Using Identity-Data to Advance Equity, Diversity and Inclusion in Canadian Health-Sciences Higher Education: *A Scoping Review*

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I. ABSTRACT

Canadian post-secondary institutions are expected to collect and use identity-data to understand the demographic composition of their students, faculty, and staff, and to support equity, diversity, and inclusion (EDI) commitments. However, in health-sciences education, where admissions, retention, faculty representation, and institutional planning influence whether the future healthcare workforce is representative of the populations it serves, less is known about how these data are actually operationalized in practice to identify inequities, inform EDI-related decision-making, and evaluate progress toward more equitable access and representation. Guided by PRISMA-ScR and a Population-Concept-Context framework, this scoping review synthesized peer-reviewed and grey literature describing specific institutional uses of a variety of identity-data variables in Canadian health-sciences post-secondary educational settings. The resulting evidence base was limited and primarily concerned learner populations, with less evidence regarding faculty, leadership, or institution-wide systems. Included sources were concentrated heavily in medicine, particularly medical school admissions, with much less documentation from other health disciplines. Across sources, identity-data use was most commonly seen at the stages of collection, analysis, reporting, and interpretation, while substantially fewer sources demonstrated implemented institutional actions and downstream evaluation. This suggests that institutional reporting remains fragmented and often insufficient in clearly linking data to action, in part because of privacy obligations, governance constraints, and the ethical considerations involved in reporting identity information. Overall, the findings suggest that although identity-data infrastructure and EDI-related initiatives likely extend far beyond what is publicly documented, the current evidence landscape remains sparse and inconsistent, underscoring the need for more standardized, transparent, and evaluable institutional reporting practices.

II. STATEMENT OF POSITIONALITY

I am a white settler woman studying at Queen's University, on the traditional lands of the Anishinaabe, Haudenosaunee, and Huron-Wendat Peoples. My social and academic position is rooted in privilege and shapes the lens through which I engage with questions of equity, identity, and institutional accountability. As such, I have approached this work with the utmost reflexivity and careful attention to the ethical and multifaceted nature of identity-data practices.

III. INTRODUCTION

Equity, diversity, and inclusion (EDI) encompass a broad framework designed to identify and address systemic inequities, and to improve representation and access across historically marginalized and underrepresented groups (Government of Ontario, 2017). As an institutional concept, EDI has emerged as a formalized expectation across Canadian higher-education. Universities Canada's *Inclusive Excellence Principles* instructs post-secondary institutions to develop and maintain EDI action plans, and to demonstrate progress over time (Universities Canada, 2017). Faculties of medicine and other health-sciences programs are of particular importance, as they are the higher education setting in which admissions, training, support, and leadership practices shape the future composition of the healthcare workforce and influence how effectively and ethically health systems respond to the populations they serve (AFMC, 2010; CMA, 2023). The Association of Faculties of Medicine of Canada (AFMC) state that "in order to achieve the desired diversity in our physician workforce, Faculties of Medicine must recruit, select, and support a representative mix of students" (Collier, 2010; AFMC, 2010). The Canadian Medical Association (CMA) similarly states that "an equitable and diverse medical population delivers better patient care and a more responsive, adaptable health care system" (CMA, 2023).

There is a growing emphasis on the collection of identity-data, which in this review refers to self-reported or institutionally-recorded sociodemographic information related to identity and social positioning, including race, Indigeneity, gender, disability, sexual orientation, socioeconomic status, and related characteristics, within Canadian higher education (CIHI, 2022). The current landscape emphasizes evidence-informed equity governance, in which institutions are expected to support equity-related decisions with robust disaggregated data, rather than broad statements of EDI goals or commitments alone. At the national level, the Council of Canadian Academies (CCA) reported that "the rationale for and assessment of EDI measures requires fulsome disaggregated national EDI data collection" and that "program evaluations will help researchers assess the effectiveness and impacts of EDI measures" (CCA, 2024). This shows that Canadian post-secondary institutions are increasingly treating EDI actions as data-dependent, and notably, that the value of those data depends on whether they are made visible and connected to institutional action and evaluation (Government of Canada, 2018; CCA, 2024).

While institutions are expected to collect identity information, Canadian guidance particularly emphasizes that such collection must have a clearly articulated purpose and a defensible use (OHRC, n.d.; Wellesley Institute, 2024). In health-sciences education specifically, the Committee on Accreditation of Canadian Medical Schools (CACMS) requires programs to engage in "ongoing, systematic, and focused recruitment and retention activities" and to undertake "the evaluation of policies and practices, program, or partnership outcomes," linking diversity

efforts to institutional monitoring and accountability (CACMS, 2024). However, these data collection requirements and accreditation standards do not guarantee meaningful institutional use of equity-related data or evidence of impact (CCA, 2024). A recurring theme in the Canadian literature is that equity data infrastructures are often strongest at the level of collection and descriptive reporting than that of implemented interventions, longitudinal assessments, and demonstrated institutional change in EDI outcomes (CCA, 2024; Gallagher-Mackay, 2016). The Higher Education Quality Council of Ontario (HEQCO) states that "it is impossible to study equity of access effectively without demographic data," and further emphasizes that "at least some of the most critical data must be longitudinal to understand changes over time and to support causal arguments about the impact of policy changes or interventions" (Gallagher-Mackay, 2016). The CCA similarly states that "publicly available and easily accessible disaggregated data, studies, and program evaluations will help researchers assess the effectiveness and impacts of EDI measures" (CCA, 2024). Overall, the current evidence demonstrates that while institutions are increasingly collecting and reporting sociodemographic data, it remains unclear how those data are actually operationalized within institutional processes and whether they are being used in ways that produce measurable equity-related outcomes.

Within the current landscape of EDI efforts in higher education, it is therefore difficult to determine how identity-data are actually used, vary across institutions, or to identify which approaches are sufficiently robust to support meaningful equity-focused decision-making and impact (CCA, 2024). The CCA argues that "sustained data tracking and sharing of best-practices across institutions regarding various measures will allow for a more comprehensive analysis" and that post-secondary institutions should demonstrate "actions and impacts, not just policies and plans" (CCA, 2024). For this reason, the central issue is not simply whether Canadian health-sciences institutions collect sociodemographic data, but whether those data are translated into decisions, interventions, and evaluative processes capable of addressing disparities and advancing equity-oriented initiatives (CCA, 2024; Wellesley Institute, 2024). This query gives this scoping review both its scholarly importance and its practical justification, because without a clear account of how identity-data are operationalized within institutional processes, it remains difficult to identify best-practices, assess institutional accountability, or determine where Canadian health-sciences education continues to be insufficient in translating equity commitments into measurable actions (CCA, 2024; Gallagher-Mackay, 2017).

