Office of the
Merit Commissioner

Report on the Sampling Methodology and Extrapolations for the Merit Performance Audit

2024/25

January 2026

Contents

Background

Section 8 of the *Public Service Act* (the Act) states that all appointments to and from within the BC Public Service (BCPS) must be based on the principle of merit. In addition, according to section 5(1) of the Act, the Merit Commissioner is responsible for monitoring the application of the merit principle through random audits of appointments. To this end, the Office conducts annual merit performance audits.

The purpose of this report is to explain the population of appointments reviewed and to describe the sampling and extrapolation methods used to support the 2024/25 Merit Performance Audit.

As part of this mandate, the Merit Commissioner assesses whether recruitment and selection processes resulted in appointments based on merit, as defined in section 8 of the Act, and whether individuals appointed met the required qualifications for their positions.

The Office of the Merit Commissioner (the Office) reports audit results to organization heads and to the Deputy Minister of the BC Public Service Agency. The Office also summarizes overall results and analysis in the annual merit performance audit report.

This report is provided to the Legislative Assembly and is publicly available on the Office of the Merit Commissioner's website. All organizations identified in Appendix A of the 2024/25 Merit Performance Audit Report are subject to random audit as part of this process.

Changes in Sampling 2024/25

In the 2016/17 audit cycle, and under the guidance of Statistics Canada, a new sampling methodology was implemented using a fixed sample size and a simple random sampling approach. This methodology was applied consistently from 2016/17 through the 2023/24 fiscal years. Annual comparisons between the selected sample and the overall population demonstrated that this simple random sampling approach produced accurate population estimates over this period.

While the existing sampling methodology was robust, the Office identified an area for potential improvement. Specifically, because some organizations have a small number of staff and do not hire every quarter, there was a risk that they might not be sampled within the larger population.

Under the guidance of Statistics Canada, a new sampling methodology was created and has since been implemented. Statistics Canada indicated that a stratified random sampling methodology would address the risk of not sampling these smaller organizations. Several aspects were considered in the implementation of a new sampling methodology:

- **Improved sample reliability.** Stratification reduces the risk of an unrepresentative sample by dividing the population into defined strata prior to selection. While the previous methodology produced accurate results, the introduction of stratification provides an additional level of confidence by reducing the likelihood of over- or under-sampling.

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- **Improved representation of small organizations.** Organizations with low hiring activity may be under-represented in a simple random sample. To address this, all appointments made by small or "low-sampled" organizations are identified, and a proportional random sample is drawn. This approach reduces the risk that these organizations are under-sampled relative to their presence in the overall population.

- **Expanded analytical capacity.** For larger organizations, the stratified sampling methodology allows for the creation of additional strata (for example, included or excluded employees, new or existing employees, job type, active public service agreement, or location). While these additional strata have not yet been applied, they remain available to support more detailed analysis in future audit cycles.

In addition to revising the sampling methodology, Statistics Canada developed a new extrapolation tool to estimate audit results for the full population. Under the previous approach, audit findings were extrapolated using weighted proportion estimates and confidence intervals calculated using a Poisson distribution method.

Under the revised approach, key audit results—including final audit findings, appointee qualifications, and documentation findings—are extrapolated to the full population using weighted proportion estimates aligned with the stratified sampling design and modified Wilson confidence intervals. Previously, the Poisson method was only used to extrapolate the final audit findings. The modified Wilson confidence intervals provide improved accuracy across all proportions, particularly when estimates are low or when sample sizes are small.

Appointment Population

The 2024/25 audit included appointments made from April 1, 2024, to March 31, 2025. Eligible appointments included permanent appointments and temporary appointments with a duration of greater than seven months. To support an efficient audit process and provide timely feedback, the fiscal year was divided into four intervals:
- April 1 – June 30, 2024;
- July 1 – September 30, 2024;
- October 1 – December 31, 2024; and,
- January 1 – March 31, 2025.

Lists of appointments for organizations subject to audit for the relevant timeframe are obtained from the BC Public Service Agency (BCPSA). A list of appointments was also obtained from the BC Liquor Distribution Branch (LDB) and BC Pension Corporation, both of which retain appointment details independently. Appointment lists were provided to the Office shortly after the conclusion of each interval. Depending on when appointment information was added to the system, this could result in some appointments not being captured in the appropriate interval. Each year, the Office analyzes these "missed" appointments to ensure that the selected sample remains representative of the majority of appointments made.

