REDCAP
ADVANCED DATABASE
MANAGEMENT(303)

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REDCap
Research Electronic Data Capture

ITHS Focus

- Speeding science to clinical practice for the benefit of patients and communities.

- Promotes translation of scientific discovery by:
  - ❏ Fostering innovative research
  - ❏ Cultivating multi-disciplinary partnerships
  - ❏ Training the next generation of researchers

- More information: www.iths.org

Laboratory → Clinic → Community

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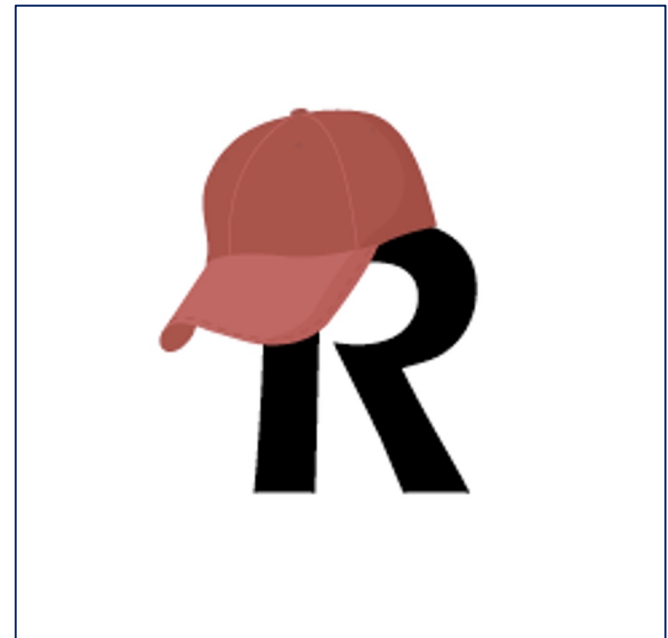
Learning objectives

- How to manage bigger more complex projects?
  - User rights management
  - Data quality
  - Data manipulation
  - Improving overview / workflow

User rights management

User rights management

Uses / Reasons why?

Roles

Suspending users

Data Access Groups

Uses / Reasons why?

- Compliance
    - HIPAA
- Data Quality
    - Blinding groups of users
- Control your own dataset
    - Exports
    - Ownership
- Prevent "too many cooks in the kitchen"
- Relieving your training burden

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User rights management

Uses / Reasons why?

Roles

Suspending users

Data Access Groups

User roles

- Allows for quick assignment of previously established rights

  o e.g., Temporary users like medical students

- Forces you to think about who does what

- Examples of common roles:

  o Data entry

  o Project manager/PI

  o User manager

  o Design manager

  o Statistician

  o Research Coordinator

User rights management

Uses / Reasons why?

Roles

Suspending users

Data Access Groups

Suspending users

Two options:

- Global suspension
  - Done by an admin
  - Great for suspending for a ton of projects at the same time
  - Usually done for people leaving an organization

- Project specific suspension
  - Predetermined date
  - Good for temporary users
  - Done by user rights enabled user

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User rights management

Uses / Reasons why?

Roles

Suspending users

Data Access Groups

Data Access Groups (DAG)

Separate records by group:

- Users in a DAG can only see records assigned to their group

- Records created by a user in a DAG automatically get assigned to that DAG

- Records can be re-assigned

  o Via the record home page

  o Via data import

- Users not in any DAG can see all records.

- DAG's are independent of user rights

  o Set both for new users

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Data Quality

Garbage In, Garbage Out!!

Data Quality

Pre-Capture
Design
Double Data Entry
During Capture
Post Capture

Before the start of data collection

- Design
  - Pre-emptive strike
  - More options than paper forms
  - Talk to your statistician
- Validation
  - Collect the "right" kind of data
- Required fields
  - Prevents missing data
- Structured fields vs unstructured fields
- Double data entry

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Data Quality

Pre-Capture
Design
Double Data Entry
During Capture
Post Capture

Design - Validation

- Think about data analysis
  - e.g., "Two" vs "2"
- Validation options
  - Date/time
  - Numeric
  - Special (MRN's, email, phone, zip code)
- Minimum & Maximum
  - Optional
  - Think about outliers
- Action tags
  - @CHARLIMIT, @WORDLIMIT