IV. RATIONALE

This review was undertaken to meet an institutional need identified within Queen's Health Sciences (QHS) Equity, Diversity, Inclusion, Indigeneity and Accessibility (EDIIA) initiatives. QHS required a stronger evidence base to understand how Canadian health-sciences institutions are using identity-data beyond collection alone, and to identify promising practices that could support more ethical, transparent, and actionable institutional approaches. More specifically, the review was intended to help inform EDIIA-related planning, strengthen internal accountability, and support the development of recommendations for how these data might be governed and used in ways that are both practically useful and ethically equity-oriented. In this sense, the review responds not only to a

gap in the published literature, but also to a concrete institutional need for evidence that can guide decision-making, and future initiatives within QHS.

Presently, the literature remains fragmented across institutions, professions, and types of data practice, making it difficult to compare approaches or determine how far institutions move from collection to meaningful intervention and evaluation (CCA, 2024). This review is therefore guided by the following overarching research question: *What approaches exist for analyzing, reporting, and ethically implementing identity-data in Canadian health-sciences higher education, and how do these approaches shape institutional decision-making, interventions, and EDI outcomes?*

To address this question, the study was designed to map the characteristics of the existing landscape of identity-data use in Canadian health-sciences post-secondary education, including the source types, institutional settings, geographic distribution, and populations represented. It also examined how identity-data are defined and analyzed across the included sources, along with the specific sociodemographic variables collected and the analytic approaches applied to identify patterns of inequities. Using a structured analytic framework, the review further assessed how far documented practices move from collection and analysis toward interpretation, intervention, and evaluation. Finally, this review identified the principal gaps and limitations in the evidence base, in order to generate practical, evidence-informed recommendations to strengthen ethical, transparent, and actionable identity-data governance and institutional decision-making within QHS.

V. METHODS

V.A. Study Design and Methodological Framework

This study employed a scoping review design, because the collection and use of sociodemographic data in Canadian health sciences education is a broad and emerging area of investigation, with relevant evidence dispersed across multiple source types and reporting formats; including peer-reviewed studies, institutional reports, admissions and equity webpages, strategic plans, censuses, dashboards, and policy documents.

The review was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018).

V.B. Eligibility Criteria

Inclusion and exclusion criteria were developed using the Population-Concept-Context (PCC) framework to ensure that screening was aligned with the review question and applied consistently across a varied body of evidence, as represented in *Table 1*. For the population *(P)* domain, eligible sources concerned applicants, learners, postgraduate trainees, faculty, staff, leadership, or institution-level systems within Canadian health sciences higher education. Regarding the concept *(C)*, sources were required to address at least one identity-related or sociodemographic variable and to provide sufficient methodological or contextual detail to determine how those data were specifically used to advance EDI-goals. Sources were excluded if they referred only to the collection of demographic data without describing its institutional application; or conversely, if they described equity-oriented

institutional action without specifying the identity variables involved, the data source used for collection, and how the data explicitly shaped a specific intervention. In terms of the context *(C)*, the review was restricted to Canadian health sciences higher education, defined broadly to include medicine, nursing, dentistry, public health, and allied health fields situated within universities, faculties, schools, or other formal post-secondary training environments.

Table 1. Inclusion and exclusion criteria using the PCC framework

Used to guide screening and source selection.

	In scope	Out of scope
Population	Applicants; admitted or enrolled learners; postgraduate trainees; faculty; staff; leadership groups; institution-level systems within Canadian health sciences higher education	Alumni; practicing clinicians/professionals outside academic settings; patients; community members
Concept	Collection, analysis, reporting, governance, benchmarking, monitoring, interpretation, intervention, or evaluation of identity-related or sociodemographic data; institutional reports, dashboards, admissions materials, policy documents, or studies with clear institutional relevance	Sources focused only on data collection methods; general EDI statements without reporting or analysis; equity-related actions that did not specify the identity variables used, the data source, or the institutional relevance of the analysis
Context	Canadian universities, faculties, schools, and professional programs in health sciences; institutional and faculty-level reports; relevant national or sectoral systems linked to health sciences education	Non-Canadian institutions, unless used only as comparators; non-health academic programs; non-academic settings; workforce-only datasets unrelated to health sciences education

V.C. Timeframe and Limits

The database search was limited to sources published from 2005 onward. This boundary was selected to provide a broad ,but contextually relevant timeframe for capturing the development of contemporary identity-data practices in Canadian post-secondary contexts. Although equity-related work in higher education predates 2005, many of the institutional structures most relevant to this review, such as sector-wide EDI commitments and federally driven accountability requirements, are concentrated in the years that followed. For example, in Ontario, the *Accessibility for Ontarians with Disabilities Act* (2005) established a legislative framework for developing and enforcing accessibility standards toward more structured inclusion and accountability in institutional settings. The 2005 lower bound also ensured that the review captured the period leading into the substantial expansion and formalization of EDI infrastructure in Canadian higher education during the 2010s, when sector-level commitments became more formalized and universities increasingly incorporated EDI into strategic planning and related accountability processes (Universities Canada, 2017).

V.D. Identification of Sources

The search strategy was developed in consultation with Courtney Svab, Health Sciences Librarian, to refine the conceptual structure of the review framework, identify database-specific subject headings and keywords, and test combinations of search terms across various bibliography databases. The final comprehensive search was conducted across five databases: Ovid Excerpta Medica Database (Embase) and Ovid Medical Literature Analysis and Retrieval System Online (MEDLINE), which were used to capture medical, clinical, and health systems literature relevant to health sciences education; Cumulative Index to Nursing and Allied Health Literature (CINAHL), which was used to identify nursing, allied health, and health professions education literature; Web of Science, which identified broader interdisciplinary studies; and Education Source, which encompassed education-focused and postsecondary literature. Although the overall search structure was consistent across sources, the strategy was

tailored to the specific subject headings, search fields, and syntax of each individual database. For reference, the full Ovid MEDLINE search strategy is provided in *Appendix A*.

A separate grey literature search was conducted to identify relevant institutional materials not present in the academic databases, with a particular focus on specific health-sciences faculties in Canadian post-secondary EDI webpages, institutional reports, strategic plans, census summaries, dashboards, and related policy documents.

Across all databases, the search strategy was organized around four concept blocks: *i.* population, *ii.* health-sciences higher education context, *iii.* demographic variables, and *iv.* data-use concepts. These were combined using Boolean logic, as shown in *Figure 1*, and then adapted to each database and grey literature search, consistent with guidance on scoping review search strategy development (Peters et al., 2020).

Figure 1. Structure of the search strategy

Example search terms and Boolean logic are presented for each concept block.

