



# CIHI's Data Source Assessment Tool



Canadian Institute  
for Health Information

Institut canadien  
d'information sur la santé

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Cette publication est aussi disponible en français sous le titre *Outil d'évaluation des sources de données de l'ICIS*.

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# 1 Introduction

*CIHI's Data Source Assessment Tool* provides a set of criteria that enable the Canadian Institute for Health Information (CIHI) to comprehensively assess its data sources across 5 dimensions of quality and to determine the fitness for use of a given data set. CIHI uses the term “fitness for use” to define quality, in line with international standards and best practice.<sup>1</sup> It means that quality is defined in the context of data users and their needs. Data does not need to be perfect — this is an unattainable goal; however, with appropriate knowledge about a given data set or product, users can make an informed decision about whether they may confidently use the data to answer their business or research question.

At CIHI, data source assessment is a corporately governed process that reflects CIHI's commitment to producing and maintaining high-quality data for a wide variety of uses. This tool can be applied to many different types of data sources, and it is comprehensive enough to meet the quality information needs of data users while also supporting data stewards and CIHI overall (Table 1).

For those who supply data to CIHI or who use CIHI's data or information products, this document provides useful information about how CIHI evaluates the data it receives. This tool can also be used by organizations interested in doing their own data quality assessments. The criteria can be adapted, expanded or reduced based on the needs and priorities of an organization or program. Used in full, the criteria can create quality benchmarks for measuring future improvement, identify major issues and generate quality-related metadata in a standard way that can then be packaged for user documentation. Used in part, they can help inform specific, high-priority quality issues or initiatives; for example, they can be considered when undertaking the development (or redevelopment) of a data source. The results of an assessment can guide appropriate data use and inform analytical plans, and they can also contribute to the creation of key quality indicators and other metrics for reporting.

**Table 1** Quality assessment information use

Audience	Use
<b>Data stewards</b>	<ul style="list-style-type: none"> <li>• Set quality improvement priorities and plans by identifying                             <ul style="list-style-type: none"> <li>– What needs to be fixed or improved</li> <li>– What needs to be monitored</li> <li>– What needs to be reported</li> </ul> </li> <li>• Provide summary information about quality management processes</li> </ul>
<b>Data users</b>	<ul style="list-style-type: none"> <li>• Support and expand data use by understanding                             <ul style="list-style-type: none"> <li>– How the data is created and processed</li> <li>– How it's currently used</li> <li>– How it could potentially be used</li> <li>– How it should not be used, based on existing limitations</li> <li>– How to access the data and its metadata</li> </ul> </li> </ul>
<b>CIHI</b>	<ul style="list-style-type: none"> <li>• Establish corporate knowledge of processes and practices, and identify opportunities to improve efficiency</li> <li>• Generate metadata to facilitate data use</li> <li>• Identify, understand and leverage existing successful approaches to quality improvement</li> <li>• Identify systematic quality challenges across the organization</li> <li>• Monitor changes in data quality</li> </ul>

This assessment tool replaces a past version that was included as part of CIHI's 2009 Data Quality Framework, which itself has been replaced by a new Information Quality Framework. The new framework is broader in scope, providing an overarching structure to integrate all quality-related activities across CIHI. It signifies an important shift in focus from *data* to *information* quality and to managing not just the quality of the data coming into CIHI but also the quality of the information products that CIHI releases.

As the quality of the data sources used is a core component of information quality, a tool to provide a common approach to assessing those sources remains a key part of CIHI's new framework. The tool has been updated as the result of extensive internal consultation within CIHI and a scan of international best practices.<sup>1-5</sup>

## Structure of the tool

This tool contains 2 sets of criteria:

- A general set for assessing the quality of all types of data sources. It is a comprehensive set of criteria and is designed to be used flexibly, as not all criteria will apply to all data sources. The assessment scope matrix found in Appendix A provides guidance on which criteria are most relevant to different types of data sources.
- A supplementary set, to be used *in addition to* the general set, for assessing the quality of survey-/sampling-specific components of data sources that contain survey results or sample data. As CIHI has relatively few data sources containing survey/sample data, the criteria were organized this way to facilitate implementation.

Each set of criteria is preceded by a section that captures key characteristics about the data source and, if applicable, the survey/sample components. The information captured in the key characteristics sections provides important context for interpreting the assessment results and, along with the assessment scope matrix, can also help determine which criteria may apply to a given data source.

## Dimensions, characteristics and criteria

Quality is a multi-dimensional concept, and CIHI's 5 dimensions of quality encompass those found in the National Quality Assurance Framework that was developed by an expert international working group in conjunction with the United Nations Statistical Commission.<sup>1</sup> These dimensions are used by CIHI to assess quality relative to users' needs and are intended to work in balance with one another, depending on users' needs and priorities.

### 5 dimensions of quality

**Relevance:** Does the information meet users' current and potential future needs?

**Accuracy and reliability:** Does the information correctly and consistently describe what it was designed to measure?

**Comparability and coherence:** Is the information consistent over time and across providers and can it easily be combined with other sources?

**Timeliness and punctuality:** Is the information current and released on schedule?

**Accessibility and clarity:** Is the information and its supporting documentation easily accessed and clearly presented in a way that can be understood?

These 5 dimensions of quality are broken down into characteristics that describe specific aspects of quality that must be understood to determine whether the data is fit for its intended use. Each characteristic is further made up of one or more criteria, which are the individual questions used to facilitate assessment. It is the response to these criteria, or the degree to which they are met, that allows users to identify the strengths and limitations of a given data source. Quality characteristics by dimension are outlined in tables 2A to 2E below, while the detailed criteria are presented in Section 3.

**Table 2A** Quality characteristics, by dimension — Relevance

Characteristic	Description
<b>Release and use</b>	<p>The ways in which data is made available for use and its subsequent utilization for various purposes. If data is being used, it is an indication that it is meeting an information need in some way. However, the opposite may not be true; data that sees little use may still be relevant but may have other issues (e.g., is not accessible).</p> <p>This is assessed by monitoring usage metrics, where available, and describing other known uses of the data.</p>
<b>Value</b>	<p>The contribution of a data source to filling priority information gaps and whether it successfully serves to address its purpose. Data that no longer meets users' needs is at risk of becoming irrelevant.</p> <p>This is assessed by monitoring the perceived value of the data with regard to main users' and stakeholders' current and emerging information needs.</p>
<b>Adaptability</b>	<p>Whether a data source is well positioned and flexible enough to address the current and future information needs of its main users. Data sources that cannot adapt may be at risk of becoming irrelevant.</p> <p>This is assessed by evaluating whether user needs are effectively and proactively identified, and then by monitoring any corresponding changes to the data source.</p>

**Table 2B** Quality characteristics, by dimension — Accuracy and reliability

Characteristic	Description
<b>Coverage*</b>	<p>The degree to which the data available for use covers the population for whom information is wanted (the population of interest). Coverage governs most use, as it is critical to understanding which populations statements can and cannot be made for based on the data.</p> <p>This is assessed by defining populations and calculating and monitoring coverage rates, including over- and under-coverage, and describing the impact of any limitations in the coverage (e.g., bias due to differences between units from which no information was received and those from which information was received).</p>
<b>Item availability</b>	<p>The degree to which the individual records received contain complete, valid information. The effect on fitness for use depends on many factors, including the importance of the missing/invalid responses to a given data element and whether there is any pattern to the missing values.</p> <p>This is assessed by routine data profiling that includes calculating and monitoring rates of valid, invalid, missing and outlier values.</p>
<b>Lineage</b>	<p>Lineage describes the process and flow of data and its influences from the point of origin through to end usage. Understanding lineage allows users to have trust in the data and allows data stewards to identify where in the supply chain quality issues might occur. Complete documentation of lineage is key metadata for a data source.</p> <p>This is assessed by documenting what is known about data lineage, describing any known variations and identifying any gaps in knowledge.</p>
<b>Capture and collection</b>	<p>The quality management practices that are in place to capture information in a usable format and prepare it for submission/transmission. Monitoring quality along the entire data supply chain can help to identify where and when issues might originate or occur.</p> <p>This is assessed by identifying what measures, processes and standards are in place to maintain constructive relationships with data providers, minimize response burden and facilitate effective data flows.</p>

Characteristic	Description
<p><b>Measurement error</b></p>	<p>The difference between the value that is reported and the true but unknown value that should have been reported. Data users should understand how data may be affected by measurement error in order to interpret results appropriately. Measurement error includes the concepts of bias (to what degree the difference between the reported values and the values that should have been reported occurs in a systematic way) and of consistency or reliability (the amount of variation that would occur if repeated measurements were done).</p> <p>This is assessed by quantifying or estimating measurement error where possible (e.g., through validation studies) or by describing potential sources of measurement error even if the degree of error is not known.</p>
<p><b>Processing</b></p>	<p>The application of programs or procedures that generally transform the data as it is received into a form that is suitable for analysis. This may include validation, correction, imputation and the creation of derived variables. Understanding processing is integral to data lineage, which (as mentioned above) is key metadata about a data source that allows users to trust the data. Documentation of processing is also important for data stewards, as it allows for continuity of operations when there are changes in staff.</p> <p>This is assessed by identifying whether processing is fully documented, including how it is done and whether transformed data can be identified and differentiated from the original data.</p>

**Note**

\* Coverage is assessed differently for survey/sample data sources, as outlined in Table 3A.

