approximately 16,000 Status Indians were residing outside Canada or nearly 2 percent of all Status Indians. For these numbers by gender and age group, see Table A4. Once one excludes reserves that did not participate in the Census from these migration counts, the estimated number of Status Indians living outside of Canada falls to approximately 9,000 individuals. It is these adjusted numbers that are reported in Table A4.

Table A1. Estimated Overcounting in the Indian Register

	2001		2006		2011	
Age Group	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
05 to 09	0	5	0	5	0	0
10 to 14	0	5	0	5	0	5
15 to 19	5	5	5	5	5	5
20 to 24	5	10	10	10	5	10
25 to 29	10	10	5	10	10	10
30 to 34	10	20	10	15	10	15
35 to 39	20	25	20	25	20	25
40 to 44	55	25	55	25	50	25
45 to 49	65	50	80	50	80	55
50 to 54	80	60	95	70	115	75
55 to 59	115	65	125	80	150	90
60 to 64	120	85	145	95	165	115
Total	**490**	**360**	**550**	**390**	**610**	**430**

Note. These estimates constructed via the procedure in the Methods section. These numbers of "overcounting" in the Indian Register due to underreporting of deaths are estimated using the number of deaths in the Register by age and gender back until 1972 and the mortality rates for five-year age cohorts estimated in each year until 2011 averaged over each five-year period. Scaling factors for sub-geographies between the vital statistics data and the INAC data were used to form national level rates of under reported deaths ("overcounted persons") in the Register.

Table A2. Estimated Number of Persons From Bands That Did Not Participate in the Census but Who Are Counted in the Indian Register

	2001			
	Male		Female	
Age Group	On Reserve	Off Reserve	On Reserve	Off Reserve
0 to 04	1,790	680	1,930	640
05 to 09	2,420	1,070	2,570	1,140
10 to 14	2,140	1,050	2,360	1,150
15 to 19	1,910	1,230	2,010	1,130
20 to 24	1,740	1,240	1,770	1,250
25 to 29	1,740	1,450	1,860	1,430
30 to 34	1,890	1,590	1,890	1,500
35 to 39	1,840	1,620	1,770	1,410
40 to 44	1,550	1,510	1,410	1,080
45 to 49	2,530	1,000	2,590	1,100
50 to 54	1,150	1,320	1,060	920
55 to 59	890	1,070	790	690
60 to 64	770	830	580	480
65 +	2,030	2,370	1,370	1,340
All Ages	24,380	18,040	23,970	15,250
Total by Gender	**42,420**		**39,220**	

Table A2. Estimated Number of Persons From Bands That Did Not Participate in the Census but Who Are Counted in the Indian Register (continued)

2006				
	Female		Male	
Age Group	On Reserve	Off Reserve	On Reserve	Off Reserve
0 to 04	1,280	530	1,360	510
05 to 09	2,320	1,110	2,390	1,180
10 to 14	2,210	1,200	2,320	1,250
15 to 19	1,880	1,190	2,100	1,230
20 to 24	1,640	1,310	1,800	1,170
25 to 29	1,560	1,280	1,620	1,240
30 to 34	1,580	1,490	1,700	1,410
35 to 39	1,760	1,670	1,770	1,490
40 to 44	1,740	1,680	1,660	1,420
45 to 49	2,040	940	2,140	910
50 to 54	1,470	1,530	1,320	1,100
55 to 59	1,100	1,280	1,010	900
60 to 64	860	1,050	720	680
65 +	2,360	2,910	1,560	1,550
All Ages	23,770	19,150	23,450	16,030
Total by Gender	**42,920**		**39,480**	

Note. All counts are rounded to the closest 10. These are the number of individuals excluded from the Indian Register counts in order to make them comparable to the Census.

Table A3. Estimates of the Status First Nations Institutionalized and Homeless Population: High Non-Response Assumption

	Average of 2001 & 2006 for Canada		Assuming a 95% Response Rate		Assuming a 90% Response Rate	
Age Group	Male	Female	Male	Female	Male	Female
05 to 09	205 (40)	360 (110)				
10 to 14	1595 (480)	1285 (290)	130 (185)			
15 to 19	2,820 (60)	2,605 (780)	1,280 (150)	1,125 (615)		
20 to 24	5,705 (360)	2,955 (350)	4,555 (225)	1,705 (230)	3,280 (80)	315 (95)
25 to 29	5,360 (790)	2,335 (165)	4,320 (780)	1,145 (135)	3,165 (765)	
30 to 34	4,950 (80)	1,975 (425)	3,905 (90)	765 (435)	2,740 (105)	
35 to 39	4,435 (520)	2,035 (390)	3,380 (490)	810 (390)	2,210 (460)	
40 to 44	3,210 (205)	1,525 (660)	2,235 (65)	470 (660)	1,145 (90)	
45 to 49	1,835 (95)	1,280 (60)	1,020 (95)	310 (260)	170 (240)	
50 to 54	665 (140)	825 (250)	115 (165)	185 (260)		
55 to 59	275 (385)	695 (330)	75 (105)	230 (325)		
60 to 64	375 (10)	420 (145)	50 (70)	25 (35)		
Total	**31,425** **(1,050)**	**18,295** **(495)**	**18,790** **(60)**	**4,660** **(595)**	**4,750** **(1,300)**	**315** **(95)**

Note. These results are calculated using Equation 2 under various assumptions of non-reporting to the Census. All estimates assume no response from everyone who belonged to a band whose reserve did not participate in the Census whether they lived on or off reserve. The results here are averaged for 2001 and 2006. Negative numbers are suppressed and represented by a blank cell. The average counts rounded to the nearest five are listed in the first row with standard deviations below in parentheses.

Table A4. Estimates of Migration Among Status First Nations by Age Group, Gender, and Year

Age Group	% Assumed	2001		2006	
		Female	Male	Female	Male
0 to 04	5.75%	280	220	350	270
05 to 09	5.75%	280	220	350	270
10 to 14	5.75%	280	220	350	270
15 to 19	5.75%	280	220	350	270
20 to 24	10.60%	520	410	640	510
25 to 29	10.60%	520	410	640	510
30 to 34	10.60%	520	410	640	510
35 to 39	10.60%	520	410	640	510
40 to 44	10.60%	520	410	640	510
45 to 49	5%	240	190	300	240
50 to 54	5%	240	190	300	240
55 to 59	3.50%	170	130	210	170
60 to 64	3.50%	170	130	210	170
65 & over	0.60%	290	230	360	290
Total	**100%**	**4,860**	**3,850**	**6,020**	**4,780**

Note. All counts are rounded to the closest 10. These are the number of individuals subtracted from the Indian Register counts in order to make them comparable to the Census since these individuals are not living in Canada. The age distribution of Status First Nations no longer living in Canada was assumed to follow the age distribution of recent migrants to the United States and was taken from Statistics Canada (2010) estimated from the 2006 American Community Survey. The distribution of emigrants is: 0-19 years 23%, 20 to 44 years 53%, 45-54 years 10%, 55 to 64 years 7%, and 65 years and over 6%. We then divide up these percentages into equal parts for our age groupings. For example, we have 4 age groups from 0-19, so there is 5.75% in each group. We then divide this by 100 and multiply for each gender and year, the population counts living outside of Canada we derived from the Indian Register.