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Prior to sample selection for each interval, appointment population lists are reviewed to identify duplicate entries. Identified duplicates are investigated to determine whether they represent distinct and eligible appointments for audit purposes. Duplicate entries and appointments deemed ineligible are removed from the population. For each interval, appointment lists from BCPSA, BC Pension Corporation, and LDB are combined to form a single appointment population list from which the audit sample is drawn. As of March 31, 2025, the end of the fiscal year, the total appointment population comprised 8,865 appointments.

Sample Selection

Previously, the Office selected a simple random sample of permanent appointments and long-term (greater than seven months) temporary appointments. A simple random sample is a statistically representative sample of the population of appointments from which results can be generalized to the total population of appointments[1]. As a result, the Office could reasonably extrapolate audit results from the sample to the full population of appointments for that fiscal year. Aligning with the start of the new fiscal year, in 2024/25 the new sampling methodology was implemented.

Sample Size Determination

Prior to 2016/17, the Office selected a fixed percentage of appointments from the population for audit. As a result, the number of audited appointments varied annually in proportion to population size. In 2016/17, for operational efficiency, the Office transitioned to selecting a fixed number of appointments each year. Currently, the set sample rate is 71 per quarter, or 284 per year. A fixed annual sample size of 284 appointments provides meaningful statistical assurance, as outlined below:

- The confidence level is set at a maximum of 95%, with a margin of error of ±6% for the "merit not applied" finding.

- For appointment populations of 12,000 or fewer, the minimum required sample size is 261.

Oversampling and Out-of-Scope Appointments

A slightly larger sample than the minimum required is selected to account for out-of-scope appointments included in the initial population lists. Beginning in the 2023/24 fiscal year, the Office increased the quarterly sample to 71 appointments, resulting in an annual sample of 284. This adjustment reflects increased appointment volumes across the public service and ensures that the desired statistical confidence level is maintained.

In 2024/25, the appointment population totaled 8,865 appointments, and the initial sample consisted of 284 appointments. Of these, eight appointments (3 percent) were determined to be out of scope. Out-of-scope

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[1] See section titled "Estimates and Confidence Intervals" for more details about the precision of results from this audit.

appointments include short-term temporary appointments and voluntary demotions. This out-of-scope rate is slightly lower than that reported in 2023/24 and is consistent with rates observed in prior years.

Stratification by Quarter

The sample was again stratified by four quarters over the 2024/25 fiscal year. Stratification ensured that the sample was drawn proportionally from the overall appointment population. Quarterly stratification was applied at three-month intervals, consistent with the periods described above. This approach allowed the Office to collect and audit appointments soon after they were made.

Based on prior experience, this timing increases the likelihood that hiring managers are available and able to provide more complete and accurate information. It also enables the Office to issue individual audit reports sooner, providing timely and constructive feedback to recipients. Because appointment volumes vary by quarter, each interval represents a different proportion of the overall sample.

Table 1 summarizes the four independent quarterly samples.

Table 1: 2023/24 Population, Sample Size, and Proportion Sampled			
Sampling interval	Population	Sample size	Proportion sampled
Apr 1 – Jun 30, 2024	2,825	71	2.5%
Jul 1 – Sep 30, 2024	2,518	71	2.8%
Oct 1 – Dec 31, 2024	1,979	71	3.6%
Jan 1 – Mar 31, 2025	1,543	71	4.6%
Total	**8,865**	**284**	**3.4%**

To minimize potential bias resulting from differing sampling proportions across quarters, a post-stratification weighting adjustment was applied. Specifically, unique weights were calculated to correct for imbalances in the overall sample.

Eight sampled appointments were identified as out of scope and excluded, resulting in 276 in-scope appointments that were audited. The Office used this information to estimate how many appointments would be in scope if the full appointment population were audited. This analysis resulted in an adjusted in-scope population of 8,616 appointments.

The statistics presented in the preceding two sections of this report are based on the in-scope population. Table 2 summarizes adjusted population totals and the proportion of appointments sampled for each fiscal year since 2016/17.

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Table 2: Year-Over-Year Comparison of In-Scope Population and Sample Size			
Year	Number of appointments	Number of audits	Proportion of population sampled
Fiscal 2016/17	5,685	257	4.5%
Fiscal 2017/18	6,269	259	4.1%
Fiscal 2018/19	7,363	273	3.7%
Fiscal 2019/20	7,413	267	3.6%
Fiscal 2020/21	5,445	269	4.9%
Fiscal 2021/22	7,534	269	3.6%
Fiscal 2022/23	10,525	268	2.5%
Fiscal 2023/24	10,969	272	2.5%
Fiscal 2024/25	8,865	276	3.1%

Distribution of Audits

The sample of 276 appointments was reviewed to confirm that it was representative of the appointment population from which it was drawn. This assessment involved comparing the distribution of sampled and population appointments across three variables: appointment type, organization size, and job classification group.