		OR	OR	OR
Higher education setting	Universities; Schools	universit*; college*; campus*	"higher education"; postsecondar*	"academic institution*"; "faculty medicine"; "faculty health"
AND **Health sciences education**	Education, Medical; Education, Nursing; Education, Dental; Education, Health	medicine; medical; nurs*; dentistr*	pharmacy; public health; "allied health"	"health profession*"; "health science*"; adjacency terms linking discipline and education/training
AND **Identity-data concepts**	Demography; "Sociodemographic Factors"	race; ethnicity; gender; sex; disability	Indigen*; Black; BIPOC; socioeconomic status	immigrant*; language; religion; rural; caregiver*; first generation
AND **Data-use concepts**	Data Collection; Privacy; Confidentiality; Benchmarking	"Program Evaluation"; "Organizational Policy"; "Decision Making"	collect*; monitor*; report*; dashboard*; transparency	disaggregat*; intersectional analys*; "data governance"; "equity report*"; "strategic planning"

Screening

Database records were imported into the systematic review tool, Covidence, for title and abstract screening using the pre-specified eligibility criteria; and full-text screening, which was conducted with dual review and conflicts resolved through discussion and consensus with fellow lab group member Marianne Llerena.

V.E. Data Charting

Data were charted using a structured extraction framework developed specifically for this review. In accordance with scoping review methodology, the charting process was designed to systematically extract the information necessary to answer the review question across heterogeneous sources (Arksey & O'Malley, 2005; Levac et al., 2010; Peters et al., 2020). The major charting domains are summarized in *Table 2*, and the full extraction template is provided in *Appendix B*.

Table 2. Core domains of the structured data-charting framework

Questions and analytic categories used to support consistent data extraction across sources.

Category	Questions posed	Purpose
Source and institutional context	What is the source type, year, institution, faculty/unit, province, and population addressed?	Establish each source within the Canadian health sciences landscape and identify where evidence was concentrated.
Identity-data characteristics	Which identity variables were collected, reported, or analyzed? How granular were the categories, were variables binary, multi-category, open-ended, or intersectional?	Assess the landscape and structure of identity-data use.
Data sources, analysis, and reporting practices	What was the data source, and were institutional data linked to census, admissions, survey, or comparator datasets? Were data aggregated, suppressed, or publicly reported?	Identify how identity-data were generated, compared, and made visible.

Governance, privacy, and stewardship	Was a named office, role, committee, or advisory body identified? Were confidentiality, suppression, de-identification, or other privacy practices described?	Map accountability and ethical implementation.
Institutional use, intervention, and evaluation	Were the data linked to decision-making, planning, policy, admissions reform, or other action? Was any downstream effect monitored or evaluated?	Distinguish descriptive reporting from actionable institutional use.

V.F. Analytical Framework

To support consistent and structured analysis across sources, this review developed and applied a *Data-to-Action* pipeline which frames identity-data use as a series of interconnected stages (*i.* data collection, *ii.* analysis, *iii.* reporting, *iv.* interpretation, *v.* intervention, and *vi.* evaluation). This was used to distinguish progressive institutional engagement with identity-data, ranging from initial collection, to evidence of institutional responses, and downstream evaluation of interventions. This framework was necessary because many included sources described the existence of sociodemographic data, but differed substantially in the extent at which they documented what was done with those data. The pipeline therefore provided a structured analytical format for examining how far the data were operationalized within institutional processes. The six stages of the pipeline, associated definitions, and examples are presented in *Table 3*. The use of an original analytical framework aligns with methodological guidance supporting structured and review-specific analytic approaches when evidence is heterogeneous in reporting and purpose (Westphaln et al., 2021).

Table 3. Data-to-Action pipeline stages

Definitions used to apply the framework across included sources.

Stage	Definition and Examples
1) Collection	Identity-data are gathered through applications, surveys, censuses, administrative records, or linked datasets.
2) Analysis	Identity-data are examined quantitatively or qualitatively to identify patterns, disparities, representation gaps, or institutional trends.
3) Reporting	Findings based on identity-data are made visible through reports, dashboards, public webpages, or institutional updates.
4) Interpretation	The institution contextualizes findings in relation to specific local barriers, inequities, representation goals, or institutional priorities.
5) Intervention	Identity-data are linked to institutional action, such as admissions reform, targeted initiatives, strategic planning, or accountability measures.
6) Evaluation	The effects of data-informed action are monitored, assessed, or reviewed over time.

V.G. Synthesis and Presentation of Findings

Results were synthesized using a mixed descriptive and interpretive approach. This is consistent with scoping review guidance emphasizing systematic mapping of the evidence base and analytic interpretation of the patterns identified (Levac et al., 2010). The quantitative aspect involved numerical summaries across key charting dimensions, including source type, institutional focus, population type, identity-variables addressed, and stages represented within the data-to-action pipeline. The qualitative component involved thematic synthesis of recurrent patterns in how identity-data were collected, reported, governed, interpreted, and used across sources.

V.H. Consultation

Consultation occurred throughout the review process at biweekly meetings beginning in September 2025 with supervisors, Dr. Giselle Valarezo and Dr. Colleen Davison. This included refinement of the research question, specifics of the eligibility criteria, and ongoing synthesis of findings.

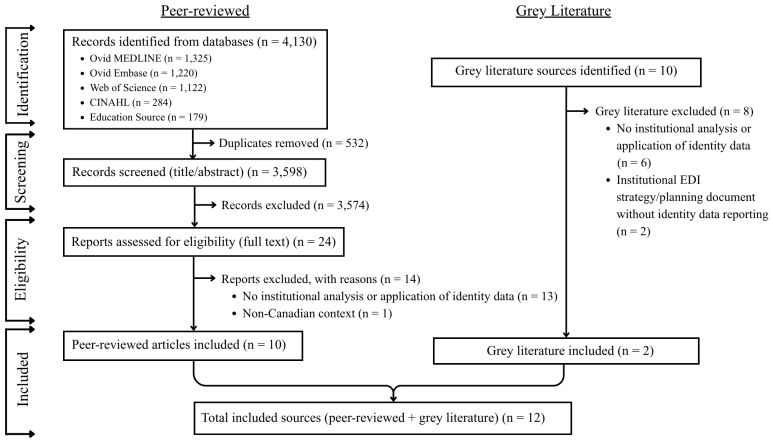
VI. RESULTS

VI.A. Selection of Sources

The database search identified a total of 4,130 records: Ovid MEDLINE (n = 1,325), Ovid Embase (n = 1,220), Web of Science (n = 1,122), CINAHL (n = 284), and Education Source (n = 179). In addition, 10 grey sources were identified through university websites, primarily EDI and admissions-related webpages and reports. After screening, 12 Canadian sources met the inclusion criteria for the final review, as seen in *Figure 2*. Of these, 10 sources (83.3%) were from academic database searching and 2 sources (16.7%) were from the grey literature search.

Figure 2. PRISMA-ScR flow diagram

Results of included sources through identification, screening and assessment of eligibility.



The final included set comprised the following 12 sources: Raghavan et al. (2011), Fortin et al. (2016), Mian et al. (2019), Harper et al. (2021), Joy (2022), Temerty Medicine (2022), Jalil et al. (2024), Kliska et al. (2024), Land et al. (2025), University of Alberta Faculty of Medicine & Dentistry (2025), Shi et al. (2026), and Van Bewer et al. (2026).