**Table 2C** Quality characteristics, by dimension — Comparability and coherence

Characteristic	Description
<p><b>Concordance</b></p>	<p>The degree to which data is in agreement with other similar and relevant sources. Users often want to bring together information from different data sources to more fully report on specific themes and topics, and they need consistent information to do so. Sometimes one data source can act as a standard against which to compare another. Unexpected differences in the comparisons may signal a quality issue in one or more of the sources.</p> <p>This is assessed by comparing aggregate statistics from other sources of data that capture the same or similar information, while being cognizant of differences that may impact the comparison.</p>
<p><b>Standardization</b></p>	<p>The level to which common definitions and/or groupings are used to collect data. Using standards can ensure comparability and facilitate analysis, whereas a lack of standardization can have the opposite effect.</p> <p>This is assessed by identifying where existing standards can be or are being used, as well as how they are used (e.g., whether there are variations or deviations from the standard) and supported.</p>
<p><b>Linkage</b></p>	<p>The process of joining records (either within a single data source or from multiple data sources) by using one or more common linking data elements. Linking data allows for more detailed and/or complete reporting and analysis and can address important questions that could not otherwise be examined.</p> <p>This is assessed by identifying whether linkage is possible through linkage variables (and their response) and, where possible, calculating linkage rates based on their availability.</p>
<p><b>Jurisdictional comparability</b></p>	<p>The degree to which the data allows for reasonable comparisons between and within provinces and territories. Meaningful comparisons among jurisdictions can be used to support effective system management, quality improvement and decision-making, whereas unreasonable comparisons can have the opposite effect. Determining comparability helps ensure appropriate use of the data.</p> <p>This is assessed by documenting any jurisdictional differences and their potential impact on the data and its use for comparative reporting.</p>
<p><b>Historical comparability</b></p>	<p>The consistency of data concepts and methods over time, which in turn allows valid comparisons of different estimates at different points in time. Determining comparability helps ensure appropriate use of the data.</p> <p>This is assessed by conducting trend analysis to identify and examine changes in data over time. Another aspect is how well-known changes to the data source are documented for users.</p>

**Table 2D** Quality characteristics, by dimension — Timeliness and punctuality

Characteristic	Description
<b>Release timeliness</b>	<p>The currency of the data at the time of release. The elapsed duration (as defined below) should be short enough that the data remains relevant for its main purposes.</p> <p>This is assessed by measuring the time elapsed between the actual date of release and the end of the data reference period.</p>
<b>Release punctuality</b>	<p>Whether the data was released on time. This is an important consideration for users, because it enables them to develop their own operational plans. Delays may provide an indication of quality issues during the production process.</p> <p>This is assessed by identifying delayed releases and the underlying causes.</p>
<b>Submission timeliness</b>	<p>Whether the data is submitted on time by data providers. Submission timeliness is critical for achieving timely and punctual release of results.</p> <p>This is assessed by measuring the magnitude of late data submissions, identifying the underlying causes and evaluating any mechanisms designed to improve timeliness.</p>
<b>Processing timeliness</b>	<p>Whether the data, once received, is processed as efficiently as possible. Processing timeliness is critical for timely and punctual release of results.</p> <p>This is assessed by understanding the processing procedures and systems, and reviewing them regularly for efficiency.</p>

**Table 2E** Quality characteristics, by dimension — Accessibility and clarity

Characteristic	Description
<b>Accessibility</b>	<p>The ease with which data can be obtained, including knowledge that the data exists and the suitability of the format of the data. Accessibility is key to data quality, as data that users do not know about, cannot locate or cannot bring into their own working environment for whatever reason will not be of use to them.</p> <p>This is assessed by determining whether a single version of the data (source of truth) is maintained in a standard format that is repeated each release. This allows users to more easily repeat analyses that will be consistent with previous results.</p>
<b>Interpretability</b>	<p>The degree to which users have the required documentation and metadata available to understand the data. Having this information available helps ensure appropriate use of the data.</p> <p>This is assessed by determining whether or not all documentation necessary to appropriately interpret and use the data is available and up to date. This also includes documentation specific to preliminary (not finalized) data use and post-release revisions to the data.</p>

Some of the criteria specific to survey and sample data found in Section 4 measure characteristics described above (historical comparability, coverage, item availability [response], measurement error [bias], capture and collection), while some are related to characteristics specific to survey and sample data as outlined in tables 3A and 3B below.

**Table 3A** Survey and sample data quality characteristics, by dimension — Accuracy and reliability

Characteristic	Description
<b>Survey/sampling frame</b>	<p>Describes the frame maintenance procedures and any monitoring processes. For recurring surveys, it is essential to keep the frame up to date to maintain adequate coverage of the target population and to document any changes in the frame that can impact survey estimates.</p> <p>This is assessed by identifying whether adequate processes are in place and by documenting changes and their potential impacts.</p>
<b>Questionnaire design</b>	<p>The processes by which the data collection instrument was developed and its suitability for collecting the data needed to produce the desired estimates.</p> <p>This can be assessed by determining whether the instrument was designed to maximize response, considering known constraints, and the degree to which it was tested.</p>
<b>Coverage</b>	<p>The degree to which the data available for use covers the population for whom information is wanted (the population of interest). For survey/sample data, the degree to which the frame (a list of the units available for sampling) covers the population of interest, and information about the achieved sample. Coverage governs most use, as it is critical to understanding which populations statements can and cannot be made for based on the data.</p> <p>This is assessed by calculating and monitoring response rates and describing the potential impact of any coverage limitations (e.g., insufficient sample size, frame under-/over-coverage) on key study estimates.</p>
<b>Non-response bias</b>	<p>Describes the extent to which the survey data is subject to non-response (missing data) and any potential bias as a result of the non-response (due to the answers from responders being different from potential answers from non-responders). It is critical to understand how representative of the population of interest the sampled respondents included in the survey are.</p> <p>This is assessed by describing potential differences between responders and non-responders, estimating the level of non-response bias and documenting any steps taken to reduce the impact of any bias.</p>
<b>Precision of estimates</b>	<p>An indication of how close the sample-based estimates are likely to be to the actual population values.</p> <p>This is assessed by calculating sampling errors to determine whether the variance of the estimate, compared with the estimate itself, is at an acceptable level. Design effects can also be calculated to assess the impact of the sample design on the precision of estimates.</p>

**Table 3B** Survey and sample data quality characteristics, by dimension — Accessibility and clarity

Characteristic	Description
<b>Survey/sample design</b>	<p>The degree to which the survey and sampling methodology that was used is fully documented for users, including the rationale for the chosen survey/sample design based on the population for which estimates need to be made and the desired precision of these estimates.</p> <p>This is assessed by determining whether the key components of the design are fully documented, including the rationale for the chosen design and what it was based on (e.g., available sampling frame, collection period).</p>

## 2 Data source key characteristics

The information captured in this section provides important context for interpreting the assessment results and, along with the assessment scope matrix found in Appendix A, can also help determine which criteria may apply to a given data source. The metadata generated can also be used to partially populate or maintain an inventory of an organization's data sources (Table 4). For each characteristic, examples of the type of detail required are provided.

