**National Physician Survey (NPS): Introduction**

The National Physician Survey (NPS) is an ongoing collaborative initiative led by the College of Family Physicians of Canada (CFPC), the Canadian Medical Association (CMA) and the Royal College of Physicians and Surgeons of Canada (Royal College), with technical support from the Canadian Institute for Health Information (CIHI). All practicing physicians, medical residents and medical students in Canada are surveyed about what they are doing (or intend to do) in their practices in response to both societal needs and personal and professional interests. The overall goal is to compile a comprehensive database documenting the practices, medical education and training, and familial contexts of current and future physicians in Canada.

**2013 National Physician Survey (NPS): Methodology/Design**

The 2013 NPS evolved from questions used in the previous editions of the survey (2004, 2007, and 2010), but with a focused theme on employment opportunities and challenges of physicians in Canada. A working group was implemented to review and refine the questions from previous survey editions. Additional consultative input was sought from other health-related organizations. The goal of the refinement process was to reproduce a concise, user-friendly questionnaire.

The 2013 NPS targeted the following constructs: current employment status, hours of work, practice profile, professional satisfaction, changes in work plan, service population, access to resources, choice of practise and location, method of remuneration, use of electronic records, and chronic disease management. The rationale for the questionnaire content was:

1. To repeat questions from earlier surveys;
2. To improve questions from previous editions of the NPS;
3. To focus on employment opportunities and challenges for Canadian physicians;
4. To add new questions in response to new and/or developing issues.

The survey consisted of 24 questions, mostly close-ended. Some questions consisted of several subsections, and thus a fully completed survey included about 100 data points with the cumulative number of responses amounting to more than half a million data points. While some questions were intended for family physicians/general practitioners, other questions targeted other specialists (e.g. medical, internal medicine, laboratory, and surgical specialists). Most importantly, the demographics (i.e., by province, gender, age group, physician type) facilitated research and policy development for particular cohorts of physicians or patient populations.
The questionnaire and survey communications were available in both English and French. The questions were piloted in the winter of 2012 with a variety of physician committees and national specialty societies, and finalized in March 2013. The survey received ethical approval from University of Saskatchewan Behavioural Research Ethics Board in January, 2013.

**2013 National Physician Survey (NPS): Mailing List & Data Collection**

**Mailing List**

The 2013 NPS was carried out as a voluntary self-reported online survey of all physicians licensed to practise in Canada. The email contact lists were generated from the NPS Masterfile. The NPS Masterfile was populated with information from the CMA membership system, the CFPC membership database, and the Royal College membership database. The CMA membership system included all physicians in Canada holding a medical license, and is compiled and updated on a daily basis with information received from provincial licensing bodies, associations, CFPC and Royal College membership listings, and individual physicians. However, only email addresses of CMA members could be used for survey research so the list was supplemented with information provided by CFPC and the Royal College. All licensed physicians in full or part-time practice, locums, or employed in a medically related field, or on leave were eligible to respond to the survey. Medical students, residents, and retired physicians were not eligible.

Once fully populated, an NPS survey ID, not related to any existing member ID in any of the membership databases, was assigned to each record in the NPS Masterfile. The total number of cases in the NPS mailing database was 77,279. Email invitations contained a link to the e-questionnaire along with a unique identification number. These numbers were used to ensure that physician responses would remain confidential, to enable subsequent emailing of the questionnaire to be sent only to physicians who had not yet replied, and to provide the opportunity to apply the same numbers to future NPS surveys for longitudinal analysis, if permission was granted by the individuals.

**Data Collection**

The invitation e-mail and reminders were sent by Ottawa Lettershop to all practising physicians in the NPS mailing database for whom a valid email address was available. Communications were sent either in English or French, depending on the physician’s preferred language of correspondence. It was estimated that respondents would take 15 to 20 minutes to complete the questionnaire.

Of the 77,279 cases in the NPS mailing databases, 60,225 physicians were directly contacted through email. The remaining physicians did not have a functioning email address to participate (but were accounted for by applying the weighting method; please see section below: *Sampling weights, estimation weights, and non-response adjustments*).
The data collection period lasted April 2 – May 31, 2013. Physicians were contacted on four separate occasions.

- An invitation to participate was sent on April 2, 2013.
- First reminder was sent on April 15, 2013.
- Second reminder was sent on April 29, 2013.
- A final reminder was sent on May 14, 2013.