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Data Quality

Pre-Capture

Design

Double Data Entry

During Capture

Post Capture

Design – Required fields

- Soft requirement
    - Only for users
    - Good reminder
- Hard requirement
    - Survey mode
    - Unskippable
- Best practices
    - Checkboxes
    - Give people an "out"
        - e.g., Prefer not to answer, Unknown

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Data Quality

Pre-Capture

Design

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During Capture

Post Capture

Design – Structured vs Unstructured

- Structured fields
    - e.g., Dropdowns, radio buttons, checkboxes, lookup tables, calculated fields
    - Quantifiable
    - Finite predictable answers
    - Easy analysis
- Unstructured fields
    - e.g., Text boxes, note boxes
    - More flexibility
    - Higher risk for "unforeseen" answers
    - Might require some cleaning later

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Data Quality

Pre-Capture

Design

Double Data Entry

During Capture

Post Capture

Double Data Entry

- Main purpose is to prevent:
  - Transcription bias
    - From paper to electronic
  - Interpretation bias
    - Interpreting clinical notes, paper comments
- Useless when doing:
  - Direct data entry
  - Surveys
  - Extractions from other clinical systems
- Requires twice the effort, time and resources

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Data Quality

Pre-Capture

During Capture

Data Resolution Workflow

During Capture

Post Capture

During data capture

- Deal with the unexpected

  o Easier to do "during" than "after the fact"

- Course correct midstream

  o Change process in REDCap

  o Move to production

- Track issues

  o Field comment log (default)

  o Data Resolution Workflow

- Dealing with issues

  o Data validator role

  o Make 1 person responsible

Data Quality

Pre-Capture
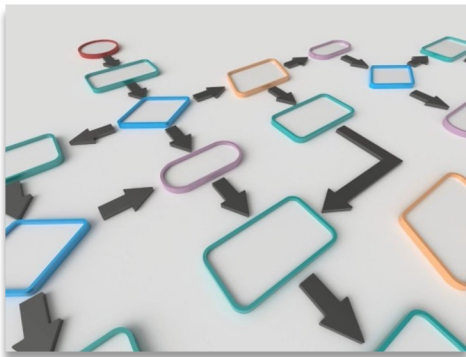
During Capture

    Data Resolution Workflow

During Capture

Post Capture

Data Resolution Workflow

- Field Comment Log

    o Basic default option

    o Comment on any variable in any record

- Data Resolution Workflow

    o Turn on in the project setup page

    o Setup the appropriate user rights

    o Allows for the opening of Queries/Issues

    o Manage the issues over time

    o Asynchronous

    o HIPAA compliant (opposed to email)

    o Ideal for larger dispersed teams

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Data Quality

Pre-Capture

During Capture

Post Capture

Logging

Data Quality

Post data capture

- Adhere to compliance rules

  o Logging

  o Data Resolution Workflows

- Clean your datasets

  o Eases analysis

  o Good indicator of your data quality

- Do a post-mortem

  o For future studies

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Data Quality

Pre-Capture

During Capture

Post Capture

    Logging

    Data Quality

Post data capture - Logging

- REDCap tracks everything
  - Page views
  - Design edits
  - Data entry
  - Modifications
- Exportable in a CSV
- Filterable
  - Tons of data
- Accessible through "Logging" application
- Talk to the REDCap Administrator for more technical logging like IP addresses

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Data Quality

Pre-Capture

During Capture

Post Capture

Logging

Data Quality

Post data capture – Data Quality

- Run checks on the entire dataset

- 8 predefined rules

  - Execute to check a rule

  - Rule H lets you update calculations in bulk

- Allows for custom rules

  - Based on branching logic

  - Look for "impossible" scenarios

    - "Negative number of births"

    - Birth date after visit dates

Data manipulation

Data manipulation

Data Manager

Deleting records

Wiping forms/surveys

Locking

Data Pre-population

Data Manager

- Responsible for:
  - o Design
  - o Data Quality
  - o Data loading
  - o Other data responsibilities
- Needs to know:
  - o The dataset itself
  - o REDCap capabilities
  - o Data manipulation
    - ▪ Importing & Exporting class recommended
- Manage this role through the user rights

