

Appendix 1: Technical Appendix - Labour Force Survey (LFS)

The Labour Force Survey (LFS) is a monthly household survey of a sample of individuals who are representative of the civilian, non-institutionalized, off-reserve (in the provinces) population 15 years of age or older. It is conducted nationwide, in both the provinces and the territories. (The territories were phased in between 1992 and 2004). In 2020, the sample size of the LFS was approximately 56,000 households and it collected information on about 100,000 individuals. (Changes in the sample size occurred in the period under study, for example, from July 1995 to December 2014 the target sample size was 54,000 households. The largest target sample size was about 62,000 in 1990 and the smallest was 47,000 in 1987. See <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getInstanceList&Id=1533523> and <https://www150.statcan.gc.ca/n1/pub/75-005-m/75-005-m2016001-eng.htm>.) The LFS is administered by Statistics Canada and was developed in 1945, initially a quarterly survey it became a monthly survey in 1952. The “modern” LFS dates from 1976. For more details, see: <https://www150.statcan.gc.ca/n1/pub/71-543-g/71-543-g2020001-eng.htm>. In addition to being the main source of timely labour market data for researchers it is used by governments to make decisions regarding job creation, education and training, retirement pensions and income support. Its estimates are also central to benefit eligibility and entitlement determination for the Employment Insurance system.

Data collection for the LFS is carried out each month over the ten days following the LFS reference week. The reference week is normally the week containing the 15th day of the month and stretches from Sunday to Saturday. LFS interviews could be conducted by telephone interviewers working out of Regional Office CATI (Computer Assisted Telephone Interview) sites or by personal visits from a CAPI (Computer Assisted Personal Interview) field interviewer. The interviewer first obtains socio-demographic information for each household member and then obtains labour force information for all members aged 15 and over except regular members of Canadian Armed Forces. Most subsequent monthly interviews (normally five) are conducted by telephone. Starting in 2015, households that meet specific criteria may be offered the option of completing the survey on-line for subsequent interviews.

Under Canada’s Statistics Act (<https://laws-lois.justice.gc.ca/eng/acts/S-19/FullText.html>), Canadians are obligated to participate in the LFS. Statistics Canada addresses this issue in its general FAQs for various survey participants at: <https://www.statcan.gc.ca/en/survey/faq> (under “Do I have to participate”), and for the LFS at:

<https://www.statcan.gc.ca/en/survey/household/3701>. Having said this, it seems likely that Statistics Canada informs Canadians of their obligation but does not always strictly enforce it.

Industry and occupation codes are assigned using the respondent's job description on the questionnaire. The coding is performed manually and is based on the classifications described in the North American Industry Classification System (NAICS) and the National Occupational Classification (NOC) system. Several variables on the microdata file are derived by combining items on the questionnaire according to classification rules. For example, labour force status is derived from specific combinations of responses to a number of survey questions regarding work activity, status in employment, job search, availability for work, etc.

In our data period the LFS did not distinguish between sex and gender, and the question regarding the respondent's "sex" allowed only "male" and "female" as responses. Following Statistics Canada's practice in the relevant period, we refer to "sex" although we recognize that some respondents may be responding to this question by providing their gender and that some respondents may have been constrained in having only two options.

When a respondent holds more than one job or business, the job or business involving the greatest number of usual hours worked is considered to be the main job. Actual hours worked is the number of hours actually worked by the respondent during the reference week, including paid and unpaid hours. These hours reflect temporary decreases or increases in work hours (for example, hours lost due to illness and vacation, or more hours worked due to overtime).

Approximately every five years, population estimates are rebased or reweighted to the most recent census population counts. The sample data are weighted to enable tabulations of estimates at national, provincial, and sub-provincial levels of aggregation. The last rebasing was in 2020. To keep the sampling frame up-to-date and ensure reliable estimates, every ten years, after the decennial population census, the LFS undergoes a sample redesign to reflect changes in population characteristics and new definitions of geographic boundaries. The last sample redesign was in 2015. Redesign of the questionnaire, data collection, processing and dissemination systems occur approximately every 20 years. The last redesign for the questionnaire was in 1997 when a number of questions were added (e.g., union membership).

