

# Data sources on artists in Canada: Methodological details regarding the National Household Survey and the Labour Force Survey

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## Background

Baseline data on artists are used for multiple purposes, including as evidence for policy analysis, trend analysis, benchmarking in reporting on outcomes, analysis of particular issues such as regional or cultural equity, and the assessment of long-term impacts of arts funding.

This report assesses the reliability and usefulness of potential data sources on the working lives of artists, including a close examination of the National Household Survey (NHS) and the Labour Force Survey (LFS).

“Artists” include individuals categorized into nine four-digit occupation codes from the 2011 National Occupational Classification: Authors and writers; Producers, directors, choreographers and related occupations; Conductors, composers and arrangers; Musicians and singers; Dancers; Actors and comedians; Painters, sculptors and other visual artists; Other performers (not elsewhere classified); and Artisans and craftspersons.

The now-defunct long-form census provided detailed occupation-related data on artists (e.g., size of labour force, income levels, etc.), including fine detail at the occupational and geographic level and for various socio-demographic groups. Based on the 2006 census, there were approximately 140,000 artists in Canada, or 0.8% of the overall labour force.

The National Household Survey, a new voluntary national survey replacing the long-form census, is now a potential source of data on artist occupations.

As the long-form census was mandatory and the NHS is voluntary, there may be an impact on reliability of the data, which would affect data quality, interpretation, analysis, and reporting. The long-form census was a mandatory census of 20% of households, while the 2011 NHS is a voluntary survey of 30% of households.

It should be noted that the long-form census was imperfect as a measurement of artists. Concerns include the focus on the job at which the respondent worked the most hours (resulting in a probable under-counting of the number of artists) and the timing of the data collection (May is an in-between month for seasonal arts activities). The NHS has the same issues, and the remainder of the report outlines other considerations when dealing with this dataset.

In order to prepare this methodological report, Hill Strategies Research has:

- Reviewed published methodology relating to the National Household Survey labour force data.
- Consulted with a limited number of experts on the NHS.
- Assessed the likely impact on baseline reporting of data on artists.
- Assessed the ability to compare data from the 2011 NHS with data from the 2006 census.
- Identified other sources of data on artists/arts occupations to supplement the NHS.

## Key findings

The main findings of the analysis of methodologies and data quality are that:

- Neither the National Household Survey (NHS) nor the Labour Force Survey (LFS) are an ideal source of data on artists. However, both may provide some useful information.
- While the NHS is less reliable than the previous long-form census, there is still valuable information in the survey that can be used to examine the working lives of artists.
- Careful attention should be paid to the reliability of statistics presented from either the LFS or the NHS. Where possible, both sources should be used (and checked against each other) in order to enhance confidence in the data.
- The NHS has a much larger sample size but a much lower response rate than the LFS.
- There are large changes in many estimates from the 2011 NHS compared with the 2006 long-form census (e.g., specific arts occupations, most provinces, territories, and Census Metropolitan Areas). It is highly improbable that these changes are all “real” differences in the amounts. As such, the two sets of estimates should not generally be compared.
- There are differences between data on artists from the NHS and the LFS. However, in Canada and all 10 provinces, the NHS estimates of artists fall within the margin of error of the LFS data.
- The small sample size of the LFS leads to limited reliability of breakdowns of the number of artists. The LFS does not publish any amount below 1,500 in certain jurisdictions (and below 500 in smaller jurisdictions).
- The LFS provides the best estimate of **trends** in the overall number of artists in Canada. The annual averages from the LFS are also timelier than the five-year census or NHS.
- Data on artists in less populated areas and for smaller demographic breakdowns will not be available from either the LFS or the NHS.
- In the 2006 census, the minimum number for reliable estimates was 40 artists. A general rule for the NHS might be to examine estimates of 500 artists or more (possibly even 1,000). Below population levels of 1,000 people, and especially below 500, the NHS population estimate tends to diverge from the census population figure (which, by definition, will be more accurate). Transposing this analysis onto artists, we might be able to consider any jurisdiction with at least 500 to 1,000 artists as being reliable.

The report provides detailed comparisons of the methodologies of the National Household Survey and the Labour Force Survey, data comparisons between the 2011 NHS and the 2011 LFS, detailed comparisons of 2006 census and 2011 NHS data, and a comparison of data trends from historical LFS data and census / NHS data from 2001, 2006, and 2011. In addition, the report compares overall population estimates at the municipal level between the 2011 NHS and 2011 census. Based on these comparisons, an assessment of the potential impact on reports related to artists is provided. Before concluding, the report provides an overview of the general methodology of the 2011 NHS. Each section of the report begins with key findings and continues with details of the analysis. An appendix provides a bibliography of key information sources used in creating this report.

## Detailed comparisons

*Key findings: The NHS is a voluntary survey with a very large sample size. The large sample size is preferred for the analysis of smaller occupation groups, such as artists. However, there is a risk of non-response bias with a voluntary survey. The LFS is a mandatory survey with a much smaller sample size. The smaller sample size of the Labour Force Survey limits its reliability for the purposes of estimating relatively small population groups. There are other differences in survey coverage and definitions that, while important, are less relevant for the analysis of arts occupations than the sample size and type of survey (i.e., voluntary or mandatory).*

### Different methodologies of the NHS and the LFS

Appendix 2.1 of the National Household Survey dictionary (available at <http://www12.statcan.gc.ca/nhs-enm/2011/ref/dict/a2-1-eng.cfm>) indicates that the sample coverage and sample sizes differ between the NHS and the LFS:

**Sample coverage:** The National Household Survey is a voluntary survey. It includes all people who usually live in Canada, including persons asking for refugee status, and persons from another country with a work, study or temporary resident permit and family members living with them. The survey excludes people living in institutions such as hospitals and retirement homes.

The LFS is a mandatory survey. It covers the civilian, non-institutionalized population 15 years of age and over. It is conducted nationwide, in both the provinces and the territories. Excluded from the survey's coverage are: persons living on reserves and other Aboriginal settlements in the provinces; full-time members of the Canadian Armed Forces and the institutionalized population. National Labour Force Survey estimates are derived using the results of the LFS in the provinces. Territorial LFS results are not included in the national estimates, but are published separately.

**Sample size:** Approximately 4.5 million households across Canada were selected for the National Household Survey. This represents about one third of all households. [Note: With a response rate of 68.6%, the actual number of respondents would be approximately 3.1 million.]

The monthly LFS sample size is approximately 56,000 households, resulting in the collection of labour market information for approximately 100,000 individuals.

While the monthly LFS has a sample size of about 56,000 households, it collects labour market information for about 100,000 individuals. More useful data on artists might come from the LFS annual averages, which combine the 12 monthly results. The LFS, which is officially mandatory, has a response rate of approximately 90% to 95%.

The LFS estimates come with the following disclaimer:

- Caution: Data with 4-digit NAICS 2007 industry or NOCS 2006 occupation codes should be used with prudence. Data with a higher variability is reliable enough for some purposes, however it should be used with great caution. Therefore, in any subsequent use, specific reference should be made to the high sampling variability of data.

The LFS has sampling variability that can sometimes see unexplained movements of 2% to 3% from year to year for estimates of the overall labour force.

An email from Sylvie Bourbonnais (Head Subject Matter, Labour Statistics, Statistics Canada) provided further details about the differences between the NHS and the LFS:

The National Household Survey (NHS) and the Labour Force Survey (LFS) are both robust sources of estimates on the Canadian labour market. There are differences between the LFS and NHS (and previously the Census) which have historically resulted in differences in the estimates between the two sources. When comparing estimates from the LFS and NHS (or previous Censuses), it is important to keep in mind these differences.

Overall, the differences between the two sources can be classified in four categories: population base; target population; questions to measure the concepts; and differences related to the collection mode. Further details on those four aspects are presented below.