Data manipulation

Data Manager

Deleting records

Wiping forms/surveys

Locking

Data Pre-population

Deleting records

- Governed by a specific user rights

  - o Is turned off by default

- Delete individual record

  - o Done in the record home page

  - o Removes entire record

- Delete in bulk

  - o "Erase all data" in "Other functionality" tab

  - o API

- Irreversible unless you have a backup

Data manipulation

Data Manager

Deleting records

Wiping forms/surveys

Locking

Data Pre-population

Wiping forms and surveys

- Also governed by the "delete records" user rights

- Does not delete the entire record

- Individual forms

  o Done on the form itself

  o Button at the bottom of the form

  o Enter "Edit survey" mode at the top of the form before you delete a survey

    ▪ Requires "edit survey" rights

- Events

  o Done in the record home page

  o Click the little red "X" underneath an event

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Data manipulation

Data Manager

Deleting records

Wiping forms/surveys

Locking

Data Pre-population

Locking

- Governed by the "Lock/Unlock records" user right

- Individual forms

  o Done on the form itself

  o Checkbox at the bottom of the form

  o Enter "Edit survey" mode at the top of the form before you lock a survey

    ▪ Requires "edit survey" rights

- Entire record

  o Done in the record home page

  o Select option in the "Choose Action" dropdown

- Locking can be undone by users with locking rights

Data manipulation

Data Manager

Deleting records

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Locking

Data pre-population

Data pre-population

Three main methods:

- @DEFAULT tag
  - o Hard coded value
  - o Piped in value from elsewhere in the record
  - o Variable must not be hidden with logic

- @PLACEHOLDER tag
  - o Shows a suggestion
  - o Does not save when untouched

- Importing
  - o Preload most kinds of data
  - o Great for demographics or EMR data dumps

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Improving overview / workflow

Improving overview / workflow

Custom labels

Custom dashboards

Creative report uses

"To do" lists

"Dynamic" reports

Custom labels

- Pipe in entered values

- Use piping syntax

- Record label

  - e.g., Last name, first name *(Doe, John)*

  - Setup in "Additional customizations"

- Event label

  - e.g., Visit date *(06-06-2018)*

  - Setup in "Define my events"

- Repeated instrument label

  - e.g., Medication name *(Tramadol)*

  - Setup in "Repeated instruments and events"

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Improving overview / workflow

Custom labels

Custom dashboards

Creative report uses

"To do" lists

"Dynamic" reports

Custom dashboards

- Need "project design/setup" rights to setup

- Found in the "Record Status Dashboard"

- Viewable by every user

  o But limited by individual user rights

- Filter based on:

  o Branching logic

  o Completion status

  o Events

  o Forms

- Assorted display options available

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Improving overview / workflow

Custom labels

Custom dashboards

Creative report uses

"To do" lists

"Dynamic" reports

Creative report uses

- You can build as many reports as you want

- Take advantage of the fact that REDCap runs the report every time you access it

- Useful options

  - Filter logic

  - Live filters

  - Sorting

  - Event limits

- Main purpose is to export data

- Other uses:

  - To do lists

  - Data quality

Improving overview / workflow

Custom labels

Custom dashboards

Creative report uses
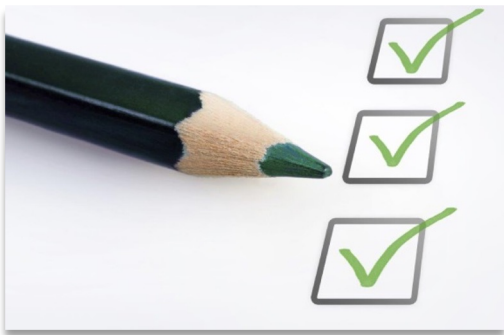
    "To do" lists

    "Dynamic" reports

"To do" lists

- Create a status variable

  - e.g., Processing status

- Build logic to show all records where that status variable is empty or has a specific value

  - Run the report

  - Select a record

  - Process the record

  - Update status variable

  - Rinse and repeat until empty

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Improving overview / workflow

Custom labels

Custom dashboards

Creative report uses

"To do" lists

"Dynamic" reports

"Dynamic" reports

- Create a date variable

  o e.g., Time stamp

- Have the date variable automatically filled in

- Build logic that compares that date variable (or smart variable) against today's date

- Specify a range

  o e.g., Last week would be 0 and -7 *

- Run the report

- The report will change based on:

  o Data entry (new records)

  o Time (older records drop off)

Thank You!

Questions?

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