

CTS-IT

Facilitating science through technology

Christopher P. Barnes (cpb@ufl.edu | @senrabc) , Director

Philip B. Chase (pbcb@ufl.edu), Assistant Director

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Team

- We are a team

Informatics Consulting with CTS-IT



CTS-IT staff pictured in 2017: Top row (standing): Christopher Barnes, Tiago Bember Simeão, Prasad Lanka, Lesley Kao, Patrick White, Michael Buchholz, and Jeryl Johnston. Bottom row (sitting): Naomi Braun, Kevin Hanson, Jenny Martinez, Matthew McConnell, Philip Chase, Taryn Stoffs, Marly Cormar, Amber Allen, Miriam Pinedo, and Shikha Mehta

What is our mission

Deliver quality data.

Help researchers with the tools, techniques and project management needed to achieve the highest quality data acquisition, processing, analysis and visualization possible.



Data Management

We provide tools for data mining, analysis and visualization that will best support your research. To manage and integrate your findings and results with data, we make use of existing tools such as content and document management systems. Your results will be compatible with a variety of systems from the moment you collect them.

Grants & Compliance

- We craft informatics components and data sharing plans to strengthen grant proposals by leveraging not only our own strengths, but also those of UF Health. We work with both internal and external-facing web teams to propose data sharing mechanisms that are compliant with all regulations, and as a national leader in the informatics community, we share our work and the work of our clients at national conferences and to collaborating peer institutions.

Software & Algorithms

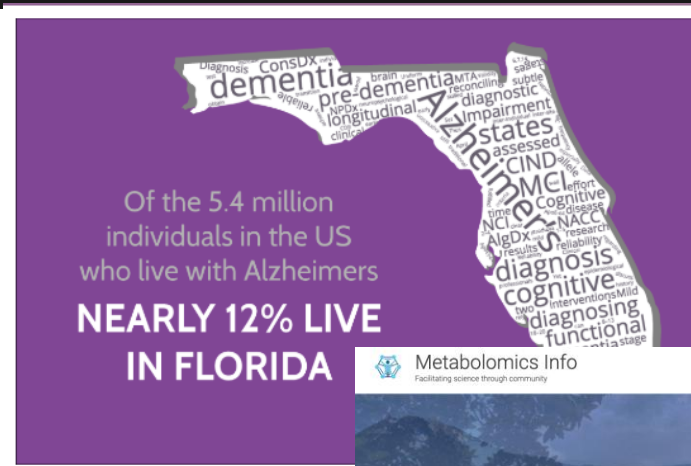
- Our development team designs, implements and maintains custom software and algorithms to meet your scientific requirements. These products are designed to manage and analyze the information you need for your research.



Source: <https://www.onespan.com/blog/five-ways-artificial-intelligence-and-machine-learning-can-fight-financial-fraud>

Who are some our collaborators

- **Dr. Christopher Cogle** - HemOnc: Early Cancer Detection
- **Dr. Steve DeKosky** - McKnight : Neuroscience Research
- **Dr. Timothy Garrett**- Pathology: Mass Spectroscopy and Metabolomics
- **Dr. Todd Golde** - CTRND : 1 Florida ADRC: Clinical Research in Alzheimer's
- **Ms. Gigi Lipori** – UF IDR : Clinical Data Warehousing
- **Ms. Holly Morris**- CRC/CTSI - Clinical Research Tools.
- **Dr. Krista Vandenborne** - PPHP: DMD/Eli Lilly : Muscular Dystrophy MRI
- **Dr. Rick Yost**- Chemistry : M3C : Metabolomics Consortium



Guiding Principles

- Customer Service
- Collaboration
- Open Standards
- Open Science



Source: <https://www.udemy.com/course/machine-learning-masterclass/>

Open Standards

LOINC - For lab tests

Logical Observation Identifiers Names and Codes

MeSH - Medical Subject Headings



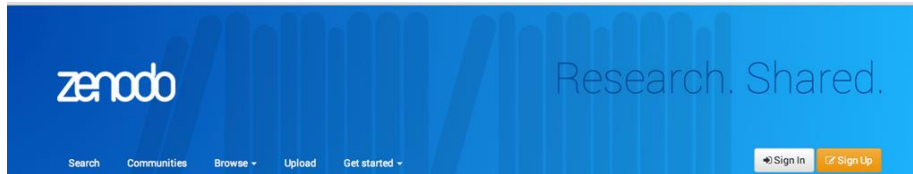
**What did you
mean by "cat"?**



Open Science

Help researchers REPRODUCIBLY publish data and software

- Open Data - Legal right to use
- DOI - make it citable



Open Data Commons is the home of a set of legal tools to help you provide and use Open Data

- [Licenses and Dedications »](#)
- [2-minute Guide to Making Your Data Open »](#)
- [Find Out More About the Project »](#)

If you're wondering about things like: why open data matters? or why do I need this legal stuff, can't I just post my data online? we suggest you check out the FAQ. If you want to know what we mean by **open data** visit the Open Definition which defines open in relation to data and content.