All responses were captured directly into one database.

Upon completion of the survey, participating physicians were eligible for a cash prize draw. There were two $1,000 prize draws available - one for early bird completion and one for all who participated. At the end of the survey, physicians were automatically directed to the online prize draw form. The early bird prize draw was carried out on May 10, 2013 for participants who completed the survey by May 3, 2013 and the second prize draw was carried out on June 21, 2013 for all participants who completed the survey during the data collection period. The winners’ contact information was, and remains, completely separate from the questionnaire responses.

**2013 National Physician Survey (NPS): Response Rate**

Of the 60,225 physicians contacted, 266 were found to be ineligible. An additional 62 physicians took advantage of the NPS ID finder which allowed any physician to complete the survey if they had heard about it. As such, of the 60,021 physicians invited to complete the 2013 NPS, 10,487 replied to the survey for an overall study response rate of 17.5%.

National level estimates based on the 2013 NPS study results are considered accurate within +/- 1.0%, 19 times out of 20.

**Sampling Weights, Estimation Weights, and Non-response Adjustment**

**Using weights to adjust for non-responses**

Non-responses are typical of a census. Non-responses in the 2013 NPS were due to physicians refraining from responding to the survey or not having an email address. Response rates also varied between demographic groups with, the possibility of unweighted estimates being highly unrepresentative, or biased.

To account for such potential bias, the weighting method was implemented to produce weighted estimates that are more representative of the total physician population. Moreover, weights should be used when making any estimates for all analysis using 2013 NPS data. The non-response adjustments were performed at the province by physician type by age-group by gender level, using the method of
The reference population for this calibration was the NPS Masterfile.

**Eligible Population:** The total population of eligible physicians (75,580) is an estimate because eligibility could not be determined for all 77,279 physicians on the initial NPS mailing list (especially that some physicians did not have an email address). Of the 77279 physicians on the initial list, eligibility could be determined for 10753 physicians, of whom 266 were ineligible and 10487 eligible. The weighting and non-response adjustment process included both the 10487 physicians who responded to the survey and the 266 found to be ineligible and assumes the same ineligibility rate (by demographic group) among the indeterminate cases (i.e., cases representing those who did not reply to the questionnaire or those who did not have an email address) as among those for which eligibility was determined. This allows the estimation of the number of ineligible physicians among the 66,748 physicians whose eligibility was not confirmed. This method produces an estimate of 65,093 eligible physicians. It is worth noting that the estimate for the total number of physicians (i.e., eligible and not eligible) (77501) is almost equal to the number of physicians in the original NPS mailing list (77279), giving us more confidence in the representativeness of the weighted estimates.

Estimated eligible population, 2013 NPS:

<table>
<thead>
<tr>
<th></th>
<th>Eligibility Determined</th>
<th>Eligibility Estimated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible</td>
<td>10487</td>
<td>65093</td>
<td>75580</td>
</tr>
<tr>
<td>Not Eligible</td>
<td>266</td>
<td>1655</td>
<td>1921</td>
</tr>
<tr>
<td>Total</td>
<td>10753</td>
<td>66748</td>
<td>77501</td>
</tr>
</tbody>
</table>

The definition of the eligible population in 2013 was different from that used in 2010, with the result that the overall population size estimates are larger in 2013. The difference in eligible population is not expected to have a significant impact on estimates of averages, proportions, regression coefficients and other analytic statistics; however estimates of totals for 2013 are not directly comparable to those from 2010.

**Responding Sample:** There were 10487 responses representing the (estimated) 75580 eligible physicians. After the non-response adjustments for different demographic groups, the estimation weights for these responses average 7.21, and range from 2.91 to 43.44.

**Sampling Variability of Estimates**

The data from the 2013 NPS are based on a census with considerable non-response. Different results would have been obtained if a census with no non-response had been conducted. These differences are called non-response errors, and sampling theory gives us a way to estimate how large they might be. For the NPS, it has been assumed that the non-response was approximately at random and so that it can be treated essentially uncorrelated with the questions asked.
The essential assumption is that the effect of non-response is approximately like that of a random sample within the classes that have been used for calibration. This is also the assumption under which the 2013 NPS estimates will accurately reflect the entire population of eligible physicians.

The weighting adjusts for over- or under-representation of groups defined by province, type of physician (specialist versus FP/GP), age, and sex. Hence any response bias due to differential non-response between these groups has been removed through the calibration of the weights.