VI.B. Overall Characteristics of Included Sources

i. Publication Timeframe

Included sources were published between 2011 and 2026. Six of 12 (50.0%) were published from 2024 onward, suggesting that documented evidence on the institutional use of identity-data in Canadian health sciences higher education has emerged largely in recent years and remains a developing area of inquiry.

ii. Geographic Distribution

Five of 12 sources (41.7%) were based in Ontario; 2 of 12 (16.7%) in Alberta; and 2 of 12 (16.7%) in Manitoba. The remaining 3 of 12 (25.0%) were national or multi-provincial in scope. Thus, 9 of 12 sources (75.0%)

were single-institution or single-faculty analyses, which indicates that the current evidence of identity-data use is produced primarily through local institutional infrastructures, rather than national cross-institutional systems.

Figure 3. Provincial and national distribution of included sources

Most included sources were institution-specific (n = 9), including five based in Ontario (red), two in Alberta (blue), and two in Manitoba (yellow).



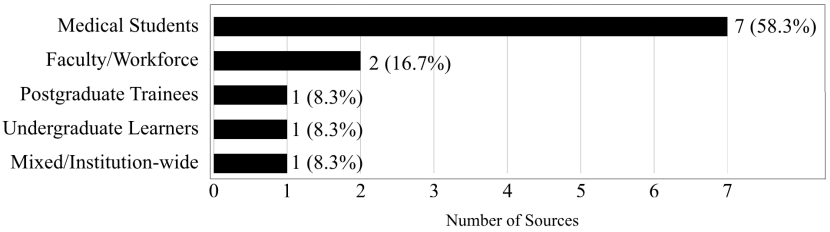
iii. Populations and Institutional Domains

The included sources were concentrated primarily in medicine, particularly at the level of medical student admissions and early-entry pathways. Overall, 7 of 12 sources (58.3%) focused on medical learner populations, including studies on admissions systems, cohort composition, and admissions reform in medical education. Only 2 of 12 sources (16.7%) focused on faculty or workforce populations; 1 of 12 (8.3%) focused on postgraduate trainees (Royal College emergency medicine residents), 1 of 12 (8.3%) focused on undergraduate nursing learners, and 1 of 12 (8.3%) examined a mixed medical education population including learners, residents, faculty, staff, and administrative structures, as seen in *Figure 4*.

The included sources were overwhelmingly dominated by MD programs and faculties of medicine. Only 1 grey literature source addressed a Faculty of Medicine & Dentistry rather than medicine alone. No included sources focused primarily on dentistry, rehabilitation sciences, physiotherapy, occupational therapy, pharmacy, or other allied health disciplines as the main source of documented identity-data use.

Figure 4. Population/institutional focus of included sources.

Medical students were the dominant population followed by other learners and faculty..



VI.C. Data Sources and Collection Methods

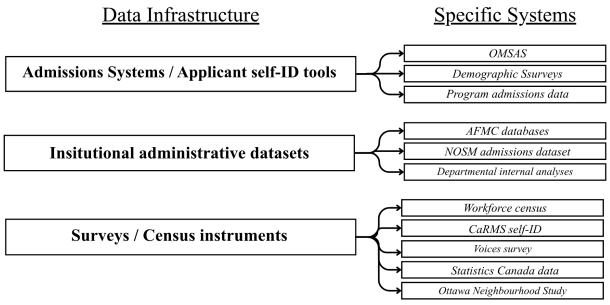
Admissions systems or admissions-associated self-identification tools were used in 4 of 12 sources (33.3%). Joy (2022) used mandatory Ontario Medical School Application Service (OMSAS) fields, a voluntary applicant diversity survey, and internal admitted-student surveys; Land et al. (2025) used OMSAS survey data and compared the admitted cohort with Statistics Canada 2021 Census benchmarks through the *Ottawa Neighbourhood Study*; Temerty Medicine (2022) linked Black Student Admission Pathways (BSAP) outcomes to OMSAS self-identification data and *Voices* surveys; and Jalil et al. (2024) used a voluntary demographic survey linked to admissions-stage outcomes at the Cumming School of Medicine.

Specific institutional administrative datasets were used in 4 of 12 sources (33.3%). Fortin et al. (2016) used AFMC databases to track completion and attrition across 17 Canadian faculties of medicine; Mian et al. (2019) used a deidentified NOSM admissions dataset containing applicant demographics, GPA, MMI scores, and stage progression; Raghavan et al. (2011) analyzed historic admissions data and rural-attributes questionnaires; and Harper et al. (2021) combined faculty departmental surveys with internal analyses of leadership, salary, and academic productivity.

Four of 12 sources (33.3%) relied primarily on surveys or census-like instruments. These included the University of Alberta Faculty of Medicine & Dentistry workforce census report (2025); Shi et al. (2026), which used a national Qualtrics survey adapted from the CaRMS self-identification tool; Van Bewer et al. (2026), which used a cross-sectional undergraduate nursing survey; and Temerty Medicine (2022), which used the *Voices* surveys and program metrics. Kliska et al. (2024) was distinct, as it was a review of published and a grey literature of admissions requirements and public admissions records across Canadian medical schools, rather than a survey or database-based study.

Figure 5. Data collection methods of included sources

Categorized into broader categories relating to the use of the data.

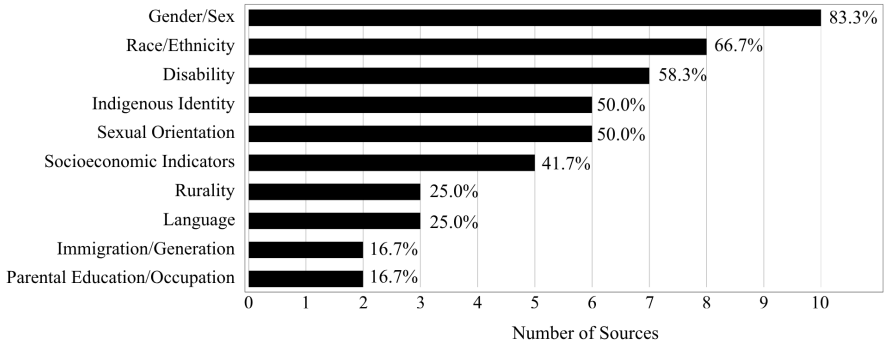


VI.D. Representation of Sociodemographic Characteristics

Although the included sources addressed a wide range of identity variables, the variety and depth was inconsistent across sources. As seen in *Figure 6*, gender/sex was the most common identity variable, appearing in 10 of 12 sources (83.3%); race/ethnicity appeared in 8 of 12 (58.3%); disability in 7 of 12 (58.3%); sexual orientation in 6 of 12 (50.0%); Indigenous identity in 6 of 12 (50.0%); socioeconomic status/income in at 5 of 12 (50.0%); and immigration/generation-related variables in 2 of 12 (16.7%). Rurality/northernity was a central variable in 2 of 12 sources (16.7%); Mian et al. (2019) examined northern and rural background in Indigenous medical admissions at NOSM, and Raghavan et al. (2011) examined rural origin and other rural-related attributes within the University of Manitoba medical school admissions scoring system. Other less frequently represented variables included language and parental education/occupation.