Future

- Help more researchers!
- MACHINE LEARNING & ARTIFICIAL INTELLIGENCE (AI)
- Encourage standards (ontologies and cont.voc. : CDISC, SNOMED, LOINC, UMLS)
- Help people access and use open datasets (use reference data before you have to disambiguate)
- High Quality Data Visualization

SOURCE: [DRIBBBLE.COM](https://www.dribbble.com) BY ANDRII BEZVERSHENKO

Project Stories

Solving informatics problems for researchers with REDCap, R, custom coding and bureaucratic wrangling

Philip Chase
Assistant Director, CTS-IT

Solving informatics problems for researchers with REDCap, R, custom coding and bureaucratic wrangling



Philip Chase
Assistant Director



PRISM Registry

Emily Weber, M.D.

UF Department of Obstetrics and
Gynecology

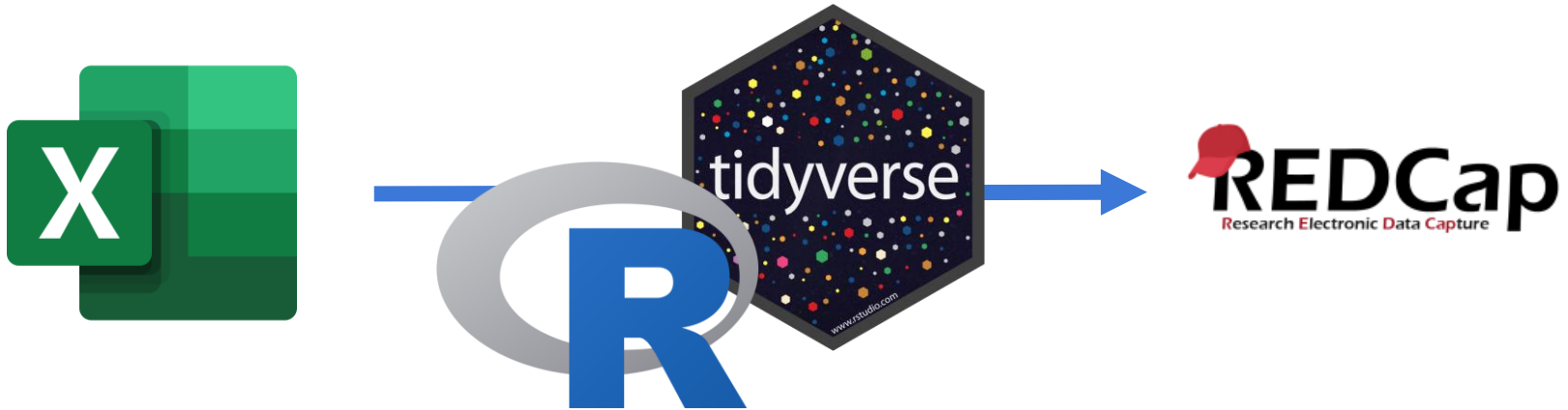


Existing Data

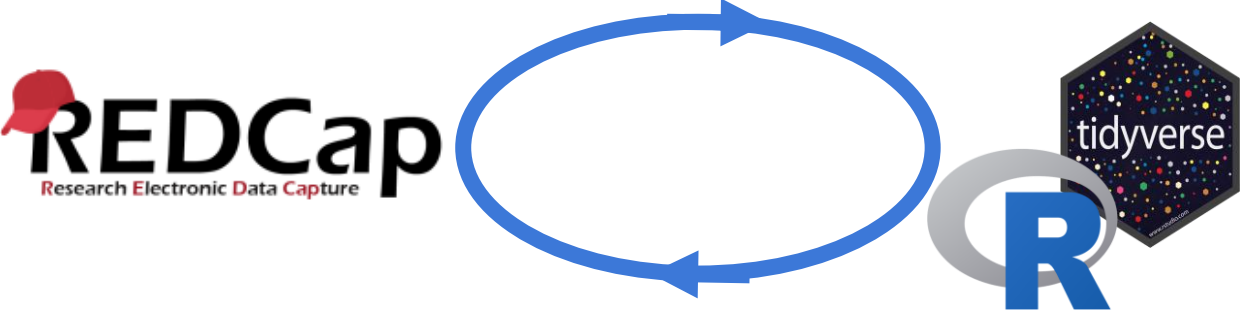
1331 surgeries in an Excel file
Data entry is unwieldy, delayed
Data quality is not enforced
Work is hard to distribute



Solution



Futures



Risky Behaviors Projects

Robert Leeman, PhD

Associate Professor

Dept of Health Education & Behavior

College of Health & Human Performance



Project design - Easy stuff

Survey research

Longitudinal studies

Daily follow-up

Young population



Why REDCap?