The comparison identified only small differences between the sample and population percentages, all within ±6 %. These results indicate that, although the sample was not stratified by these variables, the 2024/25 sample was proportionately representative of the total appointment population for the period.

Tables 3, 4, and 5 present these results for each comparison variable.

For these comparisons, the full initial sample of 284 appointments and a total population of 8,865 appointments were used. For this fiscal year, the differences shown in Tables 3, 4, and 5 between sample and audited appointment distributions all fell within ±5 percent.

Table 3: Audits by Appointment Type				
Appointment type	Total number of appointments	Percent of all appointments	Number of audits	Percent of all audits
Permanent	7889	89.0%	251	88.4%
Temporary over 7 months	976	11.0%	33	11.6%

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Table 4: Audits by Organization Size

Organization size	Total number of appointments	Percent of all appointments	Number of audits	Percent of all audits
Large (> 1,000 employees)	6577	74.2%	208	73.2%
Small (≤ 1,000 employees)	2288	25.8%	76	26.8%

Table 5: Audits by Job Type

Job classification group	Total number of appointments	Percent of all appointments	Number of audits	Percent of all audits
Admin Support	1467	17.1%	45	16.4%
Enforcement & Corrections	467	5.4%	15	5.5%
Executive	23	0.3%	0	0.0%
Finance & Economics	316	3.7%	10	3.6%
Health, Education & Social Work	1172	13.6%	40	14.5%
Information Technology	406	4.7%	11	4.0%
Legal Counsel	159	1.9%	2	0.7%
Management Band	1477	17.2%	45	16.4%
Science & Technical Officers	1071	12.5%	48	17.5%
Senior Admin & Research	2017	23.5%	59	21.5%
Trades & Operations	18	0.2%	0	0.0%

Note: Percentages may not add to 100%, due to rounding.

Estimates and Confidence Intervals

To determine the probability that the sample audit findings (i.e., "merit," "merit not applied," and "merit with exception") would be replicated in the population of appointments, the Office applied confidence intervals to the estimates for the 2024/25 audit. The Poisson distribution method had been used for estimation purposes in all merit performance audits since 2010, up to and including the previous fiscal year.

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Although sampling variation across intervals was relatively small, micro-data in prior years were weighted when generating population estimates and confidence intervals to minimize sample bias and to improve estimate accuracy.

A 95% confidence interval indicates that, with repeated sampling, the true population value would be expected to fall within the calculated lower and upper bounds in 95 out of 100 samples. Accordingly, the confidence intervals presented in Table 6 show the range within which the true population values for the "merit not applied," "merit with exception," and "merit" findings would be expected to fall with 95 percent confidence.

Table 6: Extrapolated Estimates – Audit Findings and Confidence Intervals					
Audit	Audit finding	Sample appointments audited	Estimate (weighted)	95% Confidence interval	
				Lower	Upper
2024/25 Audit	Merit not applied	27	9.8%	7.5%	14.7%
	Merit applied	184	66.7%	60.5%	71.8%
	Merit with exception	65	23.6%	18.4%	28.4%

Note: Percentages may not add to 100%, due to rounding.

In the 2024/25 audit, appointments with a "merit not applied" finding represented 9.8% of all audited appointments. Based on the associated confidence intervals, the true proportion of appointments with a "merit not applied" finding in the total population is estimated to range from 7.5% to 14.7%. The estimated proportion of appointments with a "merit" finding ranges from 60.5% to 71.8%. The estimated proportion of appointments with a "merit with exception" finding ranges from 18.4% to 28.4%.

Uses and Limitations of Audit Results

As with any sampling-based analysis, some variability is inherent in the results. The Office accounts for this expected variability by applying confidence intervals to key statistical estimates. Each confidence interval expresses the level of precision by presenting a percentage range above and below the estimated population value for each audit finding.

Appointments selected for audit were drawn as a random sample from the population of appointments occurring between April 1, 2024, and March 31, 2025. In terms of year-over-year comparisons, the number of audits conducted in the 2024/25 fiscal year was very close to the rate that was seen in the 2023/24 (268), 2022/23 (268), 2021/22 (269), 2020/21 (269), 2019/20 (267), 2018/19 (273) and, 2017/18 (259) due to the fixed sample size approach now used.

