Research IT Information & Exchange Series

Lab Based Research IT

April 14, 2017

Research IT Information & Exchange Series

- **Goal:** To educate pediatric researchers on the Research IT and Informatics resources and expertise available to facilitate their research and to identify areas where we can enhance IT methods to better support research.
- **Format:** One hour sessions led by subject matter experts to present information on the current services and expertise available.
- **Intended audience:** Researchers with an interest in capitalizing on Research IT tools to make their research better. Also, researchers who are interested in using Big Data and Healthcare Analytic approaches in their research.

Research IT Information & Exchange Series:

