

Designing Complex Suveys with REDCap

 **Sherman
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Wednesday, March 4, 2026

4:00pm – 5:00pm (**Online**)

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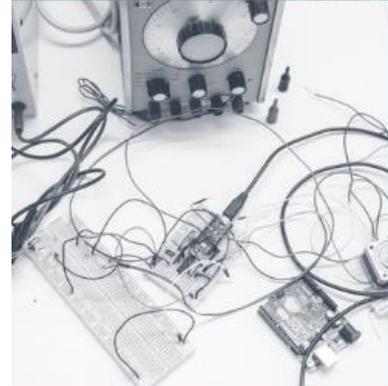
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Designing Complex Surveys with REDCap

Presenter: Shubrandu Sanjoy

Title: PhD Candidate in Health Research Methodology

Date: March 4, 2026





 **Land
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Receive help from a member of the DASH team! DASH can assist with the following topics:

- Creating data visualizations, including charts, graphs, and scatter plots
- Figuring out which statistical tests to run (e.g., t-test, chi-square, etc.).
- Analyzing data with software including SPSS, Python, R, SAS, ArcGIS, MATLAB, and Excel
- Choosing which software package to use, including free and open-source software
- Troubleshooting problems related to file formats, data retrieval, and download
- Selecting methodology and type of data analysis to use in a thesis project

Book an appointment: <https://library.mcmaster.ca/services/dash>

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- Providing guidance on creating data documentation and metadata;

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The Sherman Centre for Digital Scholarship Certificate of Attendance

The Sherman Centre's certificate program recognizes attendance at our workshops. It complements degree training, supports the development of critical competencies in data analysis, research data management, and digital scholarship, and formalizes core skills fostered by our workshops.

Participants are invited to attend seven workshops and receive a certificate of attendance. To verify your participation in today's workshop, we will provide a code and additional instructions at the end of the session.

You can learn more about the certificate program at scds.ca/certificate-program

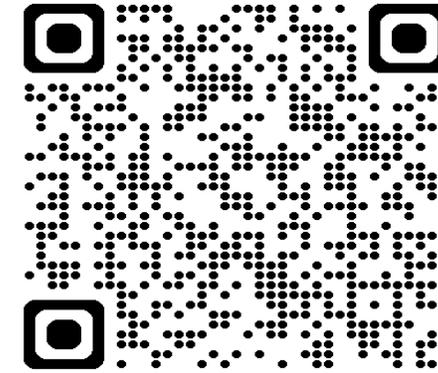
Upcoming Workshops

Data Analysis Support Hub

March 10: Create an Interactive Dashboard using ArcGIS

March 26: Creating Data Visualizations with Javascript

April 2: Microdata Analysis with Python using Statistics



Research Data Management

May : Students deserve Research Data Management

May 12: Data Management Plan Bootcamp (In-Person)

May 19: Data Deposit Bootcamp (In-Person)

Do More with Digital Scholarship

March 19: Social Media Data! Practical and Ethical Collection, Visualization, and Management

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Register for Upcoming Workshops: <https://u.mcmaster.ca/scds-workshops>

REDCap support

Web site: <https://projectredcap.org/>

FHS REDCap website: <https://redcap.healthsci.mcmaster.ca/>

To place a new REDCap request or to log a support ticket, users may do so via JIRA portal at : getredcap.mcmaster.ca

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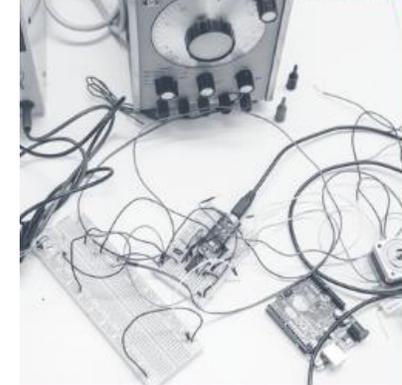
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Learning Objectives

By the end of this workshop, you will be able to:

- Set up a REDCap project
- Design complex and dynamic surveys using branching logic, and calculated fields
- Build and manage longitudinal REDCap projects with multiple events and repeating instruments
- Apply data validation and data quality checks to minimize entry errors
- Manage user rights and permissions for collaborative research projects

When Do You Need Complex Surveys?



You need advanced design when:

- Questions depend on prior answers
- You have eligibility screening
- You collect repeated measures
- You calculate scores in real time
- You manage multiple study arms

Example: Heart failure follow-up study with repeated visits and risk scores

REDCap Project Structure



- **Instrument** → Questionnaire/form
- **Field** → Individual variable/question
- **Record ID** → Participant ID
- **Event** → Timepoint (baseline, follow-up)
- **Arm** → Study group (intervention/control)

Types of Projects ?



A. Classic project

When would you use a classic project?

- For single time-point data collection
- Use a form or survey once

B. Longitudinal project

When would you use a longitudinal project?

- If you need to collect same data at multiple timepoints, you can enable longitudinal data collection in Project Setup

Surveys vs. Forms



Forms

- Manual data entry by study staff

Surveys

- Participant-submitted data

Editing responses:

- Forms: Able to be edited by study team
- Surveys: Can be restricted to prevent edits

Data Entry



Variable Types

- Text Box (Short Text)
- Notes Box (Paragraph Text)
- Calculated Field
- Multiple Choice-Drop-down List (Single Answer)
- Multiple choice-Radio Buttons (Single Answer)
- Checkboxes (Multiple Answers)
- Yes-No
- True-False
- Signature (draw signature with mouse or finger)
- File Upload (for users to upload files)
- Slide/Visual Analog Scale

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Variable Naming Best Practices



- Use lowercase + underscores
- Avoid spaces and special characters
- Keep names meaningful

Examples:

- age
- hf_stage
- baseline_bmi

Why important?

- Easier analysis in R/SAS
- Cleaner datasets

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Data Validation



Why Data Validation is Critical?

- Ensures accurate data at entry
- Prevents invalid, inconsistent, or out-of-range values
- Reduces time spent on data cleaning
- Improves quality of statistical analysis and reproducibility
- Bad data at entry = painful analysis later

Key Types of Validation

Numeric Validation

- Restricts input to numbers only (integer or decimal)
- Range Restrictions (Min–Max)
- Example: Age, lab values, blood pressure

Date & Time Validation

- Standard formats (e.g., YYYY-MM-DD)
- Prevents incorrect entries (e.g., 32/13/2025)
- Essential for time-to-event and longitudinal analysis

Branching Logic



What is Branching Logic?

- A rule that controls whether a question is shown or hidden
- Based on responses to previous questions
- Show the right question to the right participant
- Creates adaptive, personalized surveys

Why It Matters?

- Reduces unnecessary questions → improves completion rate
- Minimizes respondent burden
- Prevents irrelevant or misleading data
- Makes surveys feel smart and tailored

Example:

- Q1. Do you drive? Q2: How many hours do you drive per week?
- If the person says NO, we don't ask anything about driving.
If they say YES, then we ask follow-up questions.

Longitudinal Study in REDCap



What is it?

- Collect data from the same participant over time

Key Components

- **Events:** Baseline, Follow-ups (e.g., 3 mo, 6 mo)
- **Instruments:** Surveys assigned to each event
- **Records:** Same ID across all time points

Example

- Baseline → Demographics
- 3 months → Symptoms
- 6 months → Outcomes

User Rights in REDCap



What?

- Controls who can view, edit, export, or design the project
- Protects sensitive data, prevents accidental changes, and ensures ethical and compliant data management

Key Permissions

- Data entry (add/edit records)
- View only
- Data export (R, SAS, Excel)
- Design (build/edit forms)
- User management

Best Practice (Role-Based Access)

- PI → Full access
- Research Assistant → Data entry
- Analyst → Export only

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Common Mistakes in REDCap Design



Overusing free text fields

- Inconsistent entries (e.g., Male / M / male)
- Use dropdowns, radio buttons, or checkboxes

No data validation

- Unrealistic values (e.g., age = 500)
- Apply numeric, date, and range limits

Broken branching logic

- Questions appear incorrectly or are hidden
- Always test with different scenarios

Poor variable naming

- Hard to analyze later in R/SAS
- Use short, consistent names (e.g., age, bp_sys)

Not testing before launch

- Errors in flow and missing data
- Pilot test using dummy data

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Live Demonstration Steps



- Project setup in REDCap
- Create a REDCap survey
- Demonstrate overall navigation
- Add branching logic
- Use piping and calculated fields
- Set up a simple longitudinal structure

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