1. **Different population base:** Census/NHS data are not adjusted for undercoverage while the LFS is based on the 2006 Census estimates which are adjusted for net undercoverage. The net undercoverage can account for approximately 3% of the differences in the two populations at the national level. [Note: In other words, we would expect the NHS to count fewer people than the LFS.]
2. **Differences in target population:** The NHS estimates include armed forces personnel and people living on reserves and other Aboriginal settlements, while these populations are excluded from the LFS. Further, while LFS is administered in the Territories, these estimates are published separately from the national totals, so should be excluded when comparing to NHS estimates. [Note: With these differences, we would expect the NHS to count more people than the LFS.]
3. **Differences in the questions:** The LFS is more specific in classifying respondents into the three categories of employed, unemployed or not in the labour force. The NHS has five questions (with categories), whereas the LFS has approximately 20 separate questions to identify these three groups.
4. **Differences related to collection:**

*Reference week:* In May 2011, the reference periods between the two surveys had a gap of two weeks whereas in the past the gap between the reference periods of the two

surveys was usually one week. The reference week for the NHS was May 1 to May 7, 2011, while the reference week for the LFS was May 15 to May 21, 2011. This is important to note, as the gap in reference periods for the two surveys occurred during a strategic time of the year for youth as the academic year was at, or near, its end and job searching and hiring for the summer began. In 2011, employment and participation rates for individuals aged 15 to 24 years, particularly 15 to 19 years, show a larger difference between the two surveys for May 2011 than for previous cycles.

*Mode of survey:* For the vast majority of census respondents, people completed the questionnaire themselves based on instructions on the paper questionnaire or via the Internet. The LFS is completed by experienced interviewers using computer assisted interviewing techniques, which allows for clarification and correct responses as the interview progresses and thus the LFS is potentially less subject to response errors.

Given the very large sample size of the NHS, it is likely a better source for smaller occupation groups, such as artists. As noted in the email from Sylvie Bourbonnais of Statistics Canada:

- The NHS is a comprehensive dataset that focuses on one particular point in time – May 10, 2011 (the reference date for the NHS). The strength of the NHS is in the analysis of detailed data for smaller areas and smaller populations. For example, the NHS is well suited for analyses of labour markets for smaller geographies, specific occupations or industries, age groups or particular populations such as Aboriginal or immigrant populations.
- The NHS also allows the analysis of the labour market by other relevant socio-demographic variables, for example detailed education, field of study or income.
- The Labour Force Survey is the first indicator of the pulse of the Canadian economy, and provides timely estimates of employment and unemployment. Since it is Statistics Canada's flagship labour force survey, the accuracy of classifying respondents into the three groups is paramount. Therefore, the LFS has additional questions when classifying the employed and unemployed compared with the NHS, and is administered by interviewers who have received specific training on these concepts. The LFS is often the instrument of choice to monitor the current health of Canada's labour force, as it is released on a monthly basis, only 20 days after the reference week, which allows for analysis of the most recent trends.
- The LFS is a smaller sampled survey and will provide estimates with their associated variability, particularly for more detailed domains (e.g., lower levels of geography, occupation, etc.).

Finally, the definition of "employed labour force" may vary slightly between the two surveys, especially in regard to self-employed individuals:

In the NHS, self-employed workers who do not report working any hours or being absent from work during the reference week would be classified as 'Unemployed' or 'Not in the labour force,' depending on their responses to the other questions.

In the LFS, the same self-employed workers may be coded as 'Employed' if they attributed their absence to not having any work during the reference week. The NHS does not ask respondents the reason for their absence.

## Data comparison: 2011 NHS and 2011 LFS

*Key findings: In Canada and all 10 provinces, the NHS estimates of artists fall within the margin of error of the LFS data. For six of the nine arts occupations, the NHS estimates of artists in Canada are within the margin of error of the LFS data.*

Online data were compiled for the employed labour force in the 2011 NHS, while Canadian Heritage's custom data request was used for the 2011 LFS (also covering the employed labour force). The "employed labour force" is a subset of the "experienced labour force", excluding those who were unemployed or not in the labour force during the reference week. (These people were grouped into occupations based on the longest position held since January 1, 2010.)

In both cases, the data were **not** restricted by a minimum earnings requirement. In other words, those who earned \$0 were included in each dataset.

The NHS data presented below are from May 2011, while the LFS estimates are based on annual averages.

The margins of error of the 2013 LFS statistics are available. Unfortunately, such direct measurements of data quality are not available from the 2011 NHS. According to Statistics Canada, it is a reasonable assumption that the LFS coefficients of variation (CVs) in prior years would be similar to the 2013 CVs. Applying the 2013 CVs to the 2011 LFS data, we find that:

- The estimate of the overall number of artists in the employed labour force is 3.0% lower in the 2011 NHS (128,300) than the 2011 LFS (132,300). While this difference falls within the margin of error of the Labour Force Survey data, it is not negligible, either. This difference is fairly consistent with the difference in the overall employed labour force (4.1% lower in the NHS than the LFS).
- In all 10 provinces, the NHS estimates of artists fall within the margin of error of the LFS data.
- At the CMA level, many of the LFS estimates of artists have fairly high margins of error. In only seven CMAs could the data be released without a warning. A warning would be required in 21 CMAs. In seven other CMAs, the data are not reliable and could not be released.

For six of the nine arts occupations, the NHS estimates of artists in Canada are within the margin of error of the LFS data. As shown in the table below, there are some differences for individual arts occupations between the two datasets:

- Only 1 of 9 arts occupations has less than a 5% difference between the 2011 NHS and the 2011 LFS.
- Authors and Writers: NHS higher than 2011 LFS.
- Producers, Directors, Choreographers and Related Occupations: NHS much smaller than 2011 LFS.
- Conductors, Composers and Arrangers: NHS much higher than 2011 LFS.
- Musicians and Singers: NHS lower than 2011 LFS.
- Dancers: NHS slightly higher than 2011 LFS.
- Actors and Comedians: NHS higher than 2011 LFS.
- Painters, Sculptors and Other Visual Artists: NHS higher than 2011 LFS.
- Other Performers: NHS much lower than 2011 LFS.
- Artisans and Craftspersons: NHS much higher than 2011 LFS.

Artists by occupation in the employed labour force, Canada, 2011 NHS vs. 2011 LFS			
Occupation	NHS (2011)	LFS (2011)	% difference
<b>All occupations</b>	<b>16,595,035</b>	<b>17,306,200</b>	<b>-4.1%</b>
<b>Nine arts occupations</b>	<b>128,265</b>	<b>132,300</b>	<b>-3.0%</b>
Authors and Writers	24,355	22,000	10.7%
Producers, Directors, Choreographers and Related Occupations	21,655	31,400	-31.0%
Conductors, Composers and Arrangers	3,215	1,700	89.1%
Musicians and Singers	32,290	35,400	-8.8%
Dancers	7,730	7,500	3.1%
Actors and Comedians	7,805	7,100	9.9%
Painters, Sculptors and Other Visual Artists	15,135	14,400	5.1%
Other Performers	3,675	4,200	-12.5%
Artisans and Craftspersons	12,405	8,600	44.2%
<i>Source: Hill Strategies Research analysis of employed labour force data from NHS 2011 and LFS 2011</i>			

Regarding cultural and non-cultural workers:

- The NHS estimates of cultural workers and the overall labour force fall outside of the margin of error of the LFS data. Cultural workers: 632,300 (NHS) and 686,600 (LFS). All workers: 16,595,000 (NHS) and 17,306,200 (LFS).
- In five of the 10 provinces, the NHS estimates of cultural workers fall within the margin of error of the LFS data.

In almost all cases where there is a difference, the NHS estimates are lower than the LFS estimates.

### Data comparison: 2011 NHS and 2006 census

*Key findings: There are large differences in many estimates from the 2011 NHS compared with the 2006 long-form census (e.g., specific arts occupations, most provinces, territories, and Census Metropolitan Areas). It is highly improbable that these are all “real” differences in the amounts. As such, the two sets of estimates should not generally be compared.*

With regard to comparisons over time between the 2006 long-form census and the 2011 NHS, the NHS User Guide (p. 14) states that “It is impossible to determine with certainty whether, and to what extent, differences in a variable are attributable to an actual change or to non-response bias.” In particular, the NHS *Labour Reference Guide* indicates that “Data users should be aware that when examining small populations, either by selecting small geographical areas or by crossing multiple variables, the NHS estimates will tend to have greater variability due to sampling error.”

In this section, online data were compiled for the employed labour force in the 2011 NHS, while Canadian Heritage’s custom data request was used for the 2006 census, with care taken to ensure that the figures represent the employed labour force.

