

Institutional RDM Strategy Review Framework

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Prepared by the Institutional RDM Strategy and Policy Review Working Group for the
Portage Network, Research Intelligence Expert Group (RIEG)

NDRIO | **NOIRN**
New Digital
Research Infrastructure
Organization | Nouvelle organisation
d'infrastructure de
recherche numérique
engagedri.ca

portage
portagenetwork.ca

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Introduction

This framework supports both the development and review of Institutional Strategies for Research Data Management (RDM). It can be used by administrators, service providers, strategic analysts, and researchers themselves to explore the spectrum of RDM engagement, support, and resources offered by their institution.

Background

In March 2021, Tri-Agency formally launched a Research Data Management (RDM) Policy¹, which requires “(e)ach postsecondary institution and research hospital eligible to administer CIHR, NSERC or SSHRC funds is required to create an institutional RDM strategy and notify the agencies when it has been completed.” This RDM Policy called institutions to engage their RDM stakeholders in a continuous conversation, evaluate current RDM capacity, decide on an ideal level of support for researchers to perform best practices of data management, identify existing gaps between current and future capabilities and support, and develop strategies to address these gaps, all according to emerging research data management standards as well as the institution's context.

Based on the Tri-Agency’s policy objective and recommended areas of content within an institutional RDM strategy, NDRIO’s Portage Network have developed a series of bilingual training aids and online modules including brief guides, primers for RDM strategy development along with recent training videos and discussion prompts focusing on raising awareness and assessing institutional readiness.

This Institutional RDM strategy framework was developed as a review tool and intended to assist Canadian RDM services providers and institutions with the development and analysis of their RDM strategies according to the agencies’ RDM policy. A working group under the NDRIO-Portage Research Intelligence Expert Group reviewed existing Canadian and international institutional RDM strategies and related literature and documents, with the objective of developing an instrument that could be used to examine and compare future institutional strategies in more detailed perspectives.

¹ Tri-Agency Research Data Management Policy. (2021). Innovation, Science and Economic Development, Government of Canada; Innovation, Science and Economic Development Canada. https://www.science.gc.ca/eic/site/063.nsf/eng/h_97610.html

Features of this RDM strategy framework

This framework is focused on the following strategy areas:

- Raising awareness
- Training and consultation
- Institutional policies and guidelines
- Assessment
- Active data management
- Institutional characteristics
- Data management planning
- Data deposit and archiving
- Administrative information

For each area of RDM engagement and support, reviewers are able to set a timeline and select resources to fill in existing gaps. The reference variables and values presented, including lists of RDM stakeholders, organizational/working structure, funding strategies, infrastructure, staffing, skills, are derived from the results of Canadian Institutional RDM Capacity Survey and other references listed at the end of this document.

This framework covers many aspects that could form part of a strategy. Reviewers should complete the sections relevant to their local context and otherwise enter “NA” or “Not Applicable”.

Through broad use of this framework, we hope to encourage:

- Coordination between internal institutional partners, via centralized and decentralized approaches
- Alignment and collaboration between organizations, regionally and nationally, for policies, infrastructure, and services
- Adoption and advancement of international standards and trends of open science research

Potential use

Researchers:

If you are a researcher interested in data management, or participating in a working group to contribute to your university RDM plans, the strategy framework document will help you assess the different areas and specific points that should be reviewed in the context of research data management at large. A list of resources with examples of university strategies provides key references.

Administrators:

As funding agencies develop their recommendations and requirements on RDM and the research community move towards an open science environment, universities need to adapt their relevant policies and strategies. By providing a comprehensive list of areas relevant to RDM, this document can be used either during the development or the assessment of an existing RDM strategy.

Service providers:

Whether you already offer services that support RDM or are intending to develop them, this framework can help identify key tools, support, and resources that can benefit your local research community. It can also support greater alignment between multiple service providers within an institution.