Figure 6. Identity variables across included sources

Gender/sex was the most frequently represented variable, followed by race/ethnicity and disability; immigration/generation and parental education/occupation appeared least.



VI.E. Data Governance

Governance structures were inconsistently described; however, the strongest examples of movement from data-to-action tended to name a specific body, role, or committee with authority over the data. Four of 12 sources (33.3%) identified a formal group, committee, or advisory body, as seen in the yellow cells of *Table 4*. Three of 12 sources (25.0%) identified a named office or faculty-level system, as seen in the blue cells of *Table 4*. The

remaining 5 of 12 sources (41.7%) used identity-data in ways that were institutionally relevant, but did not clearly assign governance authority.

Table 4. Named Governance Structures across Included Sources

Examples of offices, committees, advisory groups, and designated roles identified as responsible for oversight, stewardship, or decision-making related to identity-data use.

Source	Institution & Health Sciences Faculty	Specifically named governance structure
Mian et al. (2019)	Northern Ontario School of Medicine (NOSM)	Indigenous Admissions Subcommittee; Indigenous Affairs Unit
Raghavan et al. (2011)	Faculty of Medicine, University of Manitoba	Admissions Office; Admissions Committee
Temerty Medicine (2022)	Temerty Faculty of Medicine, University of Toronto	MD-PGME Data Management Advisory Group; Diversity Advisory Council, the Temerty Medicine Office of Inclusion & Diversity, the Excellence through Equity Toolkit for Searches, Selection & Admissions Working Group, and the Learner Experience Advisory Council (LEAC).
Land et al. (2025)	Faculty of Medicine, University of Ottawa	Regional Profiles Working Group
Joy (2022)	Schulich School of Medicine & Dentistry, Western University	Equity Representative on the admissions committee
Harper et al. (2021)	Department of Medicine, Faculty of Health Sciences, McMaster University	Associate Chair of Equity and Diversity
University of Alberta (2025)	Faculty of Medicine & Dentistry, University of Alberta	Faculty-level steward

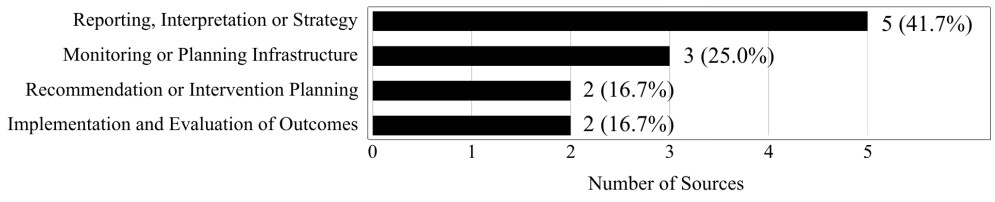
VI.F. Movement Through the Data-to-Action Pipeline

Using the six-stage Data-to-Action Pipeline, two sources (16.71%) reached the evaluation stage; three sources (25.0%) stopped at monitoring or planning infrastructure; five sources (41.7%) stopped at reporting, interpretation, or strategy framing; and the remaining two sources (16.7%) stopped at recommendation or intervention planning without evaluated implementation, as seen in *Figure 7*.

The strongest concentration of later-stage pipeline movement occurred in admissions-focused sources. Mian et al. (2019) used ten years of admissions data at NOSM to adjust context scoring and monitor Indigenous representation over time. Joy (2022) at the Schulich School of Medicine & Dentistry evaluated five admissions reforms through both applicant-versus-admitted and pre/post cohort comparisons. Raghavan et al. (2011) at the University of Manitoba Department of Medicine, used historic admissions data to inform the implementation of a weighted rurality approach to admissions and estimate its effect. By contrast, sources focused on workforce composition, or overall EDI infrastructure more often stopped at reporting, monitoring, or planning stages rather than moving into implemented and evaluated intervention.

Figure 7. Stages Reached within the Data-to-Action Pipeline

Included sources most often reached reporting, interpretation, or strategy, with fewer progressing to intervention planning or implementation and evaluation.



VI.G. Type of Institutional Action and Evaluation

The documented institutional uses of identity-data across the specific included health sciences faculties and programs are represented in *figure 8*, a heatmap (rows = health-sciences units; columns = institutional actions identified during data extraction). The columns are grouped into three broader population domains, with admissions decisions (in blue), workforce and faculty actions (in red), and institution-wide EDI infrastructure (in yellow). Each cell contains a score indicating the depth of action (0 = not mentioned, 1 = recommended, 2 = implemented, and 3 = implemented and evaluated; darker shading indicates greater depth of action). This visual shows that the strongest and most developed uses of identity-data were concentrated in admissions-focused domains, particularly pathways/streams, algorithm or scoring changes, and bias-mitigation. Faculty and workforce-related uses were less common, and governing bodies and continuous-improvement structures were more consistently documented at the institution-wide level. Overall, the heatmap demonstrates that documented uses of identity-data were unevenly distributed across domains and were most developed in admissions contexts.

Figure 8. Heatmap of documented institutional uses of identity-data

Demonstrates EDI-actions implemented by the specific health sciences faculties of the included sources



VII. DISCUSSION

This review was conducted to map the evidence base on institutional identity-data use in Canadian health-sciences higher education; examine how identity-data were defined, sourced, analyzed, reported, and governed; and assess how far documented practices moved through the Data-to-Action pipeline. The findings demonstrate a field of EDI practice that is narrow and inconsistent, with less than 0.3% (12 of 4,130) of the screened literature actually demonstrating how data is operationalized to inform equity-oriented outcomes. The available evidence was concentrated heavily in medicine, particularly medical admissions, with much less documentation from other health disciplines, faculty contexts, or broader institutional systems. Identity-data use was most often documented at the stages of collection, analysis, reporting, and interpretation, while fewer sources demonstrated clear linkage to implemented institutional action, and fewer described downstream evaluation of initiatives or interventions. Only a small number of institution-specific grey literature sources met the inclusion criteria, despite targeted searching of university reports, dashboards, admissions materials, and equity webpages. These patterns suggest that while there is variety of evidence of identity-data infrastructure and EDI-related activity in Canadian health-sciences education; their specific, actionable, governed, and evaluable uses remain sparsely documented and concentrated in a limited set of institutional contexts (CCA, 2024).