**Table 4** Data source key characteristics

Characteristic	Details
<b>Data source purpose</b>	Information need that the data source addresses
<b>Population of interest</b>	Group of units for which information is wanted
<b>Data source type</b>	<ul style="list-style-type: none"> <li>• Production database: Subject to operational quality management processes</li> <li>• Analytical/third-party data files: May be subject to fewer and less-operational quality management processes</li> <li>• Other</li> </ul>
<b>Data source content</b>	<ul style="list-style-type: none"> <li>• Unit(s) of analysis</li> <li>• Survey data</li> <li>• Sample data</li> <li>• Census data</li> <li>• Longitudinal data</li> <li>• Aggregate data</li> <li>• Record-level data</li> </ul>

Characteristic	Details
<b>Maturity</b>	<ul style="list-style-type: none"> <li>• Pilot or demonstration data</li> <li>• One-time or ad hoc submission or acquisition</li> <li>• New ongoing feed: Less than 5 years in operation</li> <li>• Established ongoing feed: 5 years or more in operation</li> </ul>
<b>Data input file formats</b>	<ul style="list-style-type: none"> <li>• Text</li> <li>• XML</li> <li>• Web form</li> <li>• Data entry application (non-web)</li> <li>• Excel</li> <li>• Proprietary statistical software format (e.g., SAS)</li> <li>• Other</li> </ul>
<b>Submission</b>	<ul style="list-style-type: none"> <li>• Commitment to participate (mandated, partially mandated, voluntary)</li> <li>• Minimum submission frequency</li> <li>• Vendor system use</li> <li>• Corrections or resubmissions accepted</li> <li>• Non-standard data accepted (e.g., free text, variable-definition fields)</li> </ul>
<b>Data provider types</b>	<ul style="list-style-type: none"> <li>• Provincial/territorial government</li> <li>• Federal government</li> <li>• Health care organization</li> <li>• Regulatory body</li> <li>• Health care provider</li> <li>• Source internal to organization (e.g., a different department or branch)</li> <li>• Other</li> </ul>

### 3 General criteria

Tables 5A to 5E outline the data source assessment criteria, by characteristic and dimension, and also include assessment details.

**Table 5A** Data source assessment criteria, by dimension — Relevance

Characteristic	Criterion	Details	Assessment
Release and use	1: All known uses of the data from the data source are documented	Describe reporting based on the data source, including scheduled and ad hoc releases and/or updates, and private and public reporting.	Yes
		Record usage metrics: number of registered users, web metrics (downloads, page views, etc.), data requests, etc.	Partial (partially documented)
		Describe known external uses of the data such as (but not limited to) funding models, products, tools, indicators, classifications/groupings, analyses and policy formation.	No
Value	2: The data source contains information that can inform priority themes and populations	Describe how the data source informs the theme or population. Consider actual and potential uses.	Yes
			No
	3: Quality improvement action plans exist and are implemented to improve relevance and meet emerging needs	Provide action plan document.	Yes
		Summarize efforts implemented via action plans that are directly related to improving relevance and addressing emerging needs (e.g., working groups, analytical projects, stakeholder consultation).	Partial (plans exist but have not been implemented)
		Describe reasons why action plans do not exist or have not been acted on, including any plans to address.	No

Characteristic	Criterion	Details	Assessment
<b>Adaptability</b>	4a: Mechanisms to identify client and stakeholder needs exist and are evaluated for effectiveness	<p>Identify mechanisms used (e.g., advisory committee, survey) and evaluate effectiveness as high, medium or low based on the following guidelines:</p> <p><b>High:</b> Mechanism identifies needs shared by multiple stakeholders; potential for improving fitness for use for a wide audience; history of initiating quality improvements related to strategic priorities.</p> <p><b>Medium:</b> Mechanism identifies needs specific to a jurisdiction or client that are unlikely to conflict with those of other clients; needs identified are usually acted upon as time allows if reasonably feasible for most stakeholders; occasionally results in improvement in quality if feedback is addressed/implemented.</p> <p><b>Low:</b> Mechanism identifies needs that are highly client-specific and not usually related to strategic priorities; addressing identified needs is usually unrealistic due to system and/or resource constraints; rarely results in improvement in quality if feedback is addressed/implemented.</p> <p>Describe reason why any mechanisms to identify client and stakeholder needs do not exist, or do exist but have not been evaluated, including any planned activities to address.</p>	Yes Partial (mechanisms exist but are not evaluated) No
	4b: Client and stakeholder needs are prioritized and implemented	<p>Describe major changes to systems or standards as a result of identified stakeholder needs.</p> <p>Describe any needs identified for which no activity is planned, including whether temporary workarounds are in place and documented.</p>	Yes Partial (needs are prioritized but not implemented) No

**Table 5B** Data source assessment criteria, by dimension — Accuracy and reliability

Characteristic	Criterion	Details	Assessment
Coverage*	5a: Populations of interest, populations of reference and submitted populations are documented, and coverage is quantifiable at both the submitting unit level and the unit(s) of analysis	<p>Indicate whether populations of interest, populations of reference and submitted populations are documented and quantifiable; if not, describe why and any plans to address.</p> <p><b>Definitions</b></p> <p><b>Population of interest:</b> The population for which information is wanted (wanted submitters).</p> <p><b>Population of reference:</b> The population for which information should be available (expected submitters).</p> <p><b>Submitted population:</b> The population for which information was actually received (confirmed submitters).</p>	<p>Yes</p> <p>Partial (populations are documented but not quantifiable)</p> <p>No</p>
	5b: Coverage rates are documented via standardized tables and are updated routinely or with each data release	<p>Provide population counts and coverage rates at both submitting unit level and record level (unit of analysis) using the following formulas:</p> <p>Population of interest units (A)                      Population of reference units (B)                      Submitting units (C)                      Unit coverage of population of interest (<math>D = C \div A</math>)                      Unit under-coverage of population of interest (<math>E = 1 - D</math>)                      Unit response (unit coverage of population of reference) (<math>F = C \div B</math>)                      Unit non-response (unit under-coverage of population of reference) (<math>G = 1 - F</math>)</p> <p>Describe coverage table update process, including frequency. If coverage is not documented or routinely updated, describe why, including any planned activities to address.</p>	<p>Yes</p> <p>Partial (coverage is documented but not in a standardized way, is not updated with each data release or both)</p> <p>No</p>

Characteristic	Criterion	Details	Assessment
<b>Coverage*</b> <b>(cont'd)</b>	5c: Significant coverage issues that impact analysis and interpretation are documented for users	Describe significant coverage issues that limit interpretation and use, considering impact at different reporting levels (e.g., national versus regional). If significant coverage issues are not documented, describe why, including any plans to address.	Yes  No  Not applicable (no significant coverage issues)
	6a: Processes exist to identify and handle duplicate and potential duplicate records within the data	Describe process for identifying duplicates.  Calculate rate of duplicates using the following formula: Number of duplicates = (A) Total units of analysis = (B) Duplicate unit of analysis rate = $(A) \div (B) \times 100$  Indicate whether duplicates are removed; if not, indicate whether they are documented to allow users to remove them.  If duplicates cannot be identified, describe why, including any plans to address, and provide an estimate of over-coverage and/or describe potential sources of over-coverage.	Yes  Partial (duplicates are identified but not handled)  No
	6b: Problems with duplicate records that can impact analysis and interpretation are documented for users and updated with each data release	Describe significant duplicate record issues that could limit interpretation and use. If issues with duplicates are not documented, describe why, including any plans to address.	Yes  Partial (problems are documented but not updated with each release)  No  Not applicable (no problems with duplicates)