The data were **not** restricted by a minimum earnings requirement. In other words, those who earned \$0 were included in each dataset.

As shown in the table below, the estimate of artists from the 2011 NHS (128,300) is 4.6% lower than the 2006 census estimate (134,500). This change is inconsistent with the difference in the overall employed labour force (3.6% **higher** in the 2011 NHS than the 2006 census).

The differences are typically more pronounced when individual arts occupations are examined:

- Only 3 of 9 occupations have less than a 5% difference between the 2006 census and the 2011 NHS.
- Authors and Writers: NHS similar to 2006 census.
- Producers, Directors, Choreographers and Related Occupations: NHS similar to 2006 census.
- Conductors, Composers and Arrangers: NHS much higher than 2006 census.
- Musicians and Singers: NHS lower slightly lower than 2006 census.
- Dancers: NHS much higher than 2006 census.
- Actors and Comedians: NHS much lower than 2006 census.
- Painters, Sculptors and Other Visual Artists: NHS much lower than 2006 census.
- Other Performers: NHS much higher than 2006 census.
- Artisans and Craftspersons: NHS much lower than 2006 census.

Artists by occupation in the employed labour force,  
Canada, 2006 census vs. 2011 NHS

Occupation	2006 census	NHS 2011	% difference, 2006 census vs. 2011 NHS
<b>All occupations</b>	<b>16,021,180</b>	<b>16,595,035</b>	<b>3.6%</b>
<b>Nine arts occupations</b>	<b>134,485</b>	<b>128,265</b>	<b>-4.6%</b>
Authors and Writers	24,125	24,355	1.0%
Producers, Directors, Choreographers and Related Occupations	21,675	21,655	-0.1%
Conductors, Composers and Arrangers	2,265	3,215	41.9%
Musicians and Singers	32,985	32,290	-2.1%
Dancers	6,935	7,730	11.5%
Actors and Comedians	8,945	7,805	-12.7%
Painters, Sculptors and Other Visual Artists	17,625	15,135	-14.1%
Other Performers	3,095	3,675	18.7%
Artisans and Craftspersons	16,830	12,405	-26.3%
<i>Source: Hill Strategies Research analysis of employed labour force data from NHS 2011 and census 2006</i>			

### *Provincial and territorial trends in NHS and census data on artists*

The table below shows very large differences in the number of artists between the 2006 census and the 2011 NHS, particularly in smaller provinces and the territories. In fact, only two of the 13 provinces and territories had less than a 5% difference in the number of artists between 2006 census data and 2011 NHS data. In both cases, these were decreases. Of the 11 provinces and territories with differences larger than 5%, nine were decreases. (In other words, only two of the 13 provinces and territories – Manitoba and the Yukon – registered an increase in artists between 2006 census data and 2011 NHS data.)

Artists in the employed labour force, Canada, provinces and territories, 2006 census vs. 2011 NHS				
Jurisdiction	Census 2006	NHS 2011	Change	Change %
<b>Canada</b>	<b>134,485</b>	<b>128,265</b>	<b>-6,220</b>	<b>-4.6%</b>
British Columbia	24,725	23,115	-1,610	-6.5%
Alberta	11,770	10,830	-940	-8.0%
Saskatchewan	2,830	2,625	-205	-7.2%
Manitoba	3,680	3,995	315	8.6%
Ontario	55,170	54,490	-680	-1.2%
Quebec	29,155	26,805	-2,350	-8.1%
New Brunswick	1,715	1,450	-265	-15.5%
Nova Scotia	3,445	3,125	-320	-9.3%
Prince Edward Island	425	315	-110	-25.9%
Newfoundland and Labrador	985	950	-35	-3.6%
Yukon Territory	220	235	15	6.8%
Northwest Territories	140	85	-55	-39.3%
Nunavut	215	150	-65	-30.2%
<i>Source: Hill Strategies Research analysis of employed labour force data from NHS 2011 and census 2006</i>				

### *Smaller-area changes in NHS and census data on artists*

Data for small towns and rural areas from the 2011 NHS were not available for this project, and the custom data from 2006 only covers the employed labour force at the Census Metropolitan Area (CMA) level. As such, the data analysis covers CMAs rather than Census Subdivisions.

There were large differences in the estimates of the number of artists in many CMAs from 2006 census data and 2011 NHS data. Of 35 CMAs, 28 had more than a 5% difference (either an increase or a decrease) in the number of artists. This includes almost all smaller CMAs, including Moncton (-15%), Trois-Rivières (-18%), Thunder Bay (-30%), and Abbotsford-Mission (+41%), as well as a few larger CMAs such as Montreal (-11%), Calgary (-13%), and Winnipeg (+7%).

The analysis also shows that 26 of the 35 CMAs saw a **smaller estimate** of the number of artists from the 2011 NHS compared with the 2006 census.

Given the methodological changes, as well as the large changes in the number of artists in specific occupations, in many provinces and territories, and in many Census Metropolitan Areas, **it is recommended that the 2011 NHS data not be compared with the 2006 census in an attempt to measure trends over time.**

### Comparison of trends in census/National Household Survey and Labour Force Survey data

*Key finding: It appears that the NHS might undercount artists compared with the LFS and prior census years.*

The charts below show the annual averages of the number of artists from the LFS. In addition, the charts compare the LFS estimates with the 2001 and 2006 census estimates, as well as the 2011 NHS estimate. All of these figures represent the “employed labour force” (i.e., excluding artists who are currently unemployed but had worked for pay or profit in the recent past) rather than the experienced labour force. The census numbers are therefore slightly smaller than those published in previous *Statistical Insights on the Arts* reports.

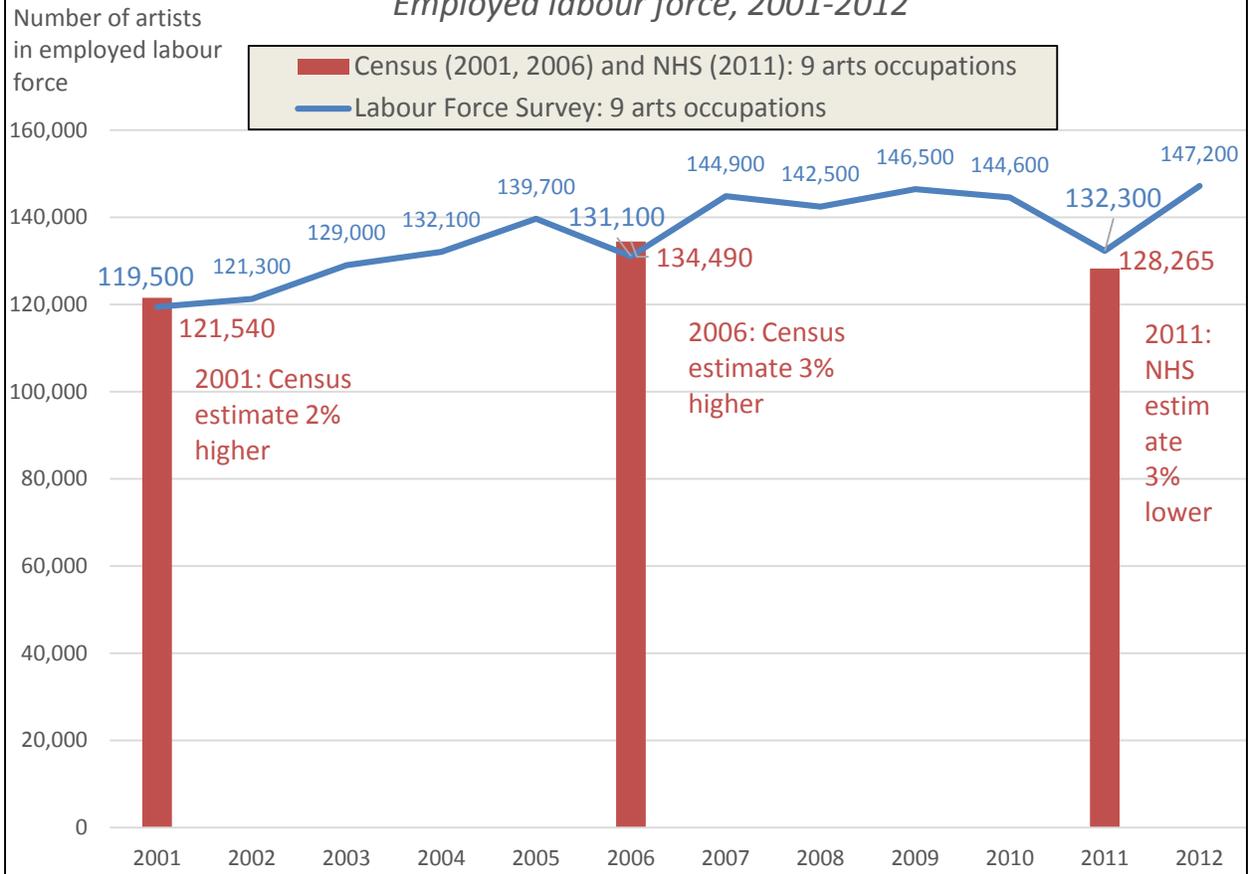
The charts show that:

- The estimate of artists from the 2001 census was 121,540, or 2% higher than the LFS estimate in the same year (119,500).
- The estimate of artists from the 2006 census was 134,490, or 3% higher than the LFS estimate in the same year (131,100).
- The estimate of artists from the 2011 NHS was 128,270, or 3% *lower* than the LFS estimate in the same year (132,300). Of the three data points, this is the only one where the NHS (or census) estimate is lower than the LFS estimate.
- Interestingly, 2006 and 2011 were “down” years in the LFS estimates. Other surrounding years showed much higher estimates of the number of artists. In fact, the 2011 estimate (132,300) appears somewhat anomalous in the context of the estimates for 2010 (144,600) and 2012 (147,200). The 2011 NHS estimate is 13% lower than the 2010 LFS estimate and 15% lower than the 2012 estimate.

Given this information, it appears that the NHS might undercount artists compared with the LFS and prior census years. The range of this undercounting might be in the area of 5% to 8%. For example, a 6% undercounting would put the NHS three percentage points above the LFS estimate, which would be consistent with prior census estimates.

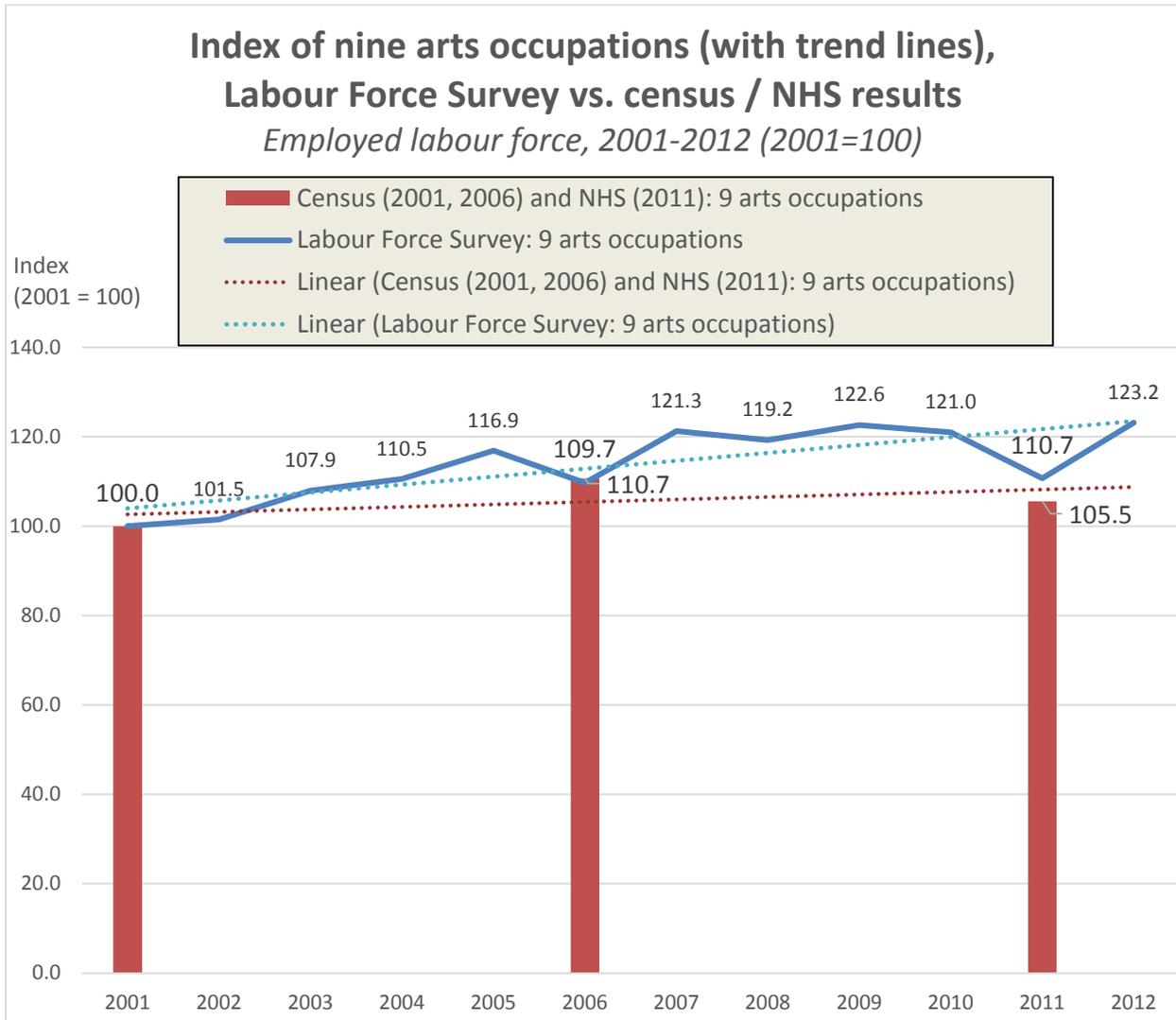
## Nine arts occupations, Labour Force Survey vs. census / NHS results

*Employed labour force, 2001-2012*



The following chart provides an index of both the LFS and NHS arts occupation data, along with a linear trend line.

While both trend lines increase, the LFS data show a stronger increase over time (due to the relatively low 2011 NHS estimate).



The following table provides the exact estimates of artists over time from the census-NHS and the LFS, as well as data on the overall labour force.

Trends in artists and all workers in Canada, Labour Force Survey annual averages (2001-2012) and census / National Household Survey (2001, 2006, and 2011) (employed labour force)								
	Census (2001, 2006) and NHS (2011)			Labour Force Survey			Difference, census / NHS vs LFS	
Year	All occupations	Artists	Artists as %	All occupations	Artists	Artists as %	All occupations	Artists
2001	14,695,135	121,540	0.83%	14,940,900	119,500	0.80%	-245,765	2,040
2002				15,297,900	121,300	0.79%	-2%	+2%
2003				15,662,900	129,000	0.82%		
2004				15,921,800	132,100	0.83%		
2005				16,124,700	139,700	0.87%		
2006	16,021,180	134,490	0.84%	16,410,200	131,100	0.80%	-389,020	3,390
2007				16,805,600	144,900	0.86%	-2%	+3%
2008				17,087,400	142,500	0.83%		
2009				16,813,100	146,500	0.87%		
2010				17,041,000	144,600	0.85%		
2011	16,595,035	128,265	0.77%	17,306,200	132,300	0.76%	-711,165	-4,035
2012				17,507,700	147,200	0.84%	-4%	-3%
% change 2001-2011	13%	6%		16%	11%			
% change 2001-2006	9%	11%		10%	10%			
% change 2006-2011	4%	-5%		5%	1%			
% change 2001-2012	n/a	n/a		17%	23%			

### Expert thoughts on data reliability

Sylvie Bourbonnais (Head Subject Matter, Labour Statistics, Statistics Canada) indicated that individual four-digit occupation codes from the NHS should be reliable at the national, provincial, territorial, and larger city levels. However, she recommended that we be cautious in analyzing data on individual arts occupations in lower population areas. In smaller jurisdictions, she believes that a focus on artists as a group would be more appropriate.