Strategic analysts

Support for RDM is not only dependent on local institutional support, but also on regional and national initiatives. Widespread use of this framework across research institutions will enable strategic analysis of the existing and planned approaches to supporting RDM across Canada.

Review areas	Variable Names	Values
1. Institutional characteristics	Name	Name
	ROR ID (from https://ror.org/)	https://ror.org/0xxxxxxx
	Types Colleges and Institutions Canada (https://www.collegesinstitutes.ca/our-members/member-directory/); CEGEP (https://www.cegepsquebec.ca/en/); Universities Canada (https://www.univcan.ca/universities/member-universities/)	Government organizations Research Centre College/CEGEP University Other, specify ____
	Categories https://www.macleans.ca/education/university-rankings/	Medical/Doctoral Comprehensive Primarily Undergraduate Other, specify ____
	CRKN Band (Gather data from https://www.crkn-rcdr.ca/)	Actual number
2. Administrative information	Responsible unit(s)	See reference variable: List of Stakeholders
		See reference variable: List of Stakeholders
	Approved by	See reference variable: List of Stakeholders
	Approval date	yyyymmdd
	Version number	Actual number
	Review intervals	Number of years

3. Strategy content analysis

3.1 Context/purpose

Categories	Subcategories
<p><i>Goals / motivations / visions</i></p>	<p>Compliance focused (Meeting the research data management and support requirements from funders) Support research excellence Research is performed ethically Institutional research support/services capacity building Deriving competitive advantage from RDM support Aligning with institutional mission of engaging community/public Aligning with institutional strategic priorities Research cultural change: data sharing and access Research cultural change: open access / open science Research cultural change: evaluation and assessment of faculty performance Leadership and innovation in RDM Other, specify_____</p>
<p><i>External principles/standards referenced</i></p>	<p>FAIR principle TRUST repositories principle</p> <p>CARE principle OCAP Principles developed and approved by indigenous communities, collectives and organizations, and in partnership with them</p> <p>OECD principles on access to research data G8 – section on open scientific research data UNESCO Recommendation on Open Science Canadian Roadmap for Open Science</p> <p>Other, specify_____</p>

External policies referenced	<p>Tri-Agency RDM Policy Tri-Agency Framework: Responsible Conduct of Research Tri-Agency Statement of Principles on Digital Data Management Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Tri-Agency Open Access Policy on Publications</p> <p>Data sharing provisions for CIHR grant holders CIHR’s Health Research and Health-Related Data Framework SSHRC’s Research Data Archiving Policy</p> <p>Other, specify_____</p>	
Strategy development partners	lead	See reference variable: List of Stakeholders
	structure	See reference variable: Working Structure of RDM Stakeholders
	list of all	See reference variable: List of Stakeholders
Referenced documents/resources	<p>Portage template/guide/primer Portage RDM Strategy training modules (videos and discussion prompts) CASRAI Glossary Other, specify_____</p>	
Scope of research data covered	<p>All research data Tri-Agency funded research project data Institutional funded research project data Other funded research project data Research data evaluated based on other pre-set criteria Other, specify_____</p>	

3.2 Raise awareness

Categories	Subcategories	
<p>Stakeholders (identify RDM stakeholder communities on campus and establish a working/organization/communication structure)</p>	List of current partners	See reference variable: List of Stakeholders
	Current lead	See reference variable: List of Stakeholders
	List of needed partners	See reference variable: List of Stakeholders
	Current working structure	See reference variable: Working Structure of RDM Stakeholders
	Needed working structure	See reference variable: Working Structure of RDM Stakeholders
	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed
<p>Local champions (recruit local champions to help promote the value of RDM and engage with various communities)</p>	Current members	Librarians Faculty researchers Graduate students Research officers: central Research officers: departmental Research support staff: central IT or other data services Research support staff: departmental IT or other data services Other, specify_____
	Needed members	Use same list as above
	Current methods of promoting RDM	Delivering workshops on data handling and other related training at their departments/institutions Organize and participate RDM events One to one mentoring Promoting/participating in development of data management tools