Characteristic	Criterion	Details	Assessment
<b>Coverage*</b> <b>(cont'd)</b>	7: Records are complete for data sources that are designed to be longitudinal	<p>If data follows a set or expected update cycle that allows for quantification of missing events, provide missing longitudinal record rate based on required assessment or other frequency.</p> <p>If data is longitudinal but there is no set update cycle (i.e., updates are based on ad hoc events), provide any information on whether completeness has ever been evaluated and the approach used.</p>	<p>Yes</p> <p>No (includes unknown)</p> <p>Not applicable (not longitudinal)</p>
<b>Item availability</b>	8a: Standard data profiling results, including rates of valid, invalid, missing and outlier values, are documented and updated routinely or with each data release	<p>Provide a data profile for key data elements (overall and by jurisdiction) that must include, at minimum, valid, invalid and missing value rates. Key data elements are those that are most important for analysis or are most widely used, and usually include socio-demographic, identification, geographic and linkage elements in addition to key content elements (e.g., diagnostic elements in an administrative health data source).</p> <p>Describe data profile update process, including frequency.</p> <p>If data profiling is not done or not routinely updated, describe why, including any plans to address.</p> <p><b>Definitions</b></p> <p><b>Valid:</b> Data conforms to data source specifications (e.g., <i>not applicable</i> is a valid value rather than a missing value).</p> <p><b>Invalid:</b> Data does not conform to data source specifications.</p> <p><b>Missing:</b> Data is missing or unknown (unavailable).</p> <p><b>Outlier:</b> A data value appears unusual with respect to the distribution of the data.</p>	<p>Yes</p> <p>Partial (data profiling is done but not in a standardized way, not done routinely/with each data release or both)</p> <p>No</p>
	8b: Standard data profiling results, including rates of valid, invalid, missing and outlier values, fall within an acceptable range	<p>For key variables included in the data profile, calculate the percentage where availability of valid data is less than 95%.</p> <p><b>Definition</b></p> <p><b>Acceptable range:</b> Rate of valid data is 95% or higher for a given data element.</p>	<p>Yes</p> <p>No</p>

Characteristic	Criterion	Details	Assessment
<b>Item availability (cont'd)</b>	8c: Any issues related to the identification of item non-response are documented for users	Describe any challenges with identifying true item non-response.	Yes  No  Not applicable (no issues related to item non-response)
<b>Lineage</b>	9a: Data lineage prior to submission is known and documented for users	<p>Describe</p> <ul style="list-style-type: none"> <li>• The level of overall detail known about data lineage prior to submission (basic or detailed information), including any known issues</li> <li>• The origin(s) of the data; include a data flow diagram</li> <li>• Known data processing and/or transformations that occur prior to submission</li> <li>• Known quality control mechanisms that occur prior to submission</li> </ul> <p><b>Definition</b></p> <p><b>Lineage:</b> Describes the process and flow of data and its influences from the point of origin through to end usage.</p>	Yes  Partial (some but not all aspects of lineage prior to submission are known)  No
	9b: Differences in data lineage prior to submission that can impact analysis and interpretation are documented for users and updated routinely or with each data release	<p>Describe significant differences in lineage (prior to submission) that could limit interpretation and use.</p> <p>If significant differences in lineage (prior to submission) are not documented, describe why, including any plans to address.</p>	Yes  Partial (differences are documented but not updated with each release)  No

Characteristic	Criterion	Details	Assessment
<p><b>Capture and collection</b></p>	<p>10: Mechanisms to support data providers in capturing high-quality information and to reduce response burden exist and are evaluated for effectiveness</p>	<p>Identify mechanisms used (e.g., client support, committee, documentation, processes) and evaluate effectiveness as high, medium or low based on the following guidelines:</p> <p><b>High:</b> Mechanism is widely used by or has been the subject of positive feedback from data providers, and has proven to significantly improve data capture and reduce response burden for most data providers.</p> <p><b>Medium:</b> Mechanism is sometimes used by or has elicited feedback from data providers, and has proven to moderately improve data capture and reduce response burden for some data providers.</p> <p><b>Low:</b> Mechanism is rarely used and has little to no impact on data capture or response burden.</p> <p>Describe reason why any mechanisms to support data providers do not exist, or do exist but have not been evaluated, including any planned activities to address.</p>	<p>Yes</p> <p>Partial (mechanisms exist but are not evaluated)</p> <p>No</p>
	<p>11: All data submissions comply with standard submission specifications or requirements</p>	<p>Provide link to data submission specifications or requirements document.</p> <p>Provide level of compliance with submission specifications.</p> <p>Identify which submission types do not comply, including amount of data that is non-compliant (if possible), and describe reason and any plans to address.</p> <p>Indicate whether data submissions are manipulated by CIHI to meet specifications or requirements (and to what extent).</p>	<p>Yes</p> <p>Partial (data required minor intervention prior to meeting database-specific submission specifications)</p> <p>No</p> <p>Not applicable (no submission specifications/requirements)</p>

Characteristic	Criterion	Details	Assessment
<b>Capture and collection (cont'd)</b>	12a: Processes to monitor data submission quality exist and are documented	Describe monitoring process, including frequency and whether it's automated. Describe who is responsible for monitoring. Describe location of monitoring results. Describe issue management process. If monitoring is not documented, describe why, including any plans to address. Describe whether there are any plans to add or improve monitoring processes or to increase level of monitoring.	Yes  Partial (processes exist but are not documented)  No
	12b: Data submission quality issues that significantly impact analysis and interpretation are documented for users and addressed	Provide details of current issues, including issue description, response or resolution and associated time frame, and potential impacts on interpretation and use of the data.  If significant data submission quality issues are not documented, describe why, including any plans to address.	Yes  No  Not applicable (no significant data submission quality issues)
<b>Measurement error</b>	13: Known or potential causes of measurement error, including error related to bias or inconsistency, are documented for users	Quantify measurement error and indicate whether it is random error, due to some type of bias (response, systematic, coverage, etc.) or due to some other root cause.  If measurement error cannot be quantified, describe potential sources.  Identify any issues that might benefit from a focused data quality study.	Yes  No

Characteristic	Criterion	Details	Assessment
<p><b>Processing</b></p>	<p>14: Data validation process is applied consistently and documented for users</p>	<p>Indicate what type of validation checks are done:</p> <p><b>Data structure/integrity:</b> Data conforms to the anticipated structure (if data source is made up of different records or tables, records can be linked together appropriately and orphan or duplicate records can be identified).</p> <p><b>Missing:</b> Data is missing or unknown (unavailable).</p> <p><b>Valid:</b> Data conforms to data source specifications (e.g., <i>not applicable</i> is a valid value rather than a missing value).</p> <p><b>Unusual:</b> Data conforms to data source specifications but the values are considered outliers.</p> <p><b>Consistency within record:</b> Corresponding fields within a record are consistent (e.g., postal code and province).</p> <p>Indicate when in data cycle validation checks are done:</p> <ul style="list-style-type: none"> <li>• At submission</li> <li>• During data processing</li> <li>• During data analysis</li> </ul> <p>Indicate whether validation process is automated or ad hoc and tools/technology used.</p>	<p>Yes</p> <p>Partial (data validation process is applied consistently but not documented)</p> <p>No</p>

Characteristic	Criterion	Details	Assessment
<p><b>Processing (cont'd)</b></p>	<p>15: Any data correction process is applied consistently and is documented for users</p>	<p>Describe correction (editing) process, including where in the processing cycle corrections occur.</p> <p>Describe ad hoc corrections handling approach (in absence of consistent process).</p> <p>Identify data elements that are subject to correction and which analytical data sets they reside in.</p> <p>Indicate whether corrected data can be identified as such and whether the nature of the correction can be identified.</p> <p>Describe how far back data can be corrected.</p> <p>If corrections are not applied consistently, describe why, including any plans to address.</p> <p>If corrections are not documented for users, describe why, including any plans to address.</p>	<p>Yes</p> <p>Partial (correction process is not documented or not applied consistently)</p> <p>No</p> <p>Not applicable (no correction process)</p>

Characteristic	Criterion	Details	Assessment
<b>Processing (cont'd)</b>	16: Any data imputation process is applied consistently and is documented for users	<p>Describe imputation process, including where in the processing cycle it occurs.</p> <p>Describe ad hoc imputation approach (in absence of consistent process).</p> <p>Identify data elements that are subject to imputation and which analytical data sets they reside in.</p> <p>Indicate whether imputed data can be identified and whether original values are retained (and where).</p> <p>Describe any potential impact of imputation on statistical results; if this assessment has not been done, indicate why and any plans to address.</p> <p>If imputation is not applied consistently, describe why, including any plans to address.</p> <p>If imputation process is not documented for users, describe why, including any plans to address.</p>	<p>Yes</p> <p>Partial (imputation process is not documented or not applied consistently)</p> <p>No</p> <p>Not applicable (no imputation)</p>
	17: Derived data elements are fully documented for users	<p>Describe derivation methodology, including where it occurs in processing cycle.</p> <p>Identify data elements that are derived and indicate whether they are available on all analytical data sets (if not, describe differences).</p> <p>If derived variables are not documented, describe why, including any plans to address.</p>	<p>Yes</p> <p>No</p> <p>Not applicable (no derived data elements)</p>
	18: Systematic processing errors are documented for users	<p>Provide details of current issues, including error description, response or resolution, and associated time frame, and potential impacts on interpretation and use of the data.</p> <p>If systematic processing errors are not documented, describe why, including any plans to address.</p>	<p>Yes</p> <p>No</p> <p>Not applicable (no systematic processing errors)</p>

**Note**

\* Coverage is measured differently for survey/sample data sources as outlined in criterion S6 in Table 7C.