Historically, the response rate to the LFS has been quite good relative to comparators. For example, in 2019 it averaged 87.0%. However, during the Covid 19 pandemic (when face-to-face interviewing was paused) response rates fell. For example, the response rate averaged

69.8% in the second half of 2020 and 69.5% in 2021. It increased after face-to-face interviewing was reintroduced in November 2022, but as of September 2023 it had not yet returned to pre-pandemic norms (<https://www150.statcan.gc.ca/n1/pub/75-005-m/75-005-m2023001-eng.htm>).

For our study, we identified and extracted physicians in the LFS using the National Occupational Classification (NOC), version 2016. The occupational code for family physicians and general practitioners is 3112, and that for specialist physicians is 3111. Using the North American Industry Classification System (NAICS), version 2012, we included only respondents whose main job was in an industry compatible with a practicing physician. Observations with the following NAICSs codes were included in our sample: 6211, offices of physicians; 6214, out-patient care centers; 6215, medical and diagnostic laboratories; 6216, home health care services; 6219, other ambulatory health care services; 6220, hospitals; 6230, nursing and residential care facilities; 9112, other federal government public administration; 9120, provincial and territorial public administration; 6113, universities; 5417, scientific research and development services; 5241, insurance carriers; and 3254, pharmaceutical and medicine manufacturing. Observations with suspicious industry codes, i.e., physicians reported working in an industry that is not relevant to their field, are omitted. Moreover, those who identified as full-time students and reported being physicians are also excluded from the sample to coincide with CIHI's removal of residents from relevant comparison data. To be conservative on this issue, physicians below the age of 28 years old are also excluded from the sample. Observations with missing values in the field of hours of work are discarded from the sample (includes those who retired within the last year for whom the occupation of the last job is recorded).

Although in practice there is modest attrition, in principle the LFS methodology calls for each sampled household to remain in the sample for 6 consecutive months before being rotated out and replaced by a household in the same area or a similar one. In our analysis, we drop multiple observations and only use one unique (the first) observation per physician; those sampled for the first time. The resultant overall sample size for our study consists of 19,479 unique physicians over the 1987-2021 period.

To provide readers with some sense of the implications of our data selection approach relative to the full LFS, we list the steps we took and how the sample selected for analysis

evolves with each restriction in Appendix Table 1. Of course, if the restrictions were imposed in a different order, then the size change of each restriction would differ.

Appendix Table 1 - Sequential Restrictions and the Sample for Analysis, 1987-2021

| Sample Restrictions | Sample Size |
|---|-------------|
| Sample with both relevant NOC codes | 108,767 |
| Imposing restrictions and removing observations | |
| Incompatible NAICS codes | 104,292 |
| Full-time students and those age 27 or less | 98,928 |
| With missing hours | 89,374 |
| All observations beyond the first | 19,479 |