Designed for Clinical Research

Great data entry, survey, and data mgmt

3700 Institutions, 1m users, 7100 citations



Project design - Challenge #1

Normative Behavior with graphical feedback

Module title and description

REDCap Chart Field (*redcap_chart_field_v1.1.1*) [View on GitHub](#)

Description: Provides a chart drawing feature for data entries and surveys. Integrates REDCap with third-party chart libraries - currently Charts.js and Chartist are supported. Piping can be used on field configuration, so charts may display facts to survey participants based on their previous answers.

Authors: [Tiago Bember](#) (University of Florida - CTSI), [Philip Chase](#) (University of Florida - CTSI), [Taryn Stoffs](#) (University of Florida - CTSI), [Marly Cormar](#) (University of Florida - CTSI)

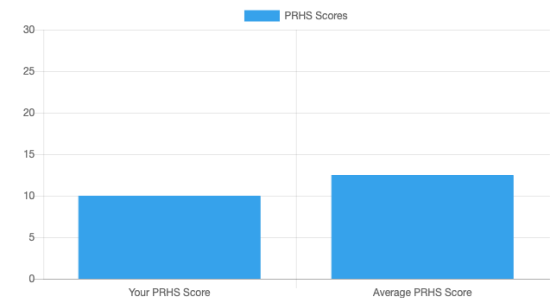
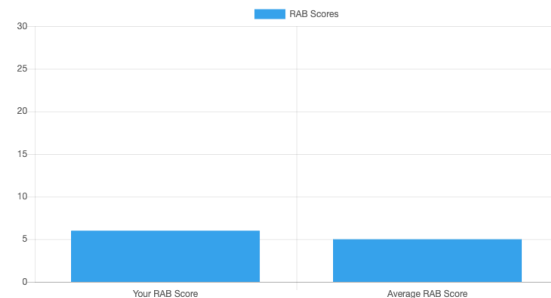
Date
Added

2018-08-24

Downloads

110

You must be a REDCap administrator logged in to REDCap to download modules.



Project design - Challenge #2

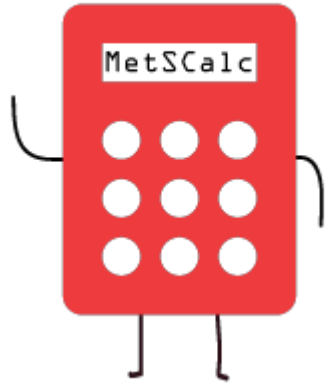
GO! CONFRONT THE PROBLEM!

FIGHT! WIN!



Project Stories

- KEVIN HANSON



Matthew Gurka, Ph.D.

**Professor, Health Outcomes & Biomedical
Informatics**

Associate Director, Institute for Child Health Policy

Business Case

- Existing code for calculator became outmoded through advancing research.
- Changes needed to calculate Metabolic Syndrome Severity Score.
- Previous builds not licensed properly for open-source sharing
- Multi-institutional branding

Solution

- Create GitHub.com organization
- Use GitHub.io free website hosting service
- Register metscal.org since the project is multi-institutional
- Place all code on GitHub.com with open-source Apache2 license
- Develop JavaScript to reflect latest research to calculate severity score
- Style website to showcase the software, how to collaborate, how to cite the work, and access the calculator

MetSCalc.org

The screenshot shows the home page of MetSCalc.org. At the top is a navigation bar with links for About, Calculator, Publications, Code, FAQ, Usage, and Donate. The main content is divided into three sections: 'About', 'Get the Code', and 'FAQ'. The 'About' section features a red calculator icon with 'MetSCalc' written on it and a 'Check it out!' button. The 'Get the Code' section includes a paragraph about the tool's privacy and a 'View Code' button, accompanied by a red heart icon. The 'FAQ' section has a cartoon liver icon with question marks and the heading 'What is the metabolic syndrome?'. The page is clean and user-friendly.

About

MetS Calc, the [metabolic syndrome](#) (MetS) severity calculator, is a browser-based form that calculates an individual's metabolic syndrome severity score using established and well-researched equations. MetS Calc was developed for Dr. Matthew J. Gurka ([University of Florida](#)) and Dr. Mark DeBoer ([University of Virginia](#)) by the [CTS-IT](#).

Check it out!

Get the Code

MetS Calc does not send any information to a server and can be used entirely online. It is written in JavaScript and the source code can be downloaded and modified.