Ms. Bourbonnais indicated that, for trend information, the LFS would probably be the best source of information. For detailed breakdowns by geography or demographic characteristics, the NHS would be a better source of data because of its large sample size.

Two interviewees for this project stressed the importance of doing extra work to assess the quality of the data. Given uncertainty regarding the non-response bias with the 2011 NHS, one expert recommended that we look for “independent benchmarks” that would reinforce confidence in the NHS data. Another expert noted that, with the change in survey methodology, the NHS estimate of the number of artists might be a bit low, especially considering the relatively low earnings of many artists. There are also relatively high imputation rates for the labour force variables (see analysis in a subsequent section of this report).

These experts recommended that we:

- See whether there is a precipitous change (likely a decrease) in the number of artists between 2006 and 2011. An analysis of potential discontinuity in the data is included above. The key finding is that there was a decrease in the number of artists between the 2006 long-form census and the 2011 NHS, although not a precipitous decline (-4.6%).
- Examine disaggregated data for the changes between 2006 and 2011 in smaller cities, towns, and rural areas to see if the data seem reliable. While data for small towns and rural areas from the 2011 NHS were not available for this project, the analysis of Census Metropolitan Areas shows that there were large swings in the number of artists in most CMAs.
- Compare occupation-by-occupation trends in the census-NHS with the LFS. The trends in the census-NHS data are very inconsistent for different arts occupations between 2001 and 2011. In contrast, the trends in LFS data – when examined as a general trend line – show an increase in the number of artists in each occupation group.
- Look carefully at any changes in the occupational codings between 2006 and 2011. This analysis has been done, and there were no changes in the nine arts occupation codes between 2006 and 2011.

One interviewee cautioned that it is quite possible that the 4.6% decrease in the number of artists (2006 census to 2011 NHS) could be attributed to the methodological changes in the NHS. Artists, who tend to be time-stressed and have lower incomes, may not have responded in the same numbers as with the mandatory long-form census. However, the nature of response bias is not always so clear. For example, if artists are typically better connected to the internet than many other Canadians, they may have been more likely to respond. Many respondents chose to complete the NHS online.

## Census subdivision population estimates from 2011 NHS and 2011 census

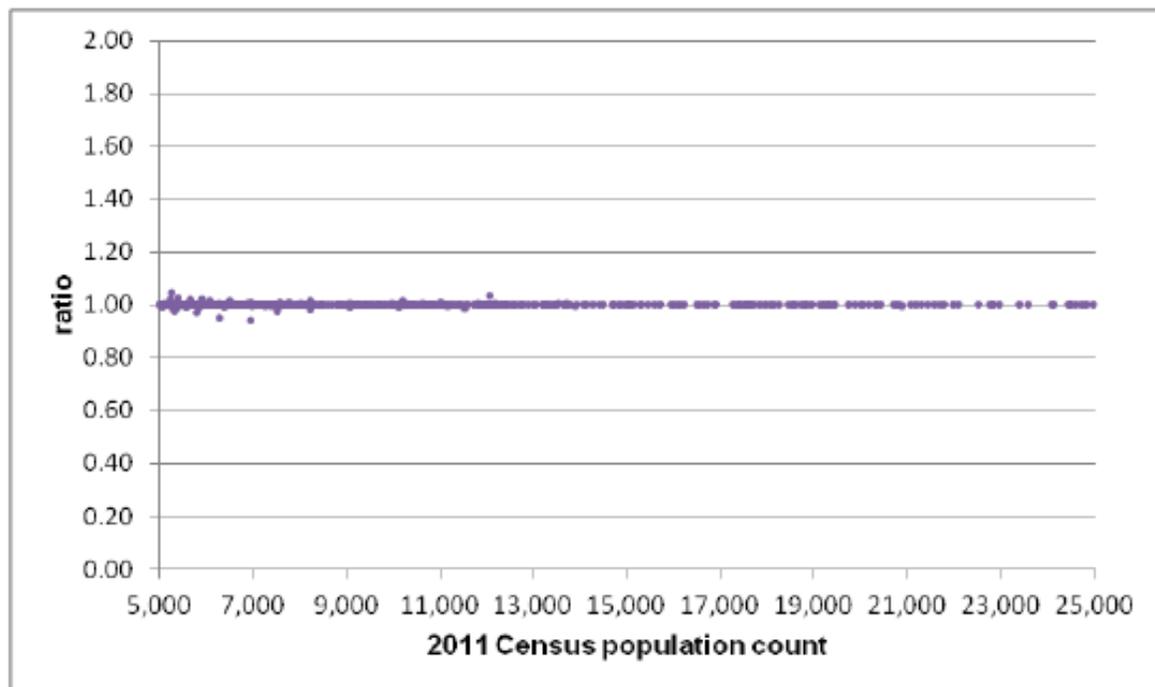
These comparison figures, copied from the *NHS User Guide*, show that the overall population estimates from the NHS are quite accurate in cities and town with populations of 1,000 or more (Figures 3.1 and 3.2).

However, below this population level, and especially below 500, the NHS population estimate tends to diverge from the census population figure (which, by definition, will be more accurate).

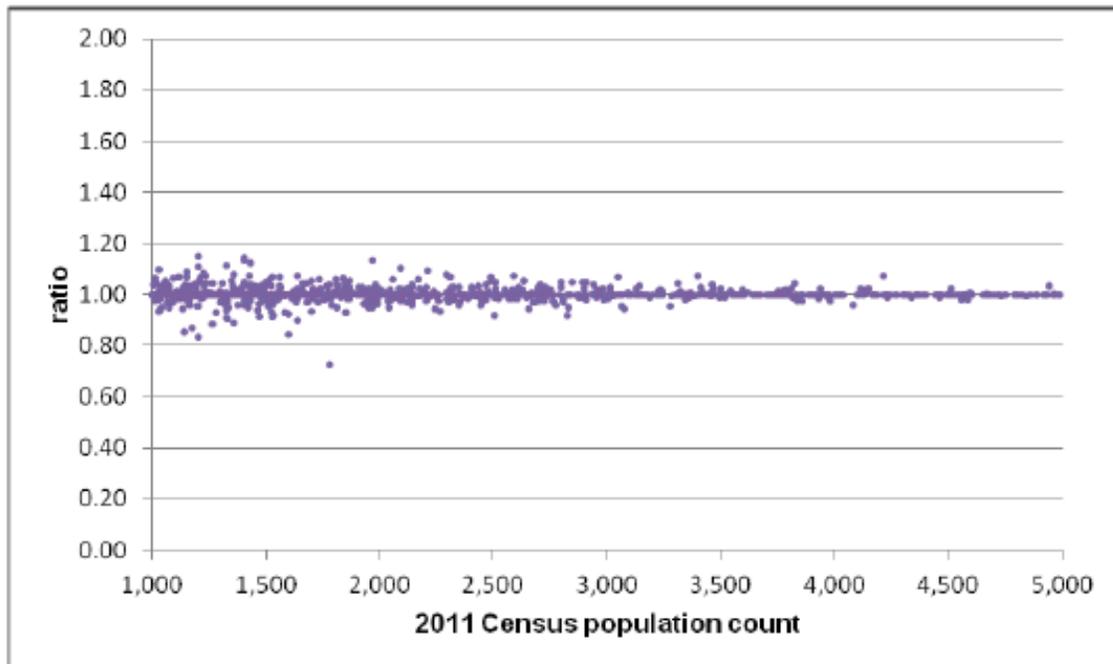
If we transpose this analysis onto artists, we might be able to consider any jurisdiction with at least 500 to 1,000 artists as being reliable. This would mean that we would only be able to access data from cities having an overall labour force of 50,000 to 100,000 (assuming that artists are in the range of 0.8% of the overall labour force).

Experts interviewed for this project were asked for their thoughts regarding a rough rule of reliability for the NHS: that estimates of 500 artists or more (possibly even 1,000) could likely be considered reliable. While there was some agreement with this idea, there might still be uncertainty as to the non-response bias of the 2011 NHS, even with smaller estimates.