**Table 5C** Data source assessment criteria, by dimension — Comparability and coherence

Characteristic	Criterion	Details	Assessment
<b>Concordance</b>	19: Aggregated statistics have been compared, fully or partially, with other sources that provide the same or similar information on the same subject matter, and any differences are identified and explained to users	Identify type of comparison (e.g., exact match, ballpark estimate, combination).	Yes
		Identify compared sources and provide results of comparison. Explain reasons for differences (if applicable and known). If aggregate statistics have not been compared with another source, describe why, including any plans to address.	No
<b>Standardization</b>	20: Exceptions to corporate data dictionary standards are documented for users	Provide assessment of compliance with corporate data standards (lagging, progressing, advancing, leading), including date of last assessment.	Yes No
		21: Where appropriate, specific classes of data are collected according to established national or international standards, and any variations on the standards used are documented for users	Indicate what standards or classifications are used. Indicate whether any variations on the above are used (e.g., reference lists, subsets) and rationale. If existing standards are not used for data collection, describe why, including any plans to address.

Characteristic	Criterion	Details	Assessment
<b>Standardization (cont'd)</b>	22: Consistent conversion between versions of standards and across different standards used within the data source is supported	Describe support mechanism used: <ul style="list-style-type: none"> <li>• Standard aggregation/groupings</li> <li>• Mapping tables</li> <li>• Lookup tables</li> <li>• Crosswalks</li> <li>• Guidelines</li> <li>• Other</li> </ul> If mechanisms are not in place to support consistent conversion, describe why, including any plans to address.	Yes No Not applicable (no relevant standards)
<b>Linkage</b>	23a: Data elements that link unique clients are available, are clearly identified and remain stable over time	Identify client linkage data elements and provide <ul style="list-style-type: none"> <li>• Definition</li> <li>• Item response rate for current and previous years</li> <li>• Trend assessment (stable, declining, improving, fluctuating, etc.)</li> </ul>	Yes Partial (linkage elements are not clearly identified or are not stable over time, based on trend) No Not applicable
	23b: Client linkage limitations that impact analysis and interpretation are documented for users	Describe any known issues with linkage elements. If client linkage issues are not documented for users, describe why, including any plans to address.	Yes No Not applicable (no linkage limitations)

Characteristic	Criterion	Details	Assessment
<b>Linkage (cont'd)</b>	24a: Data elements that link unique organizations are available, are clearly identified and remain stable over time	Identify organization linkage data elements and provide <ul style="list-style-type: none"> <li>• Definition</li> <li>• Item response rate for current and previous years</li> <li>• Trend assessment (stable, declining, improving, fluctuating, etc.)</li> </ul>	Yes  Partial (linkage elements are not clearly identified or are not stable over time, based on trend)  No  Not applicable
	24b: Organization linkage limitations that impact analysis and interpretation are documented for users	Describe any known issues with linkage elements.  If organization linkage issues are not documented for users, describe why, including any plans to address.	Yes  No  Not applicable (no linkage limitations)
	25a: Data elements that link unique health care providers are available, are clearly identified and remain stable over time	Identify provider linkage data elements and provide <ul style="list-style-type: none"> <li>• Definition</li> <li>• Item response rate for current and previous years</li> <li>• Trend assessment (stable, declining, improving, fluctuating, etc.)</li> </ul>	Yes  Partial (linkage elements are not clearly identified or are not stable over time, based on trend)  No  Not applicable
	25b: Health care provider linkage limitations that impact analysis and interpretation are documented for users	Describe any known issues with linkage elements.  If provider linkage issues are not documented for users, describe why, including any plans to address.	Yes  No  Not applicable (no linkage limitations)

Characteristic	Criterion	Details	Assessment
<b>Linkage (cont'd)</b>	26a: Data elements that support reporting at a range of geographic levels are available, are clearly identified and remain stable over time	Identify geographic data elements and provide <ul style="list-style-type: none"> <li>• Definition</li> <li>• Item response rate for current and previous years</li> <li>• Trend assessment (stable, declining, improving, fluctuating, etc.)</li> </ul>	Yes  Partial (linkage elements are not clearly identified or are not stable over time, based on trend)  No  Not applicable
	26b: Geographic variable limitations that impact analysis and interpretation are documented for users	Describe any known issues with geographic data elements.  If geographic data element issues are not documented for users, describe why, including any plans to address.	Yes  No  Not applicable (no geographic variable limitations)
<b>Jurisdictional comparability</b>	27: Limitations due to jurisdictional differences (for submitting jurisdictions) that significantly impact analysis and interpretation are documented for users	Describe any known limitations on data use due to jurisdictional differences.  If limitations due to jurisdictional differences are not documented, describe why, including any plans to address.	Yes  No  Not applicable (no limitations due to jurisdictional differences)

Characteristic	Criterion	Details	Assessment
<b>Historical comparability</b>	28: Historical changes to the data source are centrally documented for users and can easily be tracked	Describe data source components that changes are documented for and indicate time period covered by documentation: <ul style="list-style-type: none"> <li>• Data elements (definitions, codes, etc.)</li> <li>• Concepts</li> <li>• Methodology</li> <li>• Population</li> <li>• Data capture</li> <li>• Data submission</li> <li>• Data providers</li> <li>• Data processing</li> <li>• Other</li> </ul> If historical changes to the data source are not centrally documented, describe why, including any plans to address.	Yes No Not applicable (no historical changes)
	29a: Trend analysis is used to evaluate changes in core data elements	Describe trend analysis approach. Describe whether trend analysis showed any major issues or a potential decrease in quality, including any plans to address findings. If changes in core data elements have not been evaluated using trend analysis, describe why, including any plans to address.	Yes No Not applicable (insufficient time points for trending)
	29b: Changes in core data elements that significantly impact analysis and interpretation are documented for users	Describe changes to core data elements and provide explanations for trend anomalies. If changes to core data elements have not been documented, describe why, including any plans to address.	Yes No Not applicable (no changes or changes have no significant impact on use)

**Table 5D** Data source assessment criteria, by dimension — Timeliness and punctuality

Characteristic	Criterion	Details	Assessment
<b>Release timeliness</b>	30a: Planned releases occur within a reasonable time period from the end of the reference period (reasonable time period varies by release type)	For all internal and external planned data releases (or updates), indicate <ul style="list-style-type: none"> <li>Planned date of release</li> <li>Actual date of release</li> <li>Reference period of release</li> <li>Time between end of reference period and release</li> </ul>	Yes No Not applicable (no planned releases)
	30b: In the event of delays affecting a planned release, delays and causes are documented and shared with stakeholders	For all internal and external planned data releases (or updates), indicate <ul style="list-style-type: none"> <li>Whether there was a release delay</li> <li>Whether and which stakeholders were notified (if not, why not)</li> <li>Stakeholder notification method</li> </ul>	Yes No Not applicable (no delays affecting release)
<b>Release punctuality</b>	31: Preliminary data is available, and quality and limitations are documented for users	Describe preliminary data release type: <ul style="list-style-type: none"> <li>Open-year data (data still subject to updates/corrections)</li> <li>Partial data (data is finalized but not complete)</li> <li>Other</li> </ul> Indicate whether preliminary data is available for <ul style="list-style-type: none"> <li>Internal use</li> <li>Private reporting</li> <li>Third-party requests</li> </ul> Describe known preliminary data limitations.  If preliminary data is not made available, describe why, including any plans to address.  If the quality of preliminary data (including limitations) is not documented, describe why, including any plans to address.	Yes  Partial (preliminary data is available but quality and limitations are not documented)  No