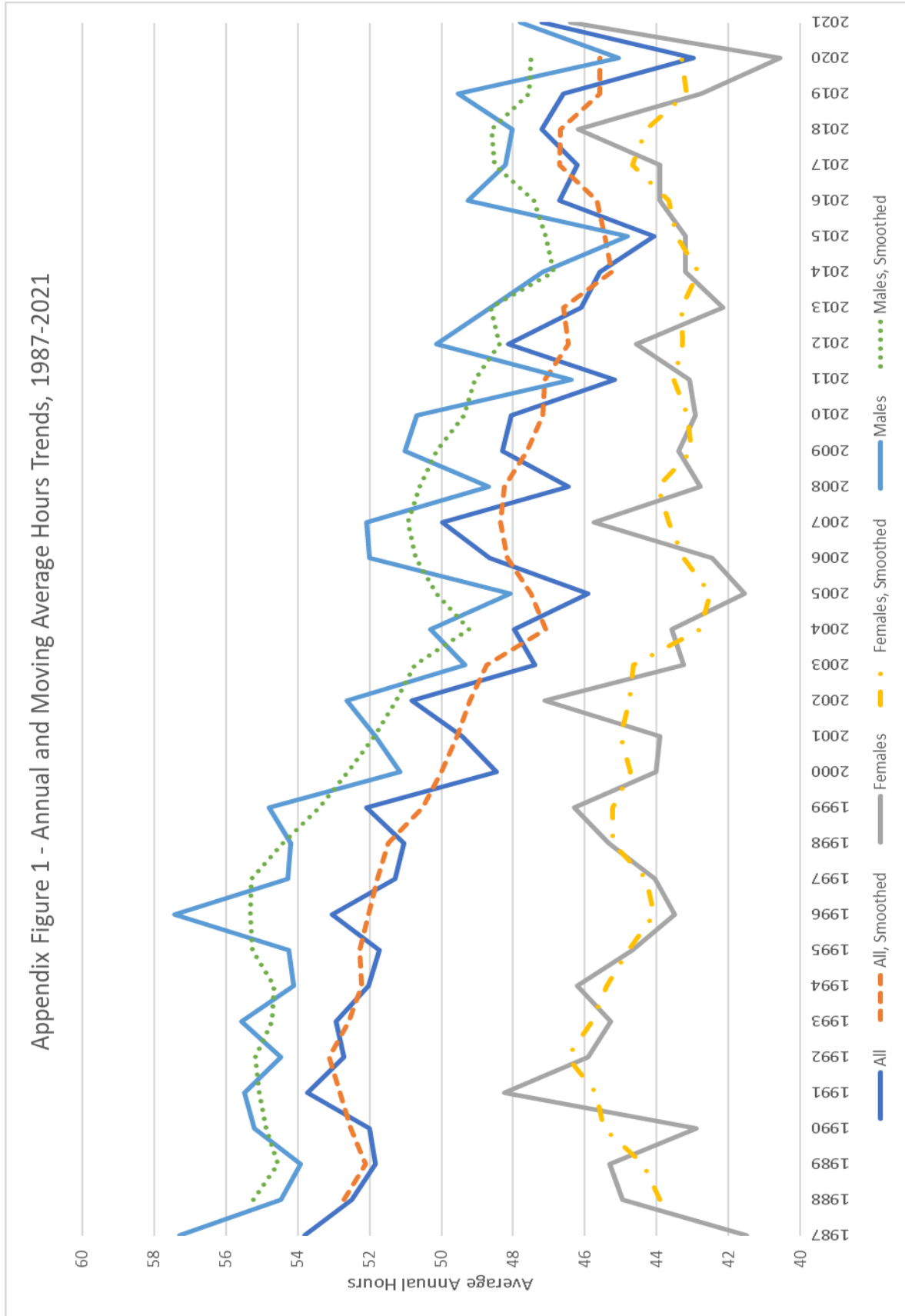
Appendix Table 2 presents the sample size, together with the average hours, for each year for all physicians and by sex; moving average versions of those averages are presented here and in the main text. Appendix Figure 1 plots the hours from Appendix Table 2 and compares trends in those averaged and their centered three-year smoothed counterparts. Some readers might be concerned about the dips observed in smoothed series in 2004 and 2014. Ironically, Appendix Figure 1 shows that the dip in 2004 follows from modest dips in 2003 and 2005 being accentuated in 2004 by the moving average; neither of the dips in 2003 and 2005 appearing too unusual given the statistical noise in the series. The dip in 2014 is only observed for males and follows from what appears to be an idiosyncratic dip in 2015. We looked for coincident changes in other variables (age, child, incorporation, region, etc.) in those years, but did not observe any. These idiosyncratic anomalous data points should not distract readers from the overall secular pattern that is the focus of the study.

