

REDCap Web-interface Database System

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What is REDCap?

- Research Electronic Data Capture (REDCap)
- “[REDCap] is a novel workflow methodology and software solution designed for rapid development and deployment of electronic data capture tools to support clinical and translational research.” (Harris et al., 2009)
- Among key features:
 - User authentication and role-based security
 - Real-time data validation and entry checks
 - Auditing capabilities
 - Uses MySQL relational database

Selecting REDCap

- KU ADC new in 2011
- Institutional investments
 - Velos eResearch (CRIS) institutional license
 - REDCap growth with the newly-formed Div. of Medical Informatics
- KU ADC needed a system...
 - ...capable of supporting large, multi-site studies, which typically budget informatics personnel to build eCRFs
 - Able to efficiently support smaller scale projects (e.g., KU ADC pilot projects) with small budgets
- KUMC approach to eCRF development
 - CRIS: eCRFs built by personnel in Dept. of Biostatistics
 - REDCap: range of options from investigators developing eCRFs (e.g., model described by Harris et al., 2009) to budgeting for informatics support

Selecting REDCap (cont.)

- Clinical Core's experience with both programs and preference weighed heavily on our decision
- Strengths of REDCap
 - Cost
 - Web-based user interface supports multi-site studies
 - Facilitates eCRF development by investigators for small budget projects by...
 - ...creating metadata table in Excel for data dictionary
 - ...using the Online Designer via web browser
 - Can facilitate link between study specific data with other data captured by the ADC (e.g., UDS)
 - Sharable form set with other ADCs
 - Opted for “out-of-the-box” REDCap utilization to sharing our database structure with other ADCs


Data Capture and Workflow

- Master patient index for all subjects
 - Clinical Core assigns unique KU ADC ID for each subject
 - KU ADC ID used across all ADC forms
- Links across databases
 - Recruitment
 - UDS and ADC-specific cohort
 - Ability to link pilot study databases

Data Capture and Workflow (cont.)

- ADC ID selected from drop-down list
 - Additional subject information displayed to assist with drop-down selection

KU-AMP Subject History

 Download PDF of

You may view an existing record/response by selecting it from one of the drop-down lists below. The records are separated into each drop-down list according to their status for this particular data collection instrument.

Total records: 4

Incomplete Records (2)

Unverified Records (1)

Complete Records (1)

-- select record --
-- select record --
1 (John Doe, RED_1)
1184 (, RED_1184)

-- select record --

- My Projects
- Project Home
- Project Setup
- Project status: **Production**
- Collection**
- Data Entry
- Locations**
- Calendar
- Data Export Tool
- Data Import Tool
- Data Comparison Tool
- File Repository
- Graphical Data View & Stats
- Report Builder
- Reports**
- ASHunt_CompleteData
- Enrollees with Probable AD
- Enrollees with MCI - Amnestic
- Enrollees with Normal Cognition
- NACC C1 (Neuropsych Eval) Entered
- Name and Date of Birth
- Phyllis' report (Name & registry date)
- Query for Lab Sample Requests
- Minority Enrollees
- Burns
- Enrollees with Possible AD
- Enrollees with MCI - Non-Amnestic
- Enrollees Impaired, not MCI
- Enrollees with non-AD Dementia
- All ADC Enrollees - Dx fields
- All ADC Enrollees - Demographic fields
- Dictation Report
- CDR and Cog Data
- Prose Recall CDR 0.5 R Handed

Data Entry: Event Grid

The grid below displays the form-by-form progress of data entered into the project for one particular ADC Subject ID for all defined events. You may click on the colored buttons to access that form for that event. If you wish, you may modify the events below by navigating to the [Define My Events](#) page.