The predominance of medical admissions-focused sources is expected, as it reflects the regulatory and professional environment in which Canadian medical education operates. The AFMC has framed admissions as central to building a socially accountable physician workforce, and the CACMS requires medical schools to engage in diversity-related recruitment and retention efforts and to evaluate the outcomes of those policies and practices (AFMC, 2010; CACMS, 2024). In this context, medicine faces unusually strong pressure to make equity visible at the point of entry. Admissions-related metrics are also more easily analysed than many later-stage processes, because the applicant pool is relatively confined and outcomes such as interview invitations, admission offers, and class composition can be tracked comparatively across cycles (Joy, 2022; Jalil et al., 2024; Mian et al., 2019). The significance of this pattern suggests that the current evidence base is strongest in the domain where institutional decisions are most measurable, not necessarily where inequities are most pervasive or consequential over time (CCA, 2024).

Another notable finding is that most documented practices remained concentrated in the earlier and middle stages of the Data-to-Action pipeline. Collection, descriptive analysis, reporting, and interpretation were relatively well represented; intervention and, especially, evaluation were much less common. However, the process of the full Data-to-Action pipeline (descriptive equity data to demonstrated institutional changes in EDI) is temporally and practically intensive, as it requires longitudinal infrastructure, governance structures, clearly assigned responsibility, and overall evaluative capacity (Gallagher-Mackay, 2016; Wellesley Institute, 2024). These requirements are more institutionally demanding than the production of dashboards, censuses, or summary reports. As a result, institutions may appear active in equity work because they document disparities, while providing limited evidence of what specifically was done in response and whether it was effective. Thus, the central implication is not whether

institutions collect identity-data, but if they are sufficiently equipped to convert those data into decisions, interventions, and demonstrable institutional change over time (CCA, 2024; Gallagher-Mackay, 2016).

The limited presence of eligible grey literature is another key result. This review involved active searching of university websites, admissions pages, equity webpages, dashboards, and policy documents; however, only two institution-specific grey literature sources met the inclusion criteria *(the University of Alberta Workforce Census and Temetry Medicine: Addressing Anti-Black Racism Accountability Report)*. Inclusion required more than strategic language, broad EDI commitments, or evidence that data had been collected. Eligibility required sources to specify the specific demographic variables under study and provide sufficient methodological or contextual detail to determine how those data were used institutionally. Many institutional grey literature sources were excluded because they described aspirational goals, initiatives, or summary findings without clearly articulating the analytic process, governance structures or evaluative measures of the associated identity-data. Privacy obligations and small-cell suppression likely contributed to this pattern as well, particularly where institutions are working with relatively small or highly disaggregated populations. Ontario human-rights guidance emphasizes that data collection must have a clear purpose, must respect dignity and privacy, and should use the least intrusive means possible (OHRC, n.d.; Wellesley Institute, 2024). Those constraints are important and appropriate, but at the same time, they explain why many public documents stop at a certain level that protects confidentiality and subsequently renders the specific institutional data use difficult and insufficient to assess. The result is a gap in visibility and reporting, in which important EDI-oriented work may be and is likely occurring, but it is not being disseminated in a way that is explicit, comparable, or reviewable as evidence of data-to-action (CCA, 2024; OHRC, n.d.; Wellesley Institute, 2024).

This same dynamic explains why QHS was not represented among the included sources. Within the boundaries of this review, no publicly available QHS source met the criteria for demonstrating how identity-data were used in practice with sufficient methodological and institutional specificity. That absence should not be interpreted as evidence that QHS is not collecting identity-data or is not engaged in EDI-related work. The most recent QHS annual report outlines robust EDIIA infrastructure, with a multi-year action plan, identity-data mapping, and institutional demographic monitoring already in place (QHS, 2024). However, the report also illustrates the central issue identified in this review, because while it documents extensive activity, it does not consistently make explicit how particular identity-data sources were analyzed, what findings emerged or how those findings informed the specified initiatives. This underscores the importance of strengthening not only identity-data infrastructure, but also the reporting mechanisms that connect those data to decision-making, accountability, and evaluation (QHS, 2024). The recommendations that follow are therefore intended to strengthen the systemic aspects necessary for identity-data to inform clear, well-governed, and measurable institutional action.

VII.A. Recommendations and Future Directions

i. Purpose-driven data collection

Identity-data collection should never be an endpoint, and should always be accompanied by a clearly defined institutional purpose, specified population(s), followed by an explicit plan for how the resulting evidence

will inform action and later be evaluated. For example, in the NOSM study, identity-data collection was driven by an explicit social-accountability mandate; Mian et al. (2019) explain that NOSM's admissions goals were to select applicants "who will be most likely to practice family medicine in the region" and who, "as an incoming class, reflect the overall demographics of Northern Ontario." In this case, the population of interest was clearly defined as self-identified Indigenous applicants, and the purpose of the data was to assess whether admissions processes were supporting the school's mandate to recruit physicians responsive to northern, rural, and Indigenous communities. The report ultimately concluded that "increased representation of Indigenous peoples among applicants admitted to medical school can be achieved through the use of socially accountable admissions," and "further tracking of Indigenous students through medical education and practice" to assess longer-term effectiveness is necessary (Mian et al., 2019). For QHS, future EDIIA-related reports should include the specific evidence underlying the inequities being examined or targeted, the affected population(s), the process the findings are intended to inform, the specific action that may follow, and the indicators by which impact will later be assessed. Without this level of specificity, identity-data collection risks becoming overly broad and difficult to translate into accountable institutional action or measurable changes over time.

ii. Indigenous data sovereignty

Kliska et al. (2024) described how most medical programs "use tools for admission known to disadvantage Indigenous applicants" and that "there has been limited progress to reduce the structural disadvantages Indigenous students face when applying to medical school." Proof-of-identity requirements for Indigenous applicants generally involve status cards or community letters of verification; however, these requirements are significant barriers when colonial policies themselves have disrupted their community ties (Kliska et al., 2024). Thus, EDI initiatives informed by Indigenous identity-data must be developed with particular caution, acknowledging that the collection, interpretation, and use of these data are inseparable from broader questions of Indigenous sovereignty, community authority, and ongoing colonial structures.

External governance frameworks, such as the First Nations principles of OCAP (*Ownership, Control, Access, and Possession*) establish how First Nations' data and information should be "collected, protected, used, or shared…to support strong information governance on the path to First Nations data sovereignty" (FNIGC, 2025). The CARE Principles similarly frame Indigenous data governance around *Collective Benefit, Authority to Control, Responsibility, and Ethics*, and describe these principles as "people-and purpose-oriented" (GIDA, 2018). These make clear that Indigenous identity-data require specific governance that recognizes collective rights, community authority, and the colonial nature of many institutional data practices.