View Code

FAQ

What is the metabolic syndrome?

The screenshot shows the 'Metabolic Syndrome Severity Calculator' form. It has a dark navigation bar with the same links as the home page. The form is titled 'Metabolic Syndrome Severity Calculator' and is divided into 'Demographics' and 'Measurements' sections. The 'Demographics' section includes fields for Birthdate (with an example 'Ex. 1984-12-23'), Sex (radio buttons for Female and Male), and Race and Ethnicity (radio buttons for Hispanic, Non-Hispanic Black, and Non-Hispanic White). The 'Measurements' section includes fields for Height (with a unit dropdown for Centimeters (cm)), Weight (with a unit dropdown for Kilograms (kg)), Waist Circumference (with a unit dropdown for Centimeters (cm)), and Systolic Blood Pressure (with an example 'Ex: 120'). Below these are 'Lab Values' sections for HDL (mg/dL, example 'Ex: 50'), Triglycerides (mg/dL, example 'Ex: 120'), and Fasting Glucose (mg/dL, example 'Ex: 75'). A blue 'Calculate' button is located at the bottom right of the form.

Metabolic Syndrome Severity Calculator

Demographics

Birthdate (if younger than 20 years old)

Ex. 1984-12-23

Sex

Female Male

Race and Ethnicity

Hispanic Non-Hispanic Black Non-Hispanic White

Measurements

Height

Centimeters (cm)

Weight

Kilograms (kg)

Waist Circumference (if available)

Centimeters (cm)

Systolic Blood Pressure (mmHg)

Ex: 120

Lab Values

HDL (mg/dL)

Ex: 50

Triglycerides (mg/dL)

Ex: 120

Fasting Glucose (mg/dL)

Ex: 75

Calculate



Todd Golde, M.D.

Director, McKnight Brain Institute

**Director, 1Florida Alzheimer's Disease Research
Center**

1 Florida ADRC

- New center in 2015
- Clinical site at Mt. Sinai Medical Center in Miami Beach, FL
- Administrative, Data and Neuropath cores in Gainesville, FL

Needs

- Workflows
- Website
- Data management
- Analysis
- Reporting

NACCulator Use Case

- What is the problem we are trying to solve?
 - NACC input format is fixed length (position matters)
 - Need a platform to reliably apply the rule set (500+)
 - Upload data to NACC's data system
- How can we address the problem?
 - Use NACC's web entry system
 - Use SAS
 - **Write software**
- What value is generated from this option?
 - Automated data transfer to NACC
 - Pre-check data issues prior to upload
 - Scheduled data export and upload
 - Modifiable as changes happen

NACCulator

- NACCulator: a translator from CSV to fixed width format
- Written in Python
- <https://github.com/ctsit/nacculator>

```
def header_fields():  
    fields = {}  
    fields['PACKET'] = nacc.uds3.Field(name='PACKET', typename='Char', position=(1, 2), l  
    fields['FORMID'] = nacc.uds3.Field(name='FORMID', typename='Char', position=(4, 6), l  
    fields['FORMVER'] = nacc.uds3.Field(name='FORMVER', typename='Num', position=(8, 10),  
    fields['ADCID'] = nacc.uds3.Field(name='ADCID', typename='Num', position=(12, 13), le  
    fields['PTID'] = nacc.uds3.Field(name='PTID', typename='Char', position=(15, 24), len  
    fields['VISITMO'] = nacc.uds3.Field(name='VISITMO', typename='Num', position=(26, 27)  
    fields['VISITDAY'] = nacc.uds3.Field(name='VISITDAY', typename='Num', position=(29, 3  
    fields['VISITYR'] = nacc.uds3.Field(name='VISITYR', typename='Num', position=(32, 35)  
    fields['VISITNUM'] = nacc.uds3.Field(name='VISITNUM', typename='Char', position=(37,  
    fields['INITIALS'] = nacc.uds3.Field(name='INITIALS', typename='Char', position=(41,
```

How it works

- Install NACCulator:
 - pip install nacculator
 - git clone
git@github.com:ctsit/nacculator.git
- curl -v -d token=123456 -d content=record -d format=csv -d type=flat https://redcap.ctsi.ufl.edu/redcap/api/ > data.csv
- Run nacculator: redcap2nacc -ivp < data.csv > data.txt
- Upload to NACC website

1Florida ADRC

Upload Data Files to the Working Database

File to upload: No file chosen

Allowable file extensions:

.txt - Space separated text (ASCII)

.csv - Comma separated variables

.tsv - Tab separated variables

.sas7bdat - SAS data file

NACCulator Demonstration



Thank you!

- Thank you for listening!
- Questions?