ADC Subject ID **test-1234**

Data Collection Instrument	Events									
	1-NACC UNIFORM DATA SET (UDS) (1)	Follow-up1 (2)	Follow-up2 (3)	Follow-up3 (4)	Follow-up4 (5)	Follow-up5 (6)	MGM -01 (7)	milestone1 (8)	milestone2 (9)	milestone3 (10)
Header	●									
KU Informed Consent	●									
Demographics KU A1 A2 A3 A5 KUMhx	●									
Medications	●									
Function KU Vitals B7 B5 B6 B1	●									
CDR Informants	●									
CDR Subjects	●									
Exam KUNeuro B3 B8 B2	●									
Diagnostic B4 B9 D1 KUdx	●									
KU Autopsy Status	●									
Neuropsych C1	●									
KU Psychometric Battery	●									
Checklist Z1 E1	●									
F/U Header		●	●	●	●	●				
F/U KUdemo A1 A2 A3 A5 Kumh Acee		●	●	●	●	●				

Form A4: Subject Medications

Data Entry

ADC Subject ID **test-1234**

Event: **1-NACC UNIFORM DATA SET (UDS)**

Data Collection Instruments:

ADC Subject ID test-1234

FORM INITIAL VISIT A4: SUBJECT MEDICATIONS

Is the subject currently taking any medications? Yes

UDS Drug Code Search Tool: NACC DrugID Lookup

For drugs on the NACC Medications List

Enter medication name:

- Helpful Hints:
 - You can use upper case or lower case letters.
 - You can enter brand name, drug name, or generic name.
 - For aspirins and multivitamins, brand names will produce better search result.
 - No need to enter the complete name. You can enter just the first few letters.
- You can also download the complete list of medications in an Excel spreads heet or a PDF and search from there:
 - [Download Excel file \(2.5MB\)](#)
 - [Download PDF \(1MB\)](#)

UDS Drug Code Search Tool: Non-NACC DrugID Lookup

For drugs not on the NACC DrugID list

Enter medication name:

- Helpful Hints:
 - You can use upper case or lower case letters.
 - You can enter brand name or drug name.
 - No need to enter the complete name. You can enter just the first few letters.

... NACC online Drug

(low)


ing the drug ID.

Type the name of the drug - optional.

Type a 3rd drug ID, d_ _ _ _ _

d and 5 numbers

Type the name of the drug - optional.



Audit Capabilities

- Creates searchable spreadsheet that captures:
 - User that entered/modified data
 - Date and time
 - Original value
 - New value
 - Reason for change

Time / Date	User name	Action	List of Data Changes OR Fields Exported	Reason for Data Change(s)
2:45pm 10/01/2012	evidoni	Manage/Design	Delete report	
2:38pm 10/01/2012	handerson3	Updated Record RED_1987 (1-NACC UNIFORM DATA SET (UDS))	r_int_think_prob = '0', r_int_think_prob2_14f = '1', r_int_think_prob_yes = 'attributes to age - word-finding difficulty', r_int_trouble_often = '2', r_int_10yrs_ago = '3', r_int_how_long = '10 years', r_int_how_consistent = 'consistent on 5 or 6 things that she has to stop and think', r_int_why_are_you = '1',	.

Download Syntax & Data



Microsoft Excel

You may download the survey results in CSV (comma-separated) format, which can be opened in Excel. You have the choice of downloading the data either with the full headers and answer labels or just with the answer codes (i.e. raw data).

NOTE: If you are using a version of Microsoft Excel prior to Excel 2007, due to limitations the data will only be read to 255 columns when opened.



[Send file?](#)



SPSS Statistical Analysis Software

Instructions: Download and save all 3 files on the right to a common location. First, double-click on the Pathway Mapper (.bat) file, which will run quickly and invisibly. (If you are not using a Windows operating system, such as Mac or Linux, please see the *Additional Instructions*.) Now double-click on the *.sps file, which will open SPSS. When the file is loaded and displayed, choose Run-->All from the top menu options. This action will launch the script that will automatically read in all data and manipulate data fields with labels, option values, etc.

[Additional instructions](#)



[Send file?](#)



SAS Statistical Software

Instructions: Download and save all 3 files on the right to a common location. First, double-click on the Pathway Mapper (.bat) file, which will run quickly and invisibly. (If you are not using a Windows operating system, such as Mac or Linux, please see the *Additional Instructions*.) Now double-click on the *.sas file, which will open SAS. When the file is loaded and displayed, choose Run (or Run-->Submit) from the top menu options. This action will launch the script that will automatically read in all data and manipulate data fields with labels, option values, etc.

[Additional instructions](#)



[Send file?](#)



R Statistical Software

Instructions: Use `download.read.csv('filename')` or read in data file.