Due to significant changes in the sampling methodology implemented in 2016/17, caution should be exercised when comparing results from 2024/25 and subsequent years with audit results from periods prior to 2016/17.
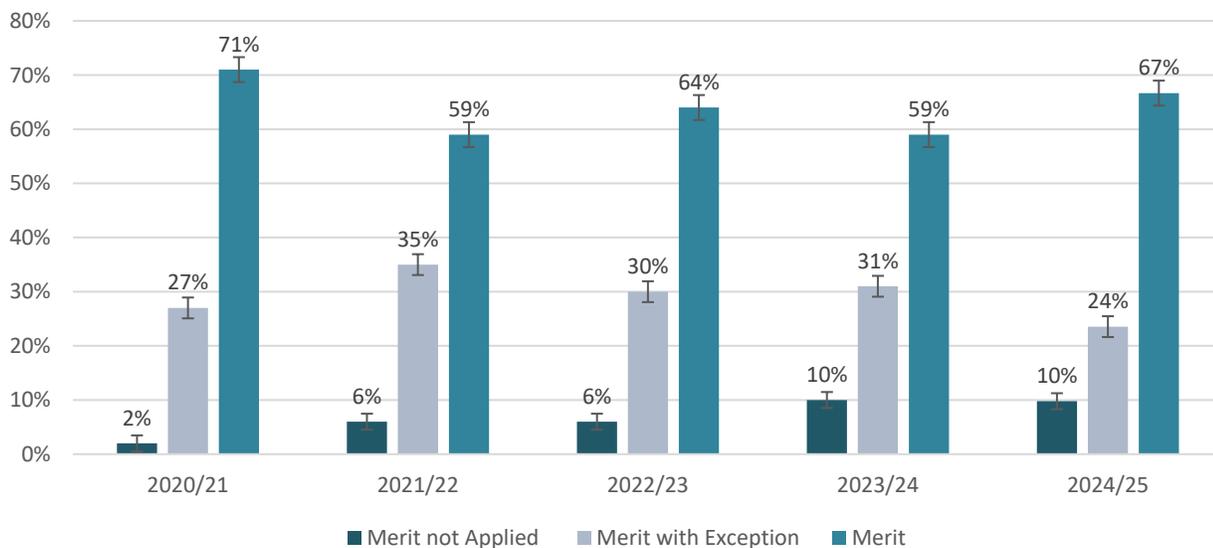
As noted above, the sampling methodology changed significantly in 2024/25. Prior to this year, only minor changes were implemented annually following the introduction of a fixed sample size in 2016/17. A summary of these changes is provided below.

- 2016/17: A fixed sample size of 70 appointments per quarter was established. Details of this change are provided in Appendix B of the 2016/17 Merit Performance Audit Report.
- In 2017/18: the Office changed how inventory errors are identified.
- 2018/19: The methodology for tallying errors was updated. Further details are provided in Appendix B of the 2018/19 Merit Performance Audit Report.
- 2018/19: An unanticipated issue identified during the first audit interval resulted in additional stratification during the third and fourth intervals. These samples were further stratified by source list (core government and Liquor Distribution Branch) and employee status (new or existing). This approach is described in Appendix B of the 2018/19 Merit Performance Audit Report.
- 2023/24: The annual sample size was increased from 280 to 284 to ensure sufficient statistical power given rising appointment volumes.
- 2023/24: Following the implementation of a new database system, the categories used to track appointment phases, processes, and errors were refined to more accurately reflect audit stages. Details are provided in the 2023/24 Merit Performance Audit Report.
- 2024/25: With the support of Statistics Canada, the Office implemented a stratified random sampling methodology, replacing the previous simple random sampling approach.

Chart 1 illustrates estimated year-over-year merit performance audit results for the population of public service appointments, with confidence intervals displayed as error bars.

Chart 1: Population Estimates for the Recruitment and Selection Process Findings

Notes:
- Error bars depict 95% confidence intervals around each population estimate.

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Conclusion

Considering the sample sizes employed and the consistent application of the sampling methodology, the results of the 2024/25 Merit Performance Audit are comparable to those of recent fiscal years. Given the level of precision reflected in the confidence intervals, the samples and resulting audit findings demonstrate reasonable statistical strength and reliability.

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