McMaster University
Research Data Management Institutional Strategy Report:

# A Vision for Research Data Management (RDM) at McMaster

Prepared by the McMaster RDM Institutional Strategy Working Group
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# Introduction and Context

Throughout 2021-2022, McMaster's Research Data Management (RDM) Institutional Strategy Working Group (ISWG) has engaged with research stakeholders across the university to develop an institutional strategy for RDM that addresses the first requirement of the Tri-Agency Research Data Management Policy and establishes a clear vision for the infrastructure, resources, and services required to implement and support best practices at McMaster. The group is following the guidance provided by the Digital Research Alliance of Canada's Institutional Research Data Management Strategy Development Template, which includes the following steps:

Stage 1: Assemble a Strategy Development Team
Stage 2: Assess the Current State of RDM
**Stage 3: Envision the Future State of RDM**
Stage 4: Articulate the Institution's Path Forward
Stage 5: Assemble and Launch the Strategy

This document presents an idealized, future state for RDM at McMaster, reflecting the third step in this process. Information has been compiled from environmental scan activities (analyses of previous IT reviews, environmental scan of current services and resources, a researcher RDM survey, and focus groups with RDM stakeholders) carried out during step 2 of this process, as well as through focus groups within the ISWG. Results are presented by theme, beginning with high-level considerations and recommendations specific to discrete aspects of Research Data Management. The cross-cutting themes of Services and Training are summarized at the end but are prominent throughout the preceding themes.

# Frameworks

## Theme 1: Governance and Policy

Broad acknowledgment of the **importance of good RDM practices** to research excellence, impact, and transparency.

A governance **framework** to oversee the development and provision of RDM-supporting infrastructure and services, undertake regular auditing and assessment of service offerings, and recommend revisions to meet the needs of and improve outcomes for McMaster researchers.

Governance **processes** that regularly engage and communicate with the McMaster research community to ensure broad stakeholder input and representation in decisions on policy development, as well as service and infrastructure provision.

**Ongoing refinement** of the McMaster RDM Institutional Strategy (beyond March 2023) in response to changing digital research infrastructure landscapes at all levels, from local to national.

RDM **policies** that are easy to understand and use, incentivize the application of best practices, make clear their value proposition, and are aligned with McMaster's Data Governance initiatives as well as provincial and national policies and guidelines. Policies harmonize service and infrastructure provision while addressing the distinct needs of individual disciplines and units.

Policies and governance decisions that acknowledge and reinforce **Indigenous data sovereignty** and governance.

Campus-wide **strategy and guidance** around research data retention and preservation.

Policy and guidelines that reflect the intersections of RDM practices with inclusion, diversity, equity, and accessibility principles; make recommendations and implement interventions that reinforce equitable RDM practices.

## Theme 2: Funding and Support

Sustained funding for services and infrastructure necessary to enable **best practices** including RDM services, Indigenous research training and review, IT security solutions, and more.

More funding to **help researchers** with RDM and/or RDM services and infrastructure that are centrally funded and provisioned as free-to-use for all. Resources and services that help researchers budget for RDM in their grants.

Appropriate **support for unfunded (e.g., student) research** to develop and apply best RDM practices.

## Theme 3: Culture, Community, and Collaboration

A campus-wide commitment to breaking down silos and building an inclusive **community of practice** for researchers and professionals with shared interest in RDM.

Venues and sustained support for campus-wide **resource and knowledge sharing**.

**Incentives and recognition** for researchers who advance RDM practices and undertake initiatives that support them.

A common and shared understanding of **data management principles** (technical, operational, organizational, ethical, social, etc.).

Foster a culture of **accountability and responsibility** for Indigenous data sovereignty.

## Theme 4: Services & Training

A **central RDM service** that helps researchers implement RDM best practices (in alignment with local standards and policies) in their research program through the provision of consultations, training, and resources.

**Equitable access** to common services and infrastructure for all McMaster researchers and scholars (students, faculty, staff, etc.).

Services that are **scalable and responsive** to the needs of individual researchers and groups.

Services offered within and beyond McMaster are **easily discovered and accessed** via a single interface.

Coordination between **local service and infrastructure providers** – within McMaster and between McMaster and the affiliated research hospitals.

Local service offerings are complementary to and coordinated with those offered at **regional, provincial, and national levels**. Local efforts help build resources, services, and infrastructure on other levels.

Services and tools provisioned by the university are accompanied by appropriate and **sustained support for users.**

Delivery of an **outreach and engagement program** that raises awareness of services and solutions, builds community, and facilitates information and expertise sharing between researchers and service providers.

A baseline **RDM training course,** readily available to everyone at McMaster (e.g., offered regularly and asynchronously)

A McMaster-wide **RDM training program** for all types of researchers (undergraduate, graduate, postdoctoral fellows, staff, faculty), which offers sessions on a variety of RDM-related topics—both introductory and specialized. Credentialing to incentivize participation.

Incentivized **RDM training for new-to-McMaster researchers,** whether graduate students, research staff, or faculty members.

RDM training is integrated into **existing academic courses** where appropriate and possible

Training offerings that promote ethical principles of data management and reinforce the envisioned **data stewardship culture** at McMaster.

# RDM Practices, Tools, and Infrastructure

## Theme 5: Indigenous Data

Develop processes to ensure Indigenous data sovereignty through systems that ensure responsibility and accountability.

Support for the work of the **McMaster Indigenous Research Institute** and **McMaster's Indigenous researchers**.