Appendix Table 2 - Annual Sample Size and Average Hours of Work

| Year | Analysis | | All MDs | | Female MDs | | Male MDs | |
|-------|-------------|--------|---------|------|------------|------|----------|------|
| | Sample Size | Period | Hours | MA3 | Hours | MA3 | Hours | MA3 |
| 1987 | 321 | 1 | 53.8 | | 41.5 | | 57.3 | |
| 1988 | 308 | 1 | 52.5 | 52.7 | 45.0 | 43.9 | 54.5 | 55.2 |
| 1989 | 312 | 1 | 51.8 | 52.1 | 45.3 | 44.4 | 53.9 | 54.5 |
| 1990 | 411 | 1 | 52.0 | 52.5 | 42.9 | 45.5 | 55.2 | 54.9 |
| 1991 | 417 | 1 | 53.7 | 52.8 | 48.3 | 45.7 | 55.5 | 55.1 |
| 1992 | 441 | | 52.7 | 53.1 | 45.9 | 46.5 | 54.5 | 55.2 |
| 1993 | 425 | | 52.9 | 52.6 | 45.3 | 45.8 | 55.6 | 54.7 |
| 1994 | 467 | | 52.0 | 52.2 | 46.2 | 45.4 | 54.1 | 54.6 |
| 1995 | 472 | | 51.7 | 52.3 | 44.7 | 44.8 | 54.3 | 55.3 |
| 1996 | 392 | | 53.0 | 52.0 | 43.5 | 44.1 | 57.4 | 55.3 |
| 1997 | 487 | 2 | 51.3 | 51.8 | 44.0 | 44.3 | 54.3 | 55.3 |
| 1998 | 413 | 2 | 51.0 | 51.5 | 45.3 | 45.2 | 54.2 | 54.4 |
| 1999 | 508 | 2 | 52.1 | 50.5 | 46.3 | 45.2 | 54.8 | 53.4 |
| 2000 | 473 | 2 | 48.5 | 50.0 | 44.0 | 44.7 | 51.2 | 52.6 |
| 2001 | 538 | 2 | 49.4 | 49.6 | 43.9 | 45.0 | 51.8 | 51.9 |
| 2002 | 554 | | 50.8 | 49.2 | 47.1 | 44.8 | 52.6 | 51.3 |
| 2003 | 588 | | 47.4 | 48.7 | 43.3 | 44.7 | 49.3 | 50.8 |
| 2004 | 594 | | 48.0 | 47.1 | 43.6 | 42.8 | 50.3 | 49.2 |
| 2005 | 562 | | 45.9 | 47.5 | 41.5 | 42.5 | 48.1 | 50.1 |
| 2006 | 737 | | 48.7 | 48.2 | 42.5 | 43.3 | 52.0 | 50.7 |
| 2007 | 605 | 3 | 50.0 | 48.4 | 45.8 | 43.7 | 52.1 | 50.9 |
| 2008 | 659 | 3 | 46.5 | 48.2 | 42.8 | 44.0 | 48.7 | 50.6 |
| 2009 | 600 | 3 | 48.3 | 47.6 | 43.4 | 43.0 | 51.0 | 50.1 |
| 2010 | 676 | 3 | 48.1 | 47.2 | 42.9 | 43.1 | 50.7 | 49.4 |
| 2011 | 647 | 3 | 45.2 | 47.1 | 43.1 | 43.5 | 46.4 | 49.1 |
| 2012 | 651 | | 48.2 | 46.5 | 44.6 | 43.3 | 50.1 | 48.4 |
| 2013 | 669 | | 46.1 | 46.6 | 42.2 | 43.3 | 48.6 | 48.6 |
| 2014 | 647 | | 45.6 | 45.3 | 43.2 | 42.9 | 47.2 | 46.9 |
| 2015 | 686 | | 44.1 | 45.5 | 43.2 | 43.4 | 44.8 | 47.1 |
| 2016 | 794 | | 46.7 | 45.7 | 43.9 | 43.7 | 49.3 | 47.4 |
| 2017 | 779 | 4 | 46.2 | 46.7 | 43.9 | 44.7 | 48.2 | 48.5 |
| 2018 | 768 | 4 | 47.2 | 46.7 | 46.2 | 44.3 | 48.0 | 48.6 |
| 2019 | 776 | 4 | 46.6 | 45.6 | 42.8 | 43.2 | 49.5 | 47.5 |
| 2020 | 692 | 4 | 43.0 | 45.6 | 40.6 | 43.3 | 45.1 | 47.5 |
| 2021 | 410 | 4 | 47.2 | | 46.4 | | 47.8 | |
| Total | 19,479 | NA | NA | NA | NA | NA | NA | NA |

Notes: MA3 = Centered three-year moving average. NA = Not applicable. The annual sample size is unweighted.

Appendix Figure 1 - Annual and Moving Average Hours Trends, 1987-2021



The LFS provides a consistent measure of self-reported hours of work by physicians. We focus on the self-reported actual hours worked by physicians. The “actual hours” measure is distinct from the “usual hours” measure, which is also collected as part of the survey. All analysis is weighted by the sampling weights provided by Statistics Canada LFS. An earlier study of physician using the LFS compared CIHI based physician data-based weights and Statistics Canada LFS and found no significant difference in results.¹

The LFS is collected under the Statistics Act, and responses can be required of participants. Statistics Canada’s survey methodologists undertake ongoing validation of various aspects of the survey and make scheduled adjustments to update the sampling strategy and other survey elements. Numerous reports are available that document these issues.^{2,3,4} We are aware of no LFS validations that focus on physicians (since it is a general-purpose survey), however the LFS sampling methodology includes a special stratum that targets high income households.⁴

More detail on the LFS can be found in

<https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3701> and other Statistics Canada publications.^{5,6}

References for Appendix 1

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