Characteristic	Criterion	Details	Assessment
<p><b>Submission timeliness</b></p>	<p>32a: Data is submitted on time by data providers</p>	<p>Indicate rate of late submissions (file level or record level as applicable).</p> <p>For file-level late submission, indicate the number of days elapsed after the submission deadline for receipt of the files, for each jurisdiction and overall.</p> <p>For record-level submission, indicate the proportion of records submitted after the submission deadline, for each jurisdiction and overall, according to the following formula:</p> <p><math>A \div B \times 100\%</math>, where</p> <p>A = the number of records submitted after the annual or quarterly submission deadline</p> <p>B = the total number of records submitted within the reporting year or quarter</p>	<p>Yes</p> <p>No</p>
	<p>32b: Mechanisms created or changes made to address issues or improve submission timeliness are evaluated for effectiveness</p>	<p>Identify submission timeliness improvement mechanisms used (e.g., public/private timeliness indicators, data provider engagement) and evaluate effectiveness as high, medium or low based on the following guidelines:</p> <p><b>High:</b> Mechanism has resulted in known timeliness improvement efforts that have significantly reduced late submissions or shortened submission timelines by many data providers.</p> <p><b>Medium:</b> Mechanism has resulted in known timeliness improvement efforts that have reduced some late submissions by some data providers.</p> <p><b>Low:</b> Mechanism has resulted in little to no reduction in late submissions.</p> <p>If submission timeliness improvement mechanisms are not in place, describe why, including any plans to address.</p>	<p>Yes</p> <p>No</p>

Characteristic	Criterion	Details	Assessment
<b>Processing timeliness</b>	33: Data processing activities are regularly reviewed to improve timeliness	Describe review process, including programs/systems reviewed and time frame for review (including date of last review).	Yes
		Describe any improvements to data processing timeliness as a result of review.  If processing activities are not regularly reviewed to improve timeliness, describe why, including any plans to address.	No

**Table 5E** Data source assessment criteria, by dimension — Accessibility and clarity

Characteristic	Criterion	Details	Assessment
<b>Accessibility</b>	34: A single source of truth exists and is used for all analysis/information products	Indicate where source of truth is maintained, including how to gain access and primary contact.  If there is no single source of truth, describe why, including any plans to address.	Yes  No
		35: Historical analysis can easily be recreated	Describe how data retention supports recreation of historical analysis.  If historical analysis cannot be easily recreated, describe why, including any plans to address.
<b>Interpretability</b>	36: Metadata and other data source documentation is available and easily accessible to support internal and external use	Indicate what metadata and documentation is available (see list below), including <ul style="list-style-type: none"> <li>• Location</li> <li>• Date of last update</li> <li>• Update frequency</li> <li>• Whether it conforms to standard format</li> <li>• Whether it is automatically generated</li> <li>• Whether it is provided externally</li> </ul>	Yes  Partial (only some metadata/documentation is available)  No

Characteristic	Criterion	Details	Assessment
<b>Interpretability (cont'd)</b>		<p>Metadata and documentation should cover the following:</p> <p>Concepts and definitions</p> <ul style="list-style-type: none"> <li>• Glossary of terms and abbreviations</li> <li>• Populations of interest and reference</li> <li>• Analytical entities</li> <li>• Data structure</li> <li>• Data elements</li> </ul> <p>Processes and methods</p> <ul style="list-style-type: none"> <li>• Data providers</li> <li>• Data collection</li> <li>• Data processing</li> <li>• Quality control</li> <li>• Timeliness</li> </ul> <p>Data quality (including metrics, issues and limitations)</p> <ul style="list-style-type: none"> <li>• Coverage</li> <li>• Item availability</li> <li>• Duplicate records</li> <li>• Formation of analytical entities</li> <li>• Consistency, bias and other measurement issues</li> <li>• Jurisdictional comparability</li> <li>• Comparability with other sources</li> </ul>	

Characteristic	Criterion	Details	Assessment
<b>Interpretability (cont'd)</b>		<p>Historical changes/comparison of data over time</p> <ul style="list-style-type: none"> <li>• Changes in population</li> <li>• Changes in content and data collection standards</li> <li>• Changes to processes and methods</li> <li>• Changes in data quality</li> <li>• Historical revisions</li> </ul> <p>Technical/operational documentation</p> <ul style="list-style-type: none"> <li>• System design artefacts</li> <li>• Standard operating procedures for production</li> </ul>	
	<p>37: A revision policy exists for all data releases and is made known to external data users</p>	<p>Describe revision policy and whether it follows any stipulated revision guidelines. Include the types of revisions covered (late data submission, corrections to previously released and used data, etc.).</p> <p>If revision policy does not exist, describe why, including any plans to address.</p> <p>If revision policy is not made public, describe why, including any plans to address.</p> <p><b>Definitions</b></p> <p><b>Revision:</b> A change to the data or to the estimates based on the data after the data has been released.</p> <p><b>Revision policy:</b> Database-specific policy that outlines when to release revised data based on the severity of errors or updates.</p>	<p>Yes</p> <p>Partial (revision policy exists but is not public)</p> <p>No</p>

Characteristic	Criterion	Details	Assessment
<b>Interpretability (cont'd)</b>	38: Impact of any revisions is assessed and documented for users	<p>Describe recent revisions (at minimum for prior year), including whether revision policy was applied (if applicable).</p> <p>Describe results of impact assessment, including root cause and future mitigation plans.</p> <p>If impact of revisions was not documented for users, describe why, including any plans to address.</p> <p><b>Definition</b></p> <p><b>Revision:</b> A change to the data or to the estimates based on the data after the data has been released.</p>	Yes Partial (impact of revisions assessed but not documented) No Not applicable (no revisions)

## 4 Survey/sample data source characteristics and criteria

These supplementary characteristics and criteria are to be used *in addition to* the general set to describe and assess the quality of the survey-/sampling-specific components related to data sources that contain survey results or sample data.

**Table 6** Data source key characteristics for survey or sample data

Characteristic	Details
<b>Frame</b>	<p><b>Target population:</b> This is the population of interest; ideally, this coincides with the sampling frame, but it may not always.</p> <p><b>Sampling frame:</b> This is the population to be sampled from; it may be different from the target population as described above.</p> <p><b>Collection period</b></p>
<b>Sample design</b>	<p><b>Type of sampling</b></p> <ul style="list-style-type: none"> <li>• Simple random sample</li> <li>• Clustered sample</li> <li>• Multi-stage sample</li> <li>• Stratified sample</li> <li>• Systematic sample</li> <li>• Other</li> </ul> <p><b>Required response rate</b> (e.g., to allow for desired precision of estimates)</p> <p><b>Possible precision of estimates</b> (based on frame and sample size)</p>
<b>Weighting</b>	<p>Indicate whether results are weighted for differences in probabilities of selection.</p> <p>If yes, describe weighting methodology or approach.</p>

**Table 7A** Survey/sample assessment criteria, by dimension — Accessibility and clarity

Characteristic	Criterion	Details	Assessment
<b>Survey/sample design</b>	S1: Survey/sample design is fully documented for users	Describe rationale for chosen survey/sample design.	Yes
		Provide overview of design.  If survey/sample design is not documented for users, describe why, including plans to address.	No

**Table 7B** Survey/sample assessment criteria, by dimension — Comparability and coherence

Characteristic	Criterion	Details	Assessment
<b>Historical comparability</b>	S2: For recurring surveys, changes to survey/sample design over time are documented for users	Describe changes in sample design over time for recurring surveys.	Yes
		Describe impact of changes on results and trending.	No
		If changes in sample design over time are not documented for users, describe why, including any plans to address.	Not applicable (survey not recurring)

**Table 7C** Survey/sample assessment criteria, by dimension — Accuracy and reliability

Characteristic	Criterion	Details	Assessment
<b>Survey/sampling frame</b>	S3: For recurring surveys, a systematic approach is in place for updating the frame and for monitoring coverage and response patterns to maintain adequate coverage of the target population	<p>Describe frame maintenance approach.</p> <p>Indicate when frame was last updated.</p> <p>If a systematic frame maintenance and monitoring approach is not in place, describe why, including plans to address.</p>	<p>Yes</p> <p>No</p> <p>Not applicable (survey not recurring)</p>
<b>Questionnaire design</b>	S4: Questionnaire (or other data collection instrument) was designed to maximize response rate while minimizing respondent and processing burden	<p>Describe rationale for chosen questionnaire/instrument and associated capture and collection processes. Consider the following:</p> <ul style="list-style-type: none"> <li>• Are the questions justified and sufficient for reaching the analytical goals of the survey?</li> <li>• Are instruments designed to minimize cost and time? Do they allow for automated data capture?</li> <li>• Are follow-up procedures in place to handle missing data or other issues?</li> <li>• Are support mechanisms in place to encourage accurate response?</li> <li>• Is information available to manage and monitor all aspects of the collection (e.g., response rates, edit failure rates, respondent feedback, quality control information, expenditures)?</li> </ul> <p>If questionnaire was not designed to maximize response rate or minimize respondent or processing burden, describe why, including any plans to address.</p>	<p>Yes</p> <p>No</p>

