**How to Teach RDM using Cases**

**About**

Each of the research cases in the curriculum is an actual depiction of a research case in a specific research environment. The cases have been developed to make it easier for science, health sciences, and engineering students at the undergraduate and graduate levels to understand data management principles and challenges in the context of familiar research settings. By integrating the case studies into classes, RDM instruction can be customized for homogenous groups.

These cases were developed and incorporated into the curriculum based on recommendations from health sciences and science faculty from the University of Massachusetts Medical School and Worcester Polytechnic Institute, who were interviewed about data management practices in academic research and the ways that students working in their labs and clinics have managed research data. Each faculty member emphasized that data and research practices vary widely from one field to another (and also often from one lab to another—even within the same field) and suggested that case studies illustrating data management in a variety of disciplinary settings be incorporated into the curriculum.

**Cases represent a range of disciplines:**

These are the curriculum’s cases:

* A clinical health study:
	+ Outcomes from Orthopedic Implant Surgery
	+ Studying Vitamin D as an Augmentation of Treatment for Bipolar Depression
* Health study in lab using derived data from multiple projects:
	+ Combining Data from 10 Years of Research for Retrospective Studies on the Effects of Exercise and Diet on the Risk of Diabetes
* Biomedical lab research:
	+ Regeneration of Functional Heart Tissue in Rats
		- Case Excerpt: Regeneration of Functional Heart Tissue in Rats
	+ Designing a Mobile and Compact Optical Mammography Instrument
* Qualitative behavioral study:
	+ Improving End-of-Life Care in African Americans
* Engineering test lab:
	+ Characterizing a Component of a Rocket Engine Used to Control Satellites in Orbit
* Interdisciplinary research project:
	+ Data Preservation Case Study: The ALIEnS Project
* Biology, ecology, and environmental science research:
	+ Study of Habitat Selection and Requirements by Grassland Birds
* Model Organisms neuroscience research lab:
	+ Using Zebrafish as a Model System for Studying Motor Axon Guidance & Motorneuron Disease
* Genomics, Microbiology, and Virology Lab Research:
	+ Enumeration and Gene-Sequencing of Bacteriophages

Please note that the NECDMC’s database of cases is not static. Additional cases that illustrate a range of data management issues in diverse research settings will be added to the curriculum and we encourage users of the curriculum to submit your unique cases to the NECDMC team!

**Teaching Points for the Cases**

Prior to the narration of each research case is a summary of the teaching points that the case illustrates.

For example, in the “Summary of Teaching Points” for the case *Regeneration of Functional Heart Tissue in Rats*, it is noted that the case addresses two topics addressed in Module 1, An Overview of Data Management: inconsistent use of paper lab notebooks among users and the potential for a lack of synchronization between lab notebook entries and the surgical log .

The case also illustrates the challenge of data types, formats, and stages, as it relays how the research team captures various images of different parts of the heart, creates tissue slides, images of tissue slides, and numerical readings of ventricular pressures—and how the project team uses an Excel spread sheet to link all the data sources together.

**Identifying a case that illustrates a specific concept**

Instructors who are looking to address specific data management concepts with a research case should refer to the document “Research Data Management Concepts illustrated in the Teaching Cases”. The table in this document compiles key data management concepts and the specific research cases that illustrate these concepts.

**Discussion Questions**

At the conclusion of each of the cases there are discussion questions. These questions are grouped by module so that students can address specific concepts within the case that are relevant to a specific module.

**Exercises involving cases**

In the lesson plans for each of the modules (Look for lesson plans in the Frameworks for a Data Management Curriculum <http://library.umassmed.edu/data_management_frameworks.pdf>) , there are assessments and assignments that use the research cases:

Module 1**, “**An Overview of Research Data”:Create a data management plan for one of the [cases](http://library.umassmed.edu/necdmc/research_cases) using [the simplified data management plan](http://library.umassmed.edu/necdmc/necdmc_simplified_dmp.docx) template.

Module 2, “Types, Formats, and Stages of Data”, includes a research case on the level of understanding residents of two coastal towns had about climate change and coastal flooding. Following the case are discussion questions related to the files and formats of the data and matching the various data to a stage in the data lifecycle continuum.

Module 3, “Contextual Details Needed to Make Data Meaningful to Others”, includes this activity: “Using a research case, identify the basic project information.”

Module 4, “Data, Storage, and Backup” Assessment: Students read the case Improving End-of-Life Care for African Americans, and respond to questions at end.

Module 5 ,“Legal and Ethical Implications of Data” Assessment**: “**Have students read excerpt of one of these cases, “Outcomes from Orthopedic Implant Surgery” or “Improving End-of-Life Care for African Americans.”

Module 6 “Data Sharing & Re-use Policies” Assessment: Read Aerospace engineering case: “Characterizing a Component of a Rocket Engine used to Control Satellites in Orbit” and answer related quiz questions.

Module 7 “Repositories, Archiving & Preservation” Activity: Identify and prioritize the functional requirements of a preservation system designed to accommodate the needs of ALIEnS.

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