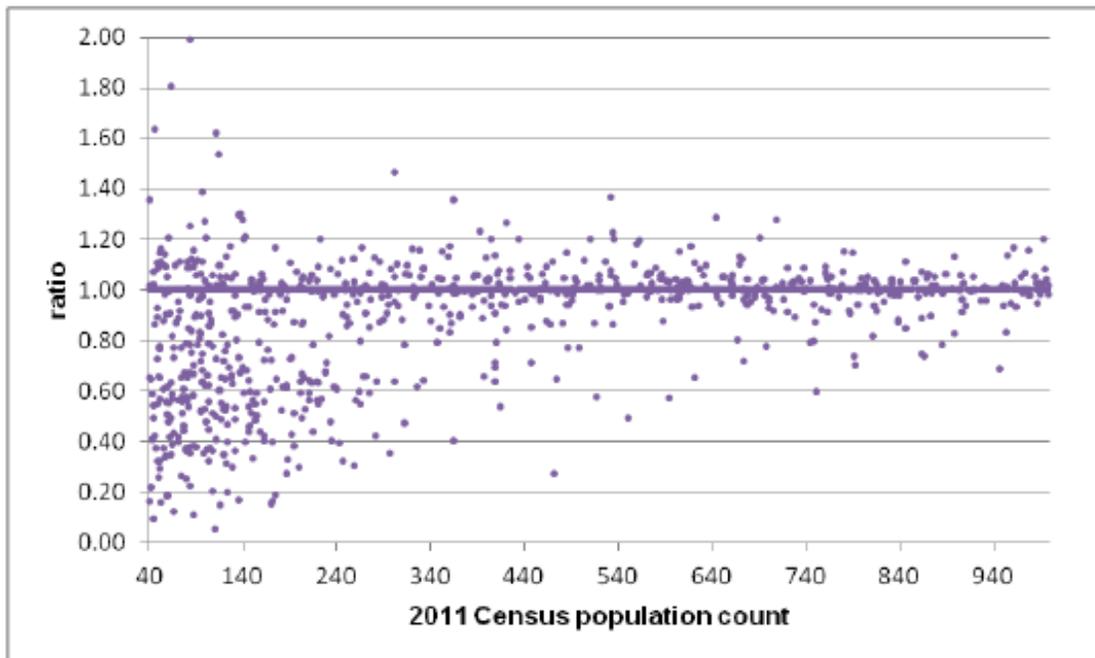
**Figure 3.1** Distribution of the ratio of the NHS population estimate to the 2011 Census population count, census subdivisions (CSDs) with a population of 5,000 to 24,999



**Figure 3.2** Distribution of the ratio of the NHS population estimate to the 2011 Census population count, census subdivisions (CSDs) with a population of 1,000 to 4,999



**Figure 3.3** Distribution of the ratio of the NHS population estimate to the 2011 Census population count, census subdivisions (CSDs) with a population of 40 to 999



## Potential reliability thresholds

For the Labour Force Survey, Statistics Canada indicates that “the reliability threshold is 1,500 for Canada, Quebec, Ontario, Alberta and British Columbia; less than 500 for Newfoundland and Labrador, New Brunswick, Nova Scotia, Manitoba and Saskatchewan; and less than 200 for Prince Edward Island.”

The National Household Survey does not have a similar minimum reliability threshold. The main indicator of data reliability in the 2011 NHS is the global non-response rate (GNR). Geographies with a GNR of over 50% do not have data disseminated. These tend to be very small municipalities. (The GNR is discussed in more detail on page 25.)

In the 2006 long-form census, the minimum number for reliable estimates was considered to be 250 artists nationally and 40 artists in smaller jurisdictions.

A working hypothesis at this point, based on Statistics Canada’s methodological publications, is that we might be able to consider any jurisdiction with at least 500 to 1,000 artists as being reliable. This working hypothesis is based in part on the divergence of the overall population estimate from the 2011 NHS compared with the 2011 short-form census at population levels below 500. If we retain this working hypothesis, it would mean that we would only be able to access data from cities having an overall labour force of 50,000 to 100,000 (assuming that artists are in the range of 0.8% of the overall labour force).

It is likely that a number of demographic and geographic breakdowns cannot be reliably estimated using the 2011 NHS (or LFS). The next section examines specific statistics from each of the four most recent reports on arts occupations in the *Statistical Insights on the Arts* series.

### **Assessment of potential impact on arts occupation data similar to previous reports in Hill Strategies’ *Statistical Insights on the Arts* series**

In 2009 and 2010, four reports were prepared by Hill Strategies Research as part of the *Statistical Insights on the Arts* series based on the 2006 long-form census: 1) A Statistical Profile of Artists in Canada; 2) Artists in Canada’s Provinces and Territories; 3) Artists in Large Canadian Cities; 4) Artists in Small and Rural Municipalities in Canada.

The national profile of artists provided hundreds of statistics regarding artists in the country. It is likely that the vast majority of these national-level statistics will still be available and reliable from the NHS. However, the report’s smallest breakdowns involved individual arts occupations in certain demographic categories (e.g., female conductors), by employment characteristics (e.g., self-employed conductors and other performers) and by industry group (many smaller breakdowns). About 20 statistics in the report have less than 1,500 artists. Some of these, especially the industry breakdown, will probably not be reliable from the 2011 NHS.

In addition, the national report examined arts occupations between 1971 and 2006. Given the methodological changes of the 2011 NHS, as well as the large changes in the number of artists in specific occupations (even at the national level) and in many provinces and territories, there will be a break in the analysis of trends over time. LFS data could be used to examine overall trends.

Data in the provincial report on artists, in most cases, could likely still be considered reliable from the 2011 NHS (or possibly from the LFS). Smaller breakdowns include artists by occupation in many provinces (and certain occupations, such as composers, in all provinces) as well as numerous demographic breakdowns in Saskatchewan, Manitoba, New Brunswick, and Nova Scotia. The overall number of artists might not be reliable in Prince Edward Island (470 in 2006), Newfoundland and Labrador (1,270), the Yukon (210), the Northwest Territories (180), and Nunavut (250).

As noted above, there were large differences in the number of artists in many provinces and territories between the 2006 census and the 2011 NHS. As such, it appears that there will be a break in the analysis of trends over time. LFS data may cover part of this gap.

The large cities report examined the situation of artists in 93 cities with a population of 50,000 or more. While the top 10 cities in this list each had over 2,000 artists, 77 other cities had fewer than 1,000 artists in 2006. Fifty-seven of these cities had fewer than 500 artists. NHS data for these cities may not be reliable. As is the case in other jurisdictions, trends over time will not be available for large cities from the NHS.

The report on small and rural municipalities provided information about artists in 261 municipalities with fewer than 50,000 residents and at least 40 artists. As noted above, it is highly unlikely that statistics from the NHS (or LFS) would be reliable for populations below 500 artists. The highest number of artists in any small municipality was 455. As such, it is unlikely that a report on *individual* small and rural municipalities would be possible. However, it might be possible to report on artists (as a group) in all municipalities under a certain population threshold (i.e., small municipalities as a group, not individually).

## General methodology of the National Household Survey

*Print sources: 2011 NHS Labour Reference Guide, NHS User Guide, other official documents, academic articles, Parliamentary committee report, media reports, and blogs by informed parties.*

*Interviewees: Sylvie Bourbonnais (Head Subject Matter, Labour Statistics, Statistics Canada), Doug Norris (Senior Vice President and Chief Demographer at Environics Analytics, formerly with Statistics Canada), Michael Wolfson (Canada Research Chair in Population Health Modelling/ Populomics, University of Ottawa, former Director General at Statistics Canada including responsibility for the Culture Statistics Program), Marla Waltman Daschko (consultant, formerly with Statistics Canada's Culture Statistics Program), Michael R. Veall (Department of Economics, McMaster University).*

This section provides information regarding response rates, general methodological questions in the 2011 NHS, as well as methodological issues that may have a direct impact on occupation-related questions in the NHS and LFS.

It is clear that the methodology of the NHS has an impact on data reliability compared with the previous long-form census. Wayne Smith, Chief Statistician at Statistics Canada, indicated at a 2011 meeting of the Standing Committee on Industry, Science and Technology that “it would not be realistic to expect that the data will be of the same quality as the data we would have collected with a mandatory questionnaire”.