Access to **indigenous data sovereignty training** (OCAP, CARE) for researchers, support staff, and service providers. Outline business case to develop Indigenous research training.

Provision of **solutions and guidance** that meet the diverse scenarios of data access requirements, ownership, and stewardship.

**Institutionally provided support** (tools, services, training) for data access and control for Indigenous research partners.

## Theme 6: Data Ethics & Sensitive Data

Alignment between **ethics review and data management processes** with respect to methods and administrative processes (e.g., integration between ethics applications and data management plans).

REBs, McMaster Indigenous Research Institute (MIRI), Indigenous Health Learning Lodge (IHLL), research administration offices (ROADS, HRS, MILO), IT units, OVPR, and RDM Services will collaborate to align research ethics review with McMaster policies on data management methods and administration, while also developing and sharing coordinated **templates, examples, and language** that reduce the burden of time and effort on researchers.

Discoverable and easily accessible **resources, training, and support for ethical data management**, including clear and consistent guidelines and guidance for researchers and IT service providers for

sensitive data storage and management. Topics of interest include data de-identification, depositing sensitive data, controlled access, secondary data analysis, and undergraduate research.

**Data storage solutions** with clearly documented information about data privacy and security, including where data is hosted.

General alignment of sensitive data management with McMaster's Data Governance and privacy policies and protocols.

## Theme 7: Data Management Planning

Researchers have the necessary resources, guidelines, training, and support to develop high-quality **DMPs (Data Management Plans)** that meet grant application requirements and facilitate the application of best practices throughout the study**.** DMPs are easy to use and complete, with templates, tailored guidance, and REB-approved language available for a wide range of projects.

Appropriate **resources and rubrics** for researchers and research ethics boards, research administration offices, and digital research infrastructure services to use when creating and evaluating DMPs.

Incentivize and promote the use of DMPs as a critical part of the research planning process and encourage researchers to use them as 'living documents' which are revisited and revised throughout the study.

Build connections between DMP tools and existing on-campus digital infrastructure such as Research Ethics Board (REB) applications, internal grant forms, other research compliance processes, and computing resource allocation requests. Support and promote machine actionable DMPs that enable automated integrations between DMPs and other systems.

Acknowledgment and use of DMPs as **living and changing documents** that evolve over the course of a project.

Demonstrated and clear connections between DMP completion and **improved research outcomes**.

## Theme 8: Data Storage

**A data finder tool** that helps researchers discover and evaluate selected data storage services available to them within and beyond McMaster.

Provision of a variety of **free data storage solutions** (online, nearline, coldline, and archival), which integrate with tools that support the entire data and research lifecycle (planning, project management, analysis, code versioning, deposit and sharing, preservation).

Access to tools and services that support co-management and **storage of both metadata and data**.

**File transfer services** for large files and collections.

Flexible solutions that are **platform/OS agnostic** and allow for safe and secure storage.

Storage solutions that contain features like automated retention periods, auditing capabilities, and access control to support secure data management of sensitive data.

## Theme 9: Data Documentation, Sharing, and Access

Appropriate **resources, training, infrastructure, and guidance** to support data sharing.

Coordination between **RDM and IT Services, MIRI, IHLL, research administration offices (ROADS, HRS MILO), REBs, and the McMaster Industry Liaison Office (MILO)** to ensure data sharing is secure, safe, timely, appropriate, and complies with legal, commercial, and ethical requirements.

Platforms and tools for data deposit and sharing that accommodate **large and numerous files**.

Expectations and support for creating appropriate metadata to enable **FAIR data** products.

Access to data curation expertise and support (whether within research groups or via central services) to **curate FAIR data products** for sharing and long-term archival and preservation.

Infrastructure and services that allow **easy collaboration** within and beyond the institution while meeting needs for research security and legislative compliance.

Coordination between **various campus data services** (e.g., Library Data Services, RDM Services, MILO) to improve researcher awareness of datasets available for reuse by McMaster research.

Access to and training for **electronic lab notebooks and software** that helps capture metadata at the time of data creation and analysis.

Expand the field's definition of the 'A' in FAIR by developing and sharing guidance for creating, sharing, and depositing accessible datasets, in alignment with Accessibility for Ontarians with Disabilities Act (AODA) and Web Content Accessibility Guidelines (WCAG) guidelines. Ensure that platforms for data sharing and collaboration are accessible and usable for all users.

## Theme 10: Data Security

Coordination between IT Security, IT Service Providers, the Privacy Office, REBs, MIRI, IHLL, research administration offices (ROADS, HRS, MILO), and RDM services to develop and share guidance for researchers on **protecting their research data** and other digital assets. Proper education and training for researchers and service providers to encourage best practices and complementary approaches.

Policies and guidelines that **balance McMaster's institutional risk appetite for data security, confidentiality, integrity, and data availability with the flexibility** required to support McMaster's diverse research enterprise.

Robust **processes** to validate the implementation and effectiveness of Data Security Controls for systems, practices, and procedures.

## Theme 11: Software and Applications

A consistent, coordinated, and transparent approach to licensing software and Application Programming Interfaces (APIs) for research purposes, with a **centralized research software and API catalog** for all McMaster users.

**Interoperable tools** for data collection, analysis, management, description, and depositing that are connected to / embedded in storage solutions.

Support for developing, maintaining, curating, and archiving **software and APIs created by research teams**.

Access to software and applications that are **compliant** with data security, licensing, ethical, and accessibility requirements.