	Needed methods of promoting RDM	Use same list as above
	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed
Materials and resources	Current awareness materials and resources	Scattered website/guides from different departments A consolidated location links to departmental resources and guides Links to Portage resources Links to Tri-Agency resources Other, specify_____
	Needed awareness materials and resources	Use same list as above
	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed
Outreach/communication/engagement mechanism	Current outreach mechanism	Demand based outreach Regular meetings/events Regular newsletter Ongoing outreach planning Have human resource to plan outreach Other, specify_____
	Needed outreach mechanism	Use same list as above
	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed
Participating national digital research infrastructure organization: NDRIO	NDRIO-Portage engagement around RDM	Participate in NDRIO needs assessment activities Dedicated representatives/participants on NDRIO committees: NDRIO Researcher Council Portage experts/working groups Other groups_____

		Other, specify_____
	NDRIO consultations/events around RDM - future goals	Use the same list as above
	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed

3.3. Assessment

Categories	Subcategories
Assessment level/unit	Individual faculty researchers/labs/centers Teaching faculty/instructors Faculties/schools/disciplines Departments/programs Graduate students RDM service providers Other, specify_____
Assessment tools	Survey: Canadian RDM Survey Consortium: Portage Survey: local developed Interview Focus group discussion Data profile/inventory CARDIO by DCC RISE self-evaluation framework developed by DCC Data Asset Framework developed by DCC Data Management Framework by ANDS Departmental / faculty meetings Other, specify_____
Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed

3.4. Data Management Plan (DMP)

Categories	Subcategories
DMP: current status	Adopted Portage DMP Assistant Tool Developed an institutional DMP template Customized disciplinary/departmental DMP templates Have an institutional guide on RDM budgeting Training on developing DMP available Consultation on developing DMP available Review of DMP before submission of funding applications DMP is required for all funded projects by institution DMP is required for thesis and dissertations by institution Continue monitoring DMPs after initial submission/approval Other, specify____
DMP: ideal state	Use the same list as above
Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed

3.5. RDM: current status, ideal state, and roadmap

Categories	Subcategories	
<p><i>Training and consultation</i></p>	<p>Current available</p>	<p>Formats:</p> <ul style="list-style-type: none"> RDM graduate level courses RDM undergraduate level courses Curricula integrated RDM sessions Online Training modules (link to Portage or CIHR’s training modules) Online training modules (customized for institutional use) Software/Data Carpentry Regular in person RDM training events RDM training upon request Professional development program integrated RDM sessions Information literacy integrated RDM sessions Consultation on developing DMP available Consultation on RDM strategies available Content: RDM best practices (general) RDM principles (e.g. FAIR, TRUST, CARE) RDM best practices (customized based on research domains) DMP development and tools Data repositories and data sharing Data security Managing and archive sensitive data

		<p>Data de-identification/anonymization</p> <p>Data collection tools (Qualtrics, RedCap, and etc) Electronic Notebooks Discovering and using secondary data Data analysis tools (R, Python, NVivo, and etc.) Data visualization tools (Tableau etc.)</p> <p>Data management tools (Git, Open Refine, Jupyter Notebook, and etc) Open Science tools (OSF, reproducibility tools, and etc.) Collaboration and project management tools (Sharepoint, Confluence, Wiki, and etc.)</p> <p>Research data and ethics Research data and knowledge mobilization Legal and IP aspects</p> <p>Audience:</p> <p>Early career researchers Mid-career researchers Late-career researchers Staff Post Docs Graduate students Undergraduate students</p> <p>Assessment:</p> <p>User testing Service documentation Program evaluation Other, specify_____</p>
	Ideal state	Use the same list as above