Current QHS EDIIA reports already demonstrate meaningful Indigenous-specific activity through the Office of Indigenous Health and related initiatives (QHS, 2024). However, while QHS tracks institutional gaps using the Diversity, Equity, Assessment and Planning (DEAP) tool to monitor "women, racialized, Indigenous, and persons with disabilities," the report still presents Indigenous identity primarily within a broader *'designated-groups'* monitoring framework, rather than clearly specifying whether Indigenous data are governed through distinct partnership with Indigenous communities, community-informed authority, or separate interpretation

and reporting processes (QHS, 2024).. This risks situating Indigenous identity-data within a general EDIIA system without fully articulating the different governance principles that may be required. If QHS plans to expand Indigenous identity-data initiatives, it should do so through co-developed governance structures that recognize collective rights and community authority rather than through a generic EDIIA framework alone. This includes making explicit who approves Indigenous data collection, who participates in interpretation, what reporting boundaries apply, and which governance principles, such as OCAP® or CARE, are guiding those decisions (GIDA, 2018; FNIGC, 2025).

iii. Evaluation of Institutional Actions and Outcomes

One of the clearest differences across the included sources was between those that reported baseline demographics and those that later assessed whether institutional actions had any measurable effect. Joy (2022) provides an example of implemented admissions reforms at Schulich School of Medicine & Dentistry by comparing "diversity data before (Class of 2022) vs. after (Class of 2024) these initiatives and of the applicant pool vs. admitted class." This study found that for the Class of 2024, several admitted-group proportions "reflected applicant pool demographics" after including holistic file review, bias-mitigation training for admissions committee members, and the creation of an alternative admissions pathway for applicants facing "financial, sociocultural, and medical barriers" (Joy, 2022). QHS's current annual EDIIA report signals an intention to continuously monitor outcomes, however the evaluation pathway is not explicitly described. The report states, "we commit to multiple layers of social accountability and to regularly assessing and enhancing our social accountability mandate," that QHS had "completed a year of data collection in our Belonging Project" and "mapped and assessed sources of identity-level information that can be used to guide decisions and better evaluate equity-oriented change across the faculty" (QHS, 2024). While the *'Belonging Project'* is described as an "ongoing data collection platform" intended to "continually track experiences of belonging on campus…for evaluation, improvement and social accountability purposes," there lacks a clear indication of which specific initiatives or interventions relative to the Belonging Project are being evaluated, who is responsible for measuring outcomes, and how results are reviewed. To strengthen future reports, QHS should specify which actions are being monitored and evaluated, how EDIIA-improvements will be measured, who will govern this process, and the longitudinal range of evaluation, including when the results will be reported.

iv. Specific guidance for QHS EDIIA Initiatives

Although describing numerous EDIIA initiatives and sources of identity-level and demographic data, the QHS EDIIA Initiatives Annual Report (2024) did not meet the inclusion criteria in this review, as it did not provide sufficient methodological or contextual detail to show how specific identity-data variable(s) were analyzed and then used to inform a particular institutional intervention. In the recruitment section of the report, it states that the Office of Equity and Social Accountability works with departments and programs to "identify approaches to implementing equitable and inclusive processes in recruitment" and emphasizes actions such as "implement[ing] a consistent process for QHS hiring panels," "ensur[ing] diverse representation on all hiring panels," and "ensur[ing]

departments identify the extent to which equity-seeking groups are (under)represented within their unit" (QHS, 2024). The report describes the DEAP tool used "to monitor Queen's Health Sciences programs and departments demographic gaps in comparison to the Canadian workforce and population" and reveals that for faculty, "persons with disabilities are the most underrepresented, followed by Indigenous Peoples and visible minorities" (QHS, 2024). However, what is insufficient and unclear is the connection between these two aspects. Demographic findings have been presented, as well as various recruitment-related initiatives, but there is never any clear statement explaining that the initiatives were designed and implemented in response to those specific findings. For example, the report does not express that because persons with disabilities were identified as the most underrepresented group among faculty, a particular hiring-panel reform, outreach strategy, accommodation process, or recruitment mechanism was introduced to address that disparity. Overall, the report shows that demographic monitoring and recruitment work are both happening, but it does not make sufficiently explicit how the demographic analysis informed the subsequent recruitment initiatives.

VII.C. Limitations

This review is limited by the fact that it can only describe publicly documented or retrievably reported institutional uses of identity-data. The eligibility criteria distinguished between sources that merely confirmed the collection of sociodemographic data and those that provided enough methodological or contextual detail to show how those data were used in practice. As such, this review cannot determine the full extent of internal, unpublished, or operational EDI work occurring within Canadian health-sciences institutions. This is especially relevant in a field where significant planning, interpretation, and decision-making may occur internally without being formally documented in peer-reviewed or grey literature. In that sense, this review maps what institutions have made visible, not necessarily everything they are doing to advance EDI in their health sciences faculties. Nonetheless, this limitation actually supports a major gap the review identifies; that when institutional practices are not reported with sufficient specificity, they cannot be compared, synthesized, or used to inform practices across settings. The review therefore likely underestimates the amount of ongoing EDI-related work and identity-data activity in Canadian health-sciences education, while still accurately capturing the much narrower body of evidence that is methodologically and institutionally accessible.

The small number (n = 2) of eligible grey literature sources, despite targeted searching of institutional websites and reports, suggests not necessarily an absence of activity, but a lack of explicit reporting on how identity-data are analyzed, interpreted, governed, and translated into EDI initiatives at specific Canadian health sciences faculties. Institutions very well may be collecting robust sociodemographic data, discussing findings internally, and implementing equity-oriented intervention, but if those processes are not described in a way that links data source, analysis, interpretation, action, and evaluation, they are difficult to assess within the eligibility and purpose of the scoping review. The result is that the published and retrievable evidence base is likely less representative than the institutional reality, and QHS is a prime example of this limitation, in which the Annual QHS EDIIA INITIATIVES Report (2024) demonstrates that the faculty is comparatively advanced in the breadth of its EDIIA infrastructure. However, while the report states that identity-level information can be used "to guide

decisions and better evaluate equity-oriented change," it falls short of specifying which decisions, based on which findings, using which measures, and assessed by which structures to enact such change. For these reasons, this review should not be interpreted as a census of all EDI-related activity in Canadian health-sciences education. Instead, it is a synthesis of the subset of activity that has been made publicly available to allow for comparison and analysis of specific links between sociodemographic data and equity-related interventions. This distinction has an important implication for future work, because if institutions increasingly adopt more standardized and transparent reporting practices, then future reviews will be better able to capture the true scope of identity-data use across the sector. In this sense, the limitations of the current review also highlight one of its key findings: that without more ethical, transparent, and accountable reporting, even substantial institutional EDIIA work cannot be meaningfully assessed, compared, or used to strengthen institutional practice.

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X. APPENDIX A

Full Ovid MEDLINE search conducted on Jan 29, 2026 at 1:53 p.m.