[Send file?](#)



STATA Analysis and Statistical Software

Instructions: Download both files to common location and double-click on *.do file. This action will launch the script that will automatically read in all data and manipulate data fields with labels, option values, etc.



- New features can be requested
 - For example, we requested additional input restriction features, which have now been implemented as “out-of-the-box” features
 - Better facilitates sharing (e.g., across ADCs)

Back-up and Security

- REDCap application server
 - Secured from unauthorized access, with access limited to only a few administrators
 - Nightly back-up to different location
 - Uses https to encrypt data transmission
- REDCap database server
 - Secured from unauthorized access, with access limited to only a few administrators
 - Protected by firewall and intrusion detection system maintained by IR
 - Nightly back-up to different location
 - Daily back-up (up to three times/day)
- Utilizes Central Authentication Server
 - Common username and password for KUMC applications

Hosting a REDCap Instance

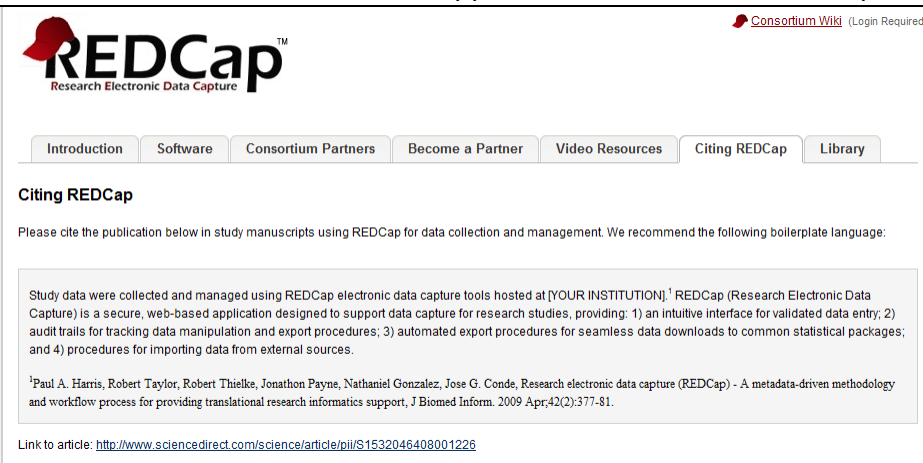
- Cost of REDCap (<http://project-redcap.org/>)
 - No cost for REDCap software and support “to institutional partners”
 - ...though not open-source
 - Does have infrastructure requirements (not free like “air”)
 - Hardware needed to host system
 - Personnel to maintain security, implement upgrades, etc.

Citing REDCap

- Recommended citation at <http://project-redcap.org/>

Study data were collected and managed using REDCap electronic data capture tools hosted at [YOUR INSTITUTION].¹ REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

 - ¹Paul A. Harris, Robert Taylor, Robert Thielke, Jonathon Payne, Nathaniel Gonzalez, Jose G. Conde, Research electronic data capture (REDCap) - A metadata-driven methodology and workflow process for providing translational research informatics support, J Biomed Inform. 2009 Apr;42(2):377-81.



REDCap™
Research Electronic Data Capture

Consortium Wiki (Login Required)

Introduction Software Consortium Partners Become a Partner Video Resources Citing REDCap Library

Citing REDCap

Please cite the publication below in study manuscripts using REDCap for data collection and management. We recommend the following boilerplate language:

Study data were collected and managed using REDCap electronic data capture tools hosted at [YOUR INSTITUTION].¹ REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

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Link to article: <http://www.sciencedirect.com/science/article/pii/S1532046408001226>

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...and of course...

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Study data were collected and managed using REDCap electronic data capture tools (Harris et al., 2009) hosted at The University of Kansas Medical Center. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

REFERENCES

- Paul A. Harris PA, Robert Taylor, Robert Thielke, Jonathon Payne, Nathaniel Gonzalez, Jose G. Conde, Research electronic data capture (REDCap) - A metadata-driven methodology and workflow process for providing translational research informatics support, *J Biomed Inform.* 2009 Apr;42(2):377-81
- <http://project-redcap.org/>