	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed
Rewards and recognition	Current status	Research data is recognized as one category of scholarly publication in researchers' tenure and promotion evaluation Recognize and celebrate exemplary research data stewardship practices at department/school/faculty level Recognize and celebrate exemplary research data stewardship practices at institutional level Other, specify _____
	Ideal state	Use the same list above
	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed
Active data management tools and infrastructure	Current available	<p>Data acquisition:</p> <p>Provide institutional level solutions Faculty/departmental level solutions Research lab/project level solutions</p> <p>Data storage:</p> <p>Institutional level solutions Faculty/departmental level solutions Research lab/project level solutions</p> <p>Data backup:</p> <p>Institutional level solutions Faculty/departmental level solutions Research lab/project level solutions</p>

		<p>Data security and sensitive data:</p> <p>Provide institutional level solutions Faculty/departmental level solutions Research lab/project level solutions</p> <p>Assessing and improve secure data storage, backup, synching, and sharing platform and system Provide secure data storage, backup, synching, and sharing platform and system Provide coherent, safe solution for researchers who need to encrypt their data Checks, control, and audit operations and users for security compliance</p> <p>Versioning:</p> <p>Provide institutional level solutions Faculty/departmental level solutions Research lab/project level solutions</p> <p>Modernize the code versioning service component (institutional Gitlab or similar system) Monitor and update code versioning service</p> <p>Data collection and analysis software:</p> <p>Provide institutional level solutions Faculty/departmental level solutions Research lab/project level solutions</p> <p>Provide Electronic Notebook systems for research labs Provide supports for commercial quantitative data analysis software Provide supports for commercial qualitative data analysis software Provide supports for electronic data collection tools</p>
	Ideal states	Use the same list as above

	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed
Data deposit and archiving	Data repositories and archiving: current	<p>Advisory:</p> <p>Provide data deposit information Provide data deposit consultation/guidance</p> <p>Data repository infrastructure:</p> <p>Have institutional SP Dataverse instance Have home-developed institutional data repository Institutional research data repository meets TRUST standard Institutional research data repository is certified by CoreTrustSeal Researchers have access to FRDR for large data hosting</p> <p>Data curation services:</p> <p>Support self-deposit of research data Data deposit (data ingest and metadata enhancement) services available Data curation (appraisal of data and documentation, metadata enhancement, and etc) services available</p> <p>Data preservation infrastructure and services:</p> <p>Have policy for long term data preservation/archiving Have institutional data preservation/archiving infrastructure and services</p> <p>Other, specify_____</p>
	Data repositories and archiving: ideal state	Use the same list as above
	Strategy to address the gap	Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed

3.6. Institutional policies, guidelines and/or procedures

Categories		Subcategories
Institutional policies, guidelines and/or procedures: current	<p><i>RDM related policies</i></p> <p><i>RDM specific policies</i></p> <p><i>Compliance monitoring</i></p> <p><i>RDM guidelines</i></p>	<p>Have RDM related policies: IP policy</p> <p>Have RDM related policies: records management policy</p> <p>Have RDM related policies: ethical review of research involves human participants</p> <p>Have RDM related policies: research integrity policy</p> <p>Have RDM related policies: Dataverse terms of use</p> <p>Have RDM related policies: Open Access policy</p> <p>Have RDM specific policies: data deposit/curation policy</p> <p>Have RDM specific policies: data preservation/archiving policy</p> <p>Have RDM specific policies: data quality/standards policy</p> <p>Have RDM specific policies: data retention policy</p> <p>Have RDM specific policies: data sharing policy</p> <p>Have RDM specific policies: data deposit policy</p> <p>Have RDM specific policies: data licensing policy</p> <p>Have RDM specific policies: un-funded research</p> <p>Monitoring compliance regarding RDM specific policies</p> <p>Have RDM specific guidelines for ethical sharing and reuse human participant data</p> <p>Have RDM specific guidelines for data security</p> <p>Have RDM specific guidelines for data disclosure risk analysis</p> <p>Have RDM specific guidelines for data management cost/budget</p> <p>Have RDM specific guidelines for data licensing</p> <p>Have RDM specific guidelines for data preparation for sharing</p> <p>Have RDM specific guidelines for data sharing/deposit/curation</p> <p>Other, specify_____</p>
Institutional policies, guidelines and/or procedures: ideal state		Use the same list as above
Strategy to address the gap		Timeline, responsible unit(s) , organizational/working structure of responsible unit(s) , infrastructure , funding/budget , staffing and skills needed