Characteristic	Criterion	Details	Assessment
<b>Questionnaire design (cont'd)</b>	S5: Questionnaire (or other data collection instrument) was pre-tested for each mode of collection to ensure accuracy and robustness	<p>Describe pre-testing approach.</p> <p>Describe testing results and adjustments made to questionnaire/instrument (if any).</p> <p>If pre-testing was not done, describe why, including any plans to address.</p>	<p>Yes</p> <p>Partial (testing occurred but not for each mode of collection)</p> <p>No</p>
<b>Coverage*</b>	S6a: Unit response/non-response is documented and assessed for users	<p>Describe (overall and/or by category)</p> <ul style="list-style-type: none"> <li>• Target sample size (based on sample design)</li> <li>• Set sample size (number of units drawn from the frame)</li> <li>• Achieved sample size</li> <li>• Unit response rate</li> <li>• Potential impact on key estimates</li> </ul> <p>If unit response/non-response is not documented for users, describe why, including any plans to address.</p>	<p>Yes</p> <p>No</p>
	S6b: Significant issues related to coverage of sample-based data that impact analysis and interpretation are documented	<p>Describe any deficiencies around coverage: sample size, frame coverage and coverage (based on survey characteristics).</p> <p>Describe the potential impact of these deficiencies on key estimates.</p> <p>Describe any methods used to address coverage issues and potential coverage error.</p> <p>If significant issues related to coverage are not documented, describe why, including plans to address.</p>	<p>Yes</p> <p>No</p> <p>Not applicable (no significant coverage issues)</p>

Characteristic	Criterion	Details	Assessment
<p><b>Capture and collection</b></p>	<p>S7: Differences in collection that may impact results are assessed and documented for users</p>	<p>For the following collection characteristics, describe any differences, including potential impact and plans to address:</p> <ul style="list-style-type: none"> <li>• Collection method or mode</li> <li>• Field period</li> <li>• Jurisdictional variations</li> <li>• Language</li> <li>• Survey frequency</li> <li>• Other</li> </ul> <p>If potential impact of different collection modes on results was not assessed, describe why, including any plans to address.</p> <p>If the reason potential impact of different collection modes on results is not documented, describe why, including any plans to address.</p>	<p>Yes</p> <p>Partial (impact was assessed but not documented)</p> <p>No</p> <p>Not applicable (no differences in collection)</p>
<p><b>Non-response bias</b></p>	<p>S8: Non-response bias is assessed and documented for users</p>	<p>Describe potential sources of non-response (unit <i>and</i> item non-response).</p> <p>Provide an estimate of bias (if possible) or describe potential differences between responders and non-responders, and refer to any relevant studies.</p> <p>Describe methods used to address non-response.</p> <p>When weighting is required, indicate whether a weight is associated with each sampled unit in the database after the data processing is complete.</p> <p>If non-response bias was not assessed, describe why, including any plans to address.</p> <p>If potential non-response bias was not documented for users, describe why, including any plans to address.</p>	<p>Yes</p> <p>Partial (non-response bias was assessed but not documented for users)</p> <p>No</p>

Characteristic	Criterion	Details	Assessment
<p><b>Precision of estimates</b></p>	<p>S9: Survey/sample design effects on estimation are assessed and documented for users</p>	<p>Describe how design estimates were done, including which survey estimates they were done for and whether a typical design effect was derived.</p> <p>If design effects were not estimated, describe why, including any plans to address.</p> <p>If design effects on estimation are not documented for users, describe why, including any plans to address.</p>	<p>Yes</p> <p>Partial (design effects calculated but not documented for users)</p> <p>No</p>
	<p>S10: The precision of estimates is at an acceptable level</p>	<p>For key estimates, identify</p> <ul style="list-style-type: none"> <li>• Variance of the estimate</li> <li>• Standard error</li> <li>• Coefficient of variation</li> <li>• 95% confidence interval</li> </ul> <p>Describe any feedback from users on the fitness of the estimates for their intended use.</p> <p>Identify any estimates where precision is not at an acceptable level, including potential reasons and any plans to address. Acceptable level can be determined based on proximity to “possible precision of estimates” indicated in survey/sample key characteristics, and intended use of the information. A general guideline is that the coefficient of variation should be less than 16.6%.</p>	<p>Yes</p> <p>No</p>

**Note**

\* Coverage is measured differently for survey/sample data sources and criterion S6 should replace the general coverage criteria (criteria 5a, 5b, 5c) in Table 5B for assessments of survey/sample data sources.

## Appendix A: Assessment scope matrix

This matrix identifies which criteria are most relevant to different types of data sources. It is meant to be used as a guideline to determine the scope of an assessment. Some criteria may be relevant but not reasonably assessable and therefore considered out of scope for an assessment; in cases like these, this should be documented in the assessment results.

**Table A1** Assessment criteria scope matrix

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
1	Relevance	Release and use	All known uses of the data from the data source are documented	Applies	Applies	Applies	n/a	n/a
2	Relevance	Value	The data source contains information that can inform priority themes and populations	Applies	Applies	n/a	Applies	Applies
3	Relevance	Value	Quality improvement action plans exist and are implemented to improve relevance and meet emerging needs	Applies	Applies	Applies	n/a	n/a
4a	Relevance	Adaptability	Mechanisms to identify client and stakeholder needs exist and are evaluated for effectiveness	Applies	Applies	Applies	Applies	n/a
4b	Relevance	Adaptability	Client and stakeholder needs are prioritized and implemented	Applies	Applies	Applies	Applies	n/a

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
5a	Accuracy and reliability	Coverage	Populations of interest, populations of reference and submitted populations are documented, and coverage is quantifiable at both the submitting unit level and the unit(s) of analysis	Applies	Applies	n/a	Applies	Applies
5b	Accuracy and reliability	Coverage	Coverage rates are documented via standardized tables and are updated routinely or with each data release	Applies	n/a	Applies	n/a	Applies
5c	Accuracy and reliability	Coverage	Significant coverage issues that impact analysis and interpretation are documented for users	Applies	n/a	n/a	Applies	Applies
6a	Accuracy and reliability	Coverage	Processes exist to identify and handle duplicate and potential duplicate records within the data	Applies	Applies	Applies	Applies	n/a
6b	Accuracy and reliability	Coverage	Problems with duplicate records that can impact analysis and interpretation are documented for users and updated with each data release	Applies	Applies	Applies	Applies	Applies
7	Accuracy and reliability	Coverage	Records are complete for data sources that are designed to be longitudinal	Applies	Applies	n/a	Applies	Applies

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
8a	Accuracy and reliability	Item availability	Standard data profiling results, including rates of valid, invalid, missing and outlier values, are documented and updated routinely or with each data release	Applies	Applies	Applies	Applies	Applies
8b	Accuracy and reliability	Item availability	Standard data profiling results, including rates of valid, invalid, missing and outlier values, fall within an acceptable range	Applies	Applies	Applies	Applies	Applies
8c	Accuracy and reliability	Item availability	Any issues related to the identification of item non-response are documented for users	Applies	Applies	Applies	Applies	Applies
9a	Accuracy and reliability	Lineage	Data lineage prior to submission is known and documented for users	Applies	Applies	Applies	Applies	Applies
9b	Accuracy and reliability	Lineage	Differences in data lineage prior to submission that can impact analysis and interpretation are documented for users and updated routinely or with each data release	Applies	Applies	Applies	Applies	Applies
10	Accuracy and reliability	Capture and collection	Mechanisms to support data providers in capturing high-quality information and to reduce response burden exist and are evaluated for effectiveness	Applies	Applies	n/a	Applies	n/a