Concept block	Lines	Vocabulary and keyword terms	Records retrieved
Higher education setting	**1**	exp Universities/ or exp Schools/ or (universit* or college* or campus* or academi* or "higher education" or postsecondar* or post-secondary or "academic institution*" or "academic medical center*" or "teaching hospital*" or "faculty medicine" or "faculty health" or "faculty dentistry" or "faculty nursing").ti,ab,kf.	**1,066,271**
Health sciences higher education context	**2**	Schools, Health Occupations/ or Education, Medical/ or Education, Dental/ or Education, Nursing/ or Education, Pharmacy/ or Education, Public Health/ or Allied Health Occupations/ or (medical or medicine or dental or dentistr* or nurs* or midwi* or pharmacy or pharmac* or physiotherap* or "physical therap*" or "occupational therap*" or paramedic* or optometr* or "health profession*" or "health science*" or "allied health" or "public health").ti,ab,kf. or (("health profession*" or "health science*" or medical or medicine or dental or dentistr* or nurs* or pharmacy or physiotherap* or "occupational therap*" or "allied health" or "public health") adj5 (educat* or program* or school* or faculty or universit* or college* or student* or learner* or resident* or internship* or residency or fellowship*)).ti,ab,kf.	**4,725,233**
Identity-data concepts	**3**	Demography/ or "Sociodemographic Factors"/ or "Ethnic Groups"/ or "Minority Groups"/ or "Race Factors"/ or "Sex Factors"/ or "Gender Identity"/ or "Socioeconomic Factors"/ or "Disabled Persons"/ or "Indigenous Peoples"/ or "Indigenous Canadians"/ or Racism/ or "Cultural Diversity"/ or "Diversity, Equity, Inclusion"/ or "Social Justice"/ or Immigrants/ or "Emigration and Immigration"/ or Refugees/ or Language/ or Religion/ or "Rural Population"/ or Caregivers/ or "First Generation College Students"/ or (demograph* or identity data or demographic data or self identif* or disaggregat* or stratifi* or intersectional* or equity or inequity or diversity or inclusion or underrepresent* or minorit* or racialized or racialised or Indigen* or Inuit or Metis or Black or BIPOC or disability or socioeconomic status or gender or transgender or nonbinary or LGBTQ or sexualit* or immigrant* or citizenship or permanent resident* or newcomer* or refugee* or first generation or first generation student* or parental education or language background or mother tongue or linguistic minorit* or religion or rural or remote or caregiver* or parental status).ti,ab,kf.	**3,563,095**
Data-use concepts	**4**	Data Collection/ or "Data Interpretation, Statistical"/ or Statistics as Topic/ or Information Dissemination/ or Disclosure/ or Confidentiality/ or Privacy/ or "Access to Information"/ or Informed Consent/ or "Ethics, Research"/ or "Ethics, Institutional"/ or Benchmarking/ or "Program Evaluation"/ or "Organizational Policy"/ or "Decision Making, Organizational"/ or "Personally Identifiable Information"/ or (("identity" or demographic* or race or racial* or ethn* or Indigen* or gender or sex or disability or socioeconomic) adj7 (data or dataset* or information or variable* or indicator* or metric* or measure* or census or survey)).ti,ab,kf. ((collect* or gather* or record* or measur* or monitor* or track* or surveill* or audit* or benchmark* or dashboard* or report* or disclosure or publish* or disseminat* or transparency) adj5 (demograph* or identity data or equity or diversity or inclusion or race or ethn* or Indigen* or gender or disability or socioeconomic)).ti,ab,kf. (disaggregat* or stratifi* or "subgroup analys*" or "intersectional analys*" or "multivariable analys*" or "risk adjustment" or "case mix").ti,ab,kf. ("data governance" or "data stewardship" or "data management" or "data quality" or "data standards" or "data dictionary" or "privacy impact assessment" or de-identif* or anonymi* or "ethical implement*" or "ethical reporting" or "institutional research" or Cinstitutional analytics" or "learning analytics" or	**1,518,637**

		"equity analytics" or "equity report*" or "diversity report*" or "institutional report*" or "equity dashboard*" or scorecard*).ti,ab,kf. ("policy change*" or "policy response*" or "strategic planning" or "strategic decision*" or "resource allocation" or "institutional response*" or "evidence informed decision*" or "decision support").ti,ab,kf.	
Canadian context	**5**	Canada/ or (canad* or ontari* or quebec* or alberta* or manitoba* or saskatchewan* or "british columbia" or bc or "nova scotia" or "new brunswick" or "prince edward island" or pei or newfoundland* or labrador* or nunavut* or yukon or "northwest territor*").ti,ab,kf.	**342,016**
Combined search set	**6**	1 and 2 and 3 and 4 and 5	**1,324**
Date-limited final set	**7**	limit 6 to yr= “2005-Current”	**1,120**

XI. APPENDIX B.

Full data extraction chart.

Category	Description
Author(s)	First author + et al.
Year	Publication year
Title	Full title
Document Type	Peer-reviewed article; institutional report; policy; dashboard; accreditation material; grey literature
Province/Territory	Province(s) represented
Institution Name	Full institution name
Faculty/Unit	School of Medicine, Nursing, Allied Health, University-wide, etc.
Institution Type	University; professional school; faculty; multi-institution
Program Level	Undergraduate; Graduate; Professional (MD, RN, etc.); Mixed
Population Covered	Applicants; admitted students; enrolled students; faculty; staff; mixed
Study Design/Document Format	Cross-sectional survey; qualitative study; administrative report; policy analysis; mixed methods
Identity Variables Collected	Explicit identity categories collected or reported (race, Indigeneity, gender identity, disability, SES, etc.)
Granularity of Identity Data	Binary; multi-category; open-text; aggregated
Data Source	Admissions forms; equity census; HR systems; surveys; administrative databases
Collection Method	Voluntary self-ID; mandatory; administrative; mixed
Timing of Collection	Pre-admission; at entry; during training; post-graduation; ongoing
Data Owner	Registrar; Equity Office; Faculty; External body
Stated Purpose of Identity Data	Compliance; monitoring; planning; intervention design; accountability
Privacy & Suppression Practices	Aggregation; cell suppression; anonymization
Indigenous Data Governance	OCAP; CARE; Indigenous governance involved; none
Ethical Frameworks Cited	EDIIA; EDIAR; Tri-Agency; AFMC/CACMS; institutional frameworks
Comparative Analyses	Across programs; over time; vs benchmarks; none
Data-to-Action Stages Documented	Collection; reporting; analysis; interpretation; intervention; evaluation
Pipeline Endpoint	Stops at reporting vs. Reaches intervention vs. Includes evaluation
Decision Domains Affected	Admissions; hiring; curriculum; student supports; funding
Interventions Described	Concrete actions informed by identity data
Evaluation of Interventions	Pre-post; longitudinal; benchmarking; none
Role of Identity Data	Descriptive only; diagnostic; justificatory
Strengths	Longitudinal tracking; governance; transparency
Limitations/Gaps	Lack of intersectionality; no evaluation; weak linkage to action