Reference variables

List of RDM Stakeholders

Internal

RDM Committee/Working Group (include multiple stakeholders)

Senior institutional leadership or management (VP of Research)

Library administrators
Librarians/library department(s)

CIO
IT/ Academic Technology Services (institutional level)
IT/ Academic Technology Services (departmental/school/research center level)

Research support services/facilities (digital humanities, data analytics, statistical counseling, and etc.) (institutional level)
Research support services//facilities (digital humanities, data analytics, statistical counseling, and etc.) (departmental/school/research center level)

Research Office (institutional level)
Research Officers (departmental/school/research center level)

Ethics Review Board/Committee (institutional level)
Ethics Review Board/Committee (departmental/school/research center level)

Legal department

Faculty of Graduate Studies
Representatives of research faculties

External

Tri-Agency
Canadian Institute for Health Information
Other funding agencies
Other government agencies

NDRIO
Compute Canada and its regional networks
Research Data Canada
Portage

Canadian Association for Research Administrators
Canadian University Council of Chief Information Officers

CARL
Scholars Portal
Dataverse
FRDR

Research societies/associations
Journals/publishers
Repositories

Organizational/Working Structure

Dedicated RDM team(s) within department(s)/unit(s)
Institutional RDM committee/group(s)/council(s) (temporary)
Institutional RDM committee/group(s)/council(s) (long term)
Informal multi-unit group(s) or discussions within institution

Funding Strategies

Sources :

Internal:

Dedicated institutional budget
Core institutional provision (overheads)
Unit(s) operational budget within institution
Charges on research grants (deposit storage fees etc.)

External:

Grant funding for institutions (Research Support Fund etc.)
Grant funding for research projects (RDM expenses)

Duration:

Short term
Long term

Infrastructure

No additional infrastructure needed

Types of infrastructure

Software

Hardware

Strategies

Commercial solution

Institutional solution

Regional partnership

National partnership

International partnership

Disciplinary partnership

Staffing

No additional HR needed

Create/reassign

Create dedicated new position(s)

Reassign/part of existing position(s)

Position types:

Faculty

Staff

Students

Duration

- Full time
- Part time
- Short term
- Long term

Skills

Plan

- Knowledge of national policies
- Data security and risk management
- Legal (licensing, intellectual property, etc.)
- Advisory
- Technical aspects in the area of e-infrastructures

Create, process, analyze

- Research software development
- Research data management
- Technical aspects of managing sensitive data
- Data analysis and visualization

Disseminate, reuse

- Data curation
- Metadata creation

Preserve

- Data preservation

References and resources

Institutional Research Data Management Services Capacity Survey

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Canadian Institutional RDM Principle/Strategy

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UK Institutional RDM Roadmap/Strategy/Assessment Guide

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International RDM Emerging Principles/Standards

FAIR principle: <https://www.go-fair.org/fair-principles/>

TRUST repositories principle: <https://www.rd-alliance.org/rda-community-effort-trust-principles-digital-repositories>

CARE principle: <https://www.gida-global.org/care>

OCAP: <https://fnigc.ca/ocap-training/>

OECD : Recommendation of the Council concerning Access to Research Data from Public Funding: <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0347>

G8 – section on open scientific research data: <http://www.g8.utoronto.ca/science/130613-science.html>

UNESCO Recommendation on Open Science: <https://en.unesco.org/science-sustainable-future/open-science/recommendation>

Canadian Roadmap for Open Science: https://www.ic.gc.ca/eic/site/063.nsf/eng/h_97992.html