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
11	Accuracy and reliability	Capture and collection	All data submissions comply with standard submission specifications or requirements	Applies	Applies	n/a	Applies	n/a
12a	Accuracy and reliability	Capture and collection	Processes to monitor data submission quality exist and are documented	Applies	Applies	n/a	Applies	n/a
12b	Accuracy and reliability	Capture and collection	Data submission quality issues that significantly impact analysis and interpretation are documented for users and addressed	Applies	Applies	n/a	Applies	n/a
13	Accuracy and reliability	Measurement error	Known or potential causes of measurement error, including error related to bias or inconsistency, are documented for users	Applies	Applies	Applies	Applies	Applies
14	Accuracy and reliability	Processing	Data validation process is applied consistently and documented for users	Applies	Applies	Applies	Applies	Applies
15	Accuracy and reliability	Processing	Any data correction process is applied consistently and is documented for users	Applies	Applies	Applies	n/a	n/a
16	Accuracy and reliability	Processing	Any data imputation process is applied consistently and is documented for users	Applies	Applies	Applies	n/a	Applies
17	Accuracy and reliability	Processing	Derived data elements are fully documented for users	Applies	Applies	Applies	n/a	Applies

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
18	Accuracy and reliability	Processing	Systematic processing errors are documented for users	Applies	Applies	Applies	n/a	n/a
19	Comparability and coherence	Concordance	Aggregated statistics have been compared, fully or partially, with other sources that provide the same or similar information on the same subject matter, and any differences are identified and explained to users	Applies	Applies	Applies	Applies	Applies
20	Comparability and coherence	Standardization	Exceptions to corporate data dictionary standards are documented for users	Applies	Applies	Applies	n/a	n/a
21	Comparability and coherence	Standardization	Where appropriate, specific classes of data are collected according to established national or international standards, and any variations on the standards used are documented for users	Applies	Applies	Applies	Applies	Applies
22	Comparability and coherence	Standardization	Consistent conversion between versions of standards and across different standards used within the data source is supported	Applies	Applies	Applies	n/a	Applies
23a	Comparability and coherence	Linkage	Data elements that link unique clients are available, are clearly identified and remain stable over time	Applies	Applies	Applies	Applies	Applies

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
23b	Comparability and coherence	Linkage	Client linkage limitations that impact analysis and interpretation are documented for users	Applies	Applies	Applies	Applies	Applies
24a	Comparability and coherence	Linkage	Data elements that link unique organizations are available, are clearly identified and remain stable over time	Applies	Applies	Applies	Applies	Applies
24b	Comparability and coherence	Linkage	Organization linkage limitations that impact analysis and interpretation are documented for users	Applies	Applies	Applies	Applies	Applies
25a	Comparability and coherence	Linkage	Data elements that link unique health care providers are available, are clearly identified and remain stable over time	Applies	Applies	Applies	Applies	Applies
25b	Comparability and coherence	Linkage	Health care provider linkage limitations that impact analysis and interpretation are documented for users	Applies	Applies	Applies	Applies	Applies
26a	Comparability and coherence	Linkage	Data elements that support reporting at a range of geographic levels are available, are clearly identified and remain stable over time	Applies	Applies	Applies	Applies	Applies
26b	Comparability and coherence	Linkage	Geographic variable limitations that impact analysis and interpretation are documented for users	Applies	Applies	Applies	Applies	Applies

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
27	Comparability and coherence	Jurisdictional comparability	Limitations due to jurisdictional differences (for submitting jurisdictions) that significantly impact analysis and interpretation are documented for users	Applies	Applies	Applies	Applies	Applies
28	Comparability and coherence	Historical comparability	Historical changes to the data source are centrally documented for users and can easily be tracked	Applies	Applies	Applies	n/a	Applies
29a	Comparability and coherence	Historical comparability	Trend analysis is used to evaluate changes in core data elements	Applies	Applies	Applies	n/a	Applies
29b	Comparability and coherence	Historical comparability	Changes in core data elements that significantly impact analysis and interpretation are documented for users	Applies	Applies	Applies	n/a	Applies
30a	Timeliness and punctuality	Release timeliness	Planned releases occur within a reasonable time period from the end of the reference period (reasonable time period varies by release type)	Applies	Applies	Applies	n/a	n/a
30b	Timeliness and punctuality	Release timeliness	In the event of delays affecting a planned release, delays and causes are documented and shared with stakeholders	Applies	Applies	Applies	n/a	n/a
31	Timeliness and punctuality	Release punctuality	Preliminary data is available, and quality and limitations are documented for users	Applies	Applies	n/a	n/a	n/a

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
32a	Timeliness and punctuality	Submission timeliness	Data is submitted on time by data providers	Applies	Applies	n/a	n/a	n/a
32b	Timeliness and punctuality	Submission timeliness	Mechanisms created or changes made to address issues or improve submission timeliness are evaluated for effectiveness	Applies	Applies	n/a	n/a	n/a
33	Timeliness and punctuality	Processing timeliness	Data processing activities are regularly reviewed to improve timeliness	Applies	Applies	Applies	n/a	n/a
34	Accessibility and clarity	Accessibility	A single source of truth exists and is used for all analysis/information products	Applies	Applies	Applies	Applies	Applies
35	Accessibility and clarity	Accessibility	Historical analysis can easily be recreated	Applies	Applies	Applies	n/a	n/a
36	Accessibility and clarity	Interpretability	Metadata and other data source documentation is available and easily accessible to support internal and external use	Applies	Applies	Applies	Applies	Applies
37	Accessibility and clarity	Interpretability	A revision policy exists for all data releases and is made known to external data users	Applies	Applies	n/a	n/a	n/a
38	Accessibility and clarity	Interpretability	Impact of any revisions is assessed and documented for users	Applies	Applies	Applies	n/a	n/a

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
S1	Accessibility and clarity	Survey/sample design	Survey/sample design is fully documented for users	n/a	Applies	n/a	n/a	n/a
S2	Comparability and coherence	Historical comparability	For recurring surveys, changes to survey/sample design over time are documented for users	n/a	Applies	n/a	n/a	n/a
S3	Accuracy and reliability	Survey/sampling frame	For recurring surveys, a systematic approach is in place for updating the frame and for monitoring coverage and response patterns to maintain adequate coverage of the target population	n/a	Applies	n/a	n/a	n/a
S4	Accuracy and reliability	Questionnaire design	Questionnaire (or other data collection instrument) was designed to maximize response rate while minimizing respondent and processing burden	n/a	Applies	n/a	n/a	n/a
S5	Accuracy and reliability	Questionnaire design	Questionnaire (or other data collection instrument) was pre-tested for each mode of collection to ensure accuracy and robustness	n/a	Applies	n/a	n/a	n/a
S6a	Accuracy and reliability	Coverage	Unit response/non-response is documented and assessed for users	n/a	Applies	n/a	n/a	n/a
S6b	Accuracy and reliability	Coverage	Significant issues related to coverage of sample-based data that impact analysis and interpretation are documented	n/a	Applies	n/a	n/a	n/a

#	Dimension	Characteristic	Criterion	Own operational or administrative data source	Own survey or sample data source	Own master data source	Own demonstration or pilot data source	External data source
S7	Accuracy and reliability	Capture and collection	Differences in collection that may impact results are assessed and documented for users	n/a	Applies	n/a	n/a	n/a
S8	Accuracy and reliability	Non-response bias	Non-response bias is assessed and documented for users	n/a	Applies	n/a	n/a	n/a
S9	Accuracy and reliability	Precision of estimates	Survey/sample design effects on estimation are assessed and documented for users	n/a	Applies	n/a	n/a	n/a
S10	Accuracy and reliability	Precision of estimates	The precision of estimates is at an acceptable level	n/a	Applies	n/a	n/a	n/a

## References

1. United Nations Statistics Division. [Guidelines for the Template for a Generic National Quality Assurance Framework \(NQAF\)](#). 2012.
2. Canadian Institute for Health Information. [The CIHI Data Quality Framework, 2009](#). 2009.
3. Office for National Statistics. [Guidelines for Measuring Statistical Output Quality](#). 2013.
4. United Nations Economic Commission for Europe. [Generic Statistical Business Process Model \(GSBPM\)](#). 2013.
5. Statistics Canada. [Statistics Canada's Quality Assurance Framework](#). 2017.



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