### NHS methodology

The *NHS User Guide* states that:

The NHS is a sample survey. A random sample of 4.5 million dwellings was selected for the NHS. This is slightly less than one-third (30%) of all private dwellings in Canada in 2011. The sample size was determined to ensure a uniform dissemination probability for small areas and small populations, within the available budget and resources. The NHS sample was selected from the 2011 Census of Population dwelling list.

The sampling fraction varies with the questionnaire delivery mode. For the mail delivery mode, about 3 households in 10 (29%) received a questionnaire. For the enumerator delivery mode, the sampling fraction is 1 in 3 households (33%). However, in cases where it was necessary to reach households in remote areas or on Indian reserves, where only the interview response mode was offered, all households were invited to participate in the NHS.

Most respondents completed the NHS online:

- 63% of respondents completed the online version of the survey. (Respondents could answer the NHS questionnaire either immediately after finishing the census questionnaire or later).
- 17% did so on a print version of the survey. (Occupants of dwellings selected for the NHS who did not respond online could complete a printed questionnaire sent by mail or dropped off by a Statistics Canada enumerator in early June 2011.)
- The remaining 20% did so via another method (likely in-person enumeration: Interviews with Statistics Canada enumerators were used in remote areas, on Indian reserves, and in non-response follow-up. It was also offered to respondents who wanted to complete their questionnaire by telephone by calling the survey's help line.).

Different periods of the data collection focused on different response methods:

- In wave 1 (May and June), the focus was on online collection.
- In wave 2 (June to mid-July), printed questionnaires were mailed out to households that did not respond in wave 1 (approximately 1.2 million households).
- In wave 3 (mid-July to mid-August), non-response follow-up was conducted for households that did not respond in waves 1 and 2, with the aim of maximizing the survey's response rate (approximately 400,000 households).

## Occupation questions

The occupational codings in the 2011 NHS are based on two questions:

- Q42: What was this person's work or occupation?  
*Please be specific. For example: • plumber • fishing guide • wood furniture assembler • secondary school teacher (If in the Armed Forces, give rank.)*
- Q43: In this work, what were this person's main activities?  
*Please give details. For example: • installed residential plumbing • guided fishing parties • made wood furniture products • taught mathematics*

## Response rate by province and territory

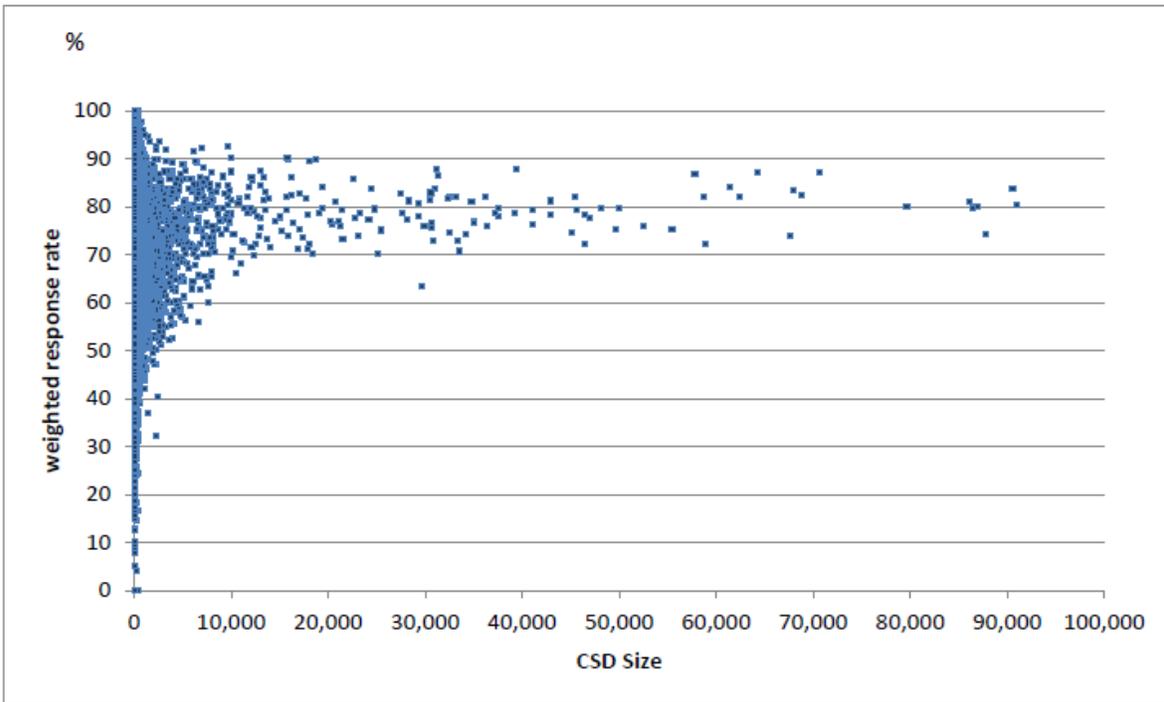
The overall unweighted response rate to the NHS was 68.6%, which Statistics Canada has indicated is similar to other voluntary surveys that they conduct. As shown in the table below, the response rate was lowest on Prince Edward Island (60.4%) and highest in Quebec (71.9%), Nunavut (76.3%), and the Northwest Territories (83.9%).

Response rate for Canada, the provinces and territories, 2011 NHS		
	<b>Unweighted</b>	<b>Weighted</b>
Canada	68.6%	77.2%
British Columbia	69.5%	77.1%
Alberta	67.3%	75.4%
Saskatchewan	63.8%	73.1%
Manitoba	69.1%	76.3%
Ontario	67.6%	76.3%
Quebec	71.9%	80.7%
Nova Scotia	63.9%	74.2%
New Brunswick	65.0%	74.8%
Prince Edward Island	60.4%	70.0%
Newfoundland and Labrador	63.3%	72.5%
Yukon	64.9%	72.7%
Northwest Territories	83.9%	83.8%
Nunavut	76.3%	76.3%

Source: *NHS User Guide*, page 8. The full table also includes the response rates by method of data collection, i.e., internet, print, other.

The chart below, copied from the *NHS User Guide* (page 9), shows that “the response rates for [Census Subdivisions] with fewer than 20,000 occupied private dwellings were highly scattered, while the response rates for larger CSDs (between 20,000 and 100,000 occupied private dwellings) fell mostly between 70% and 90%.”

Distribution of the NHS weighted response rate by census subdivision (CSD) size  
(CSDs with fewer than 100,000 dwellings)



## Global non-response rate

The main indicator of data reliability in the 2011 NHS is the global non-response rate (GNR). “The global non-response rate combines the non-response at the household level and the non-response at the question level. It is calculated and presented for each region.” (*Labour Reference Guide*, page 7)

Data are suppressed for geographies with a global non-response rate higher than 50%. The table below shows that the global non-response rate was 26.1% for all of Canada and ranged from 16.1% in the Northwest Territories to 31.4% in Newfoundland and Labrador and 33.4% on Prince Edward Island.

Global non-response rate for Canada, the provinces, and the territories, 2011 NHS	
Canada	26.1%
British Columbia	26.1%
Alberta	27.4%
Saskatchewan	29.3%
Manitoba	26.2%
Ontario	27.1%
Quebec	22.4%
New Brunswick	28.6%
Nova Scotia	28.2%
Prince Edward Island	33.4%
Newfoundland and Labrador	31.4%
Yukon	29.9%
Northwest Territories	16.1%
Nunavut	25.2%
Source: <i>NHS User Guide</i> , page 16.	

The global non-response rate threshold of 50% led Statistics Canada to suppress data for a number of smaller census subdivisions. The following table, copied from the *NHS User Guide*, shows the NHS coverage by province.

Published data by census subdivision for Canada, the provinces and territories, 2011 NHS			
	# of CSDs with published data	% of CSDs with published data	% of target population residing in published CSDs
Canada	3,439	75.3%	96.6%
British Columbia	437	82.6%	97.2%
Alberta	293	75.1%	96.7%
Saskatchewan	456	57.4%	81.7%
Manitoba	190	70.6%	92.1%
Ontario	429	81.4%	98.5%
Quebec	979	84.3%	97.8%
New Brunswick	191	71.5%	88.7%
Nova Scotia	76	85.4%	96.4%
Prince Edward Island	77	70.0%	79.4%
Newfoundland and Labrador	241	69.5%	83.9%
Yukon	15	62.5%	84.4%
Northwest Territories	34	100.0%	100.0%
Nunavut	21	84.0%	87.0%

Source: *NHS User Guide*, page 17.

### Data quality control

As is the case with many other Statistics Canada products, the NHS data were subjected to “a series of evaluations using several quality indicators”. As noted in the NHS *Labour Reference Guide* (page 6), the NHS data underwent:

1. **Verification of data during collection and processing:** this involves analysis of the quality indicators of the responses provided and the rate of non-response to questions.
2. **Verification of data after edit and imputation:** this involves evaluating the quality of the imputed data.
3. **Certification of final estimates:** after data processing and imputation are completed, the data are weighted to represent the total Canadian population. These weighted data (the final estimates) are certified to ensure that they are coherent and reliable. At this stage,

the final estimates are compared to those of different data sources. This is the final stage of data validation when data are recommended for release, by geographical level and area of interest. The main highlights of the analysis conducted at this stage are presented below.

More specifically, NHS labour variables were evaluated based on:

- An examination of total imputation rates by question.
- A comparison of the distribution of unedited and edited data to determine if any data bias is introduced by imputation.
- A comparison with data from the 2006 Census.
- A comparison with other sources of data, as applicable, especially the Labour Force Survey.

(Source: *Labour Reference Guide*, page 7)

### Imputation rates

Total imputation rates by question are a quality measurement that gives “the proportion of respondents who did not answer the question or whose response is deemed invalid and for which a value was imputed. Imputation can improve data quality by reducing the gaps caused by non-response.” (Source: *Labour Reference Guide*, page 7)

The imputation process involved replacing inconsistent or missing responses “with acceptable values. This is done by identifying persons in the same geographical area that have similar characteristics to the 'failed' record and then copying their values to fill in the missing or erroneous data. Analysis of the unedited and edited data did not reveal any significant alteration to the labour data due to imputation.” (Source: *Labour Reference Guide*, page 7)

The imputation rate for the key occupation question (Q42) was 13.6% in Canada. This is nearly twice as high as the 2006 census. (Source: *Labour Reference Guide*, page 7) As shown in the table below, the imputation rate varied from a low of 5.2% in the Northwest Territories to a high of 15.3% in Ontario.

Imputation rate of the key occupation question in the 2011 NHS <i>Q42: What was this person's work or occupation?</i>	
Canada	13.6%
British Columbia	14.0%
Alberta	13.6%
Saskatchewan	11.8%
Manitoba	12.0%
Ontario	15.3%
Quebec	11.3%
New Brunswick	11.9%
Nova Scotia	11.8%
Prince Edward Island	13.2%
Newfoundland and Labrador	14.5%
Yukon	12.2%
Northwest Territories	5.2%
Nunavut	7.4%
Source: NHS <i>Labour Reference Guide</i> , page 8.	

## Trend data

Regarding trends over time, the *NHS User Guide* (page 14) states that there are issues related to the change from a mandatory long-form census to a voluntary NHS:

Any significant change in survey method or content can affect the comparability of the data over time, and that applies to the NHS as well. It is impossible to determine with certainty whether, and to what extent, differences in a variable are attributable to an actual change or to non-response bias. Consequently, at every stage of processing, verification and dissemination, considerable effort was made to produce data that are as precise in their level of detail, and to ensure that the NHS's published estimates are of good quality in keeping with Statistics Canada standards.

Caution must be exercised when NHS estimates are compared with counts produced from the 2006 Census long form, especially when the analysis involves small geographies. Users are asked to use the NHS's main quality indicator, the global non-response rate, in assessing the quality of the NHS estimates and determining the extent to which the estimates can be compared with the counts from the 2006 Census long form. Users are also asked to read any quality notes that may be included in dissemination products.

## Risk of non-response bias

Michael Veall, writing in *Canadian Public Policy* (Vol. 36, No 3, September 2010, page 395), indicates that “the risk of the voluntary approach is that the non-response bias may be high. The people who respond may be different from those who do not.”

The *NHS User Guide* (page 6) states that “There is non-response bias when a survey's non-respondents are different from its respondents. In that case, the higher a survey's non-response is, the greater the risk of non-response bias. The quality of the estimates can be affected if such a bias is present. Several different methods can be used during data collection or processing to minimize non-response bias. NHS non-response follow-up was planned in such a way as to maximize the survey's response rate and control potential non-response bias due to the survey's voluntary nature.”

The non-response follow-up by Statistics Canada was an attempt to maximize the response rate, thereby limiting non-response bias.

Statistics Canada attempted to assess the NHS data quality, in part by generating indicators of non-response bias at various geographic levels using data from the mandatory censuses conducted in 2006 (including the long-form census) and 2011 (short-form only). The *NHS User Guide* (page 15) states that:

By means of a complex matching method using surnames, addresses and birthdates, 73% of 2011 Census respondents were linked to their 2006 records. As a result, we have 2006 Census data (including data from the long form) for a large portion of the NHS sample, whether the household responded or not.

These data made it possible (1) to compare NHS respondents and non-respondents for various characteristics measured in 2006, and (2) to calculate and analyze bias indicators and assess the quality of the NHS estimates. However, these analyses have some limitations, due to the nature of the matching file. It was impossible to match the entire NHS sample to the 2006 Census, and indicators could only be calculated for large geographic areas such as the provinces and territories, census divisions and census metropolitan areas.

In the arts, we would ideally like to know the response rates of artists specifically. This is not possible – certainly not without significant access to unpublished information from the 2011 NHS and matching records from the 2006 long-form census. As stated by Ivan Fellegi, former Chief Statistician, in front of the Industry Standing Committee, non-response “bias is intrinsically unknowable”, as “we won’t even know the response rates of the various different groups affected”.

## Conclusion

This report has attempted to assess the reliability and usefulness of potential data sources on the working lives of artists, including a close examination of the National Household Survey (NHS) and the Labour Force Survey (LFS). Research conducted for this report compared the methodologies of the National Household Survey and the Labour Force Survey, data from the 2011 NHS and the 2011 LFS, 2006 census and 2011 NHS data, and data trends from historical LFS data and census / NHS data from 2001, 2006, and 2011. In addition, the research compared population estimates for Census Subdivisions between the 2011 NHS and 2011 census. Based on these comparisons, an assessment of the potential impact on reports related to artists was provided. Finally, the general methodology of the 2011 NHS was also examined.

The key findings of the research are that:

- Neither the National Household Survey (NHS) nor the Labour Force Survey (LFS) are an ideal source of data on artists. However, both may provide some useful information.
- While the NHS is less reliable than the previous long-form census, there is still valuable information in the survey that can be used to examine the working lives of artists.
- Careful attention should be paid to the reliability of statistics presented from either the LFS or the NHS. Where possible, both sources should be used (and checked against each other) in order to enhance confidence in the data.
- The NHS has a much larger sample size but a much lower response rate than the LFS.
- There are large changes in many estimates from the 2011 NHS compared with the 2006 long-form census (e.g., specific arts occupations, most provinces, territories, and Census Metropolitan Areas). It is highly improbable that these changes are all “real” differences in the amounts. As such, the two sets of estimates should not generally be compared.
- There are differences between data on artists from the NHS and the LFS. However, in Canada and all 10 provinces, the NHS estimates of artists fall within the margin of error of the LFS data.
- The small sample size of the LFS leads to limited reliability of breakdowns of the number of artists. The LFS does not publish any amount below 1,500 in certain jurisdictions (and below 500 in smaller jurisdictions).
- The LFS provides the best estimate of **trends** in the overall number of artists in Canada. The annual averages from the LFS are also timelier than the five-year census or NHS.
- Data on artists in less populated areas and for smaller demographic breakdowns will not be available from either the LFS or the NHS.
- In the 2006 census, the minimum number for reliable estimates was 40 artists. A general rule for the NHS might be to examine estimates of 500 artists or more (possibly even 1,000). Below population levels of 1,000 people, and especially below 500, the NHS population estimate tends to diverge from the census population figure (which, by definition, will be more accurate). Transposing this analysis onto artists, we might be able to consider any jurisdiction with at least 500 to 1,000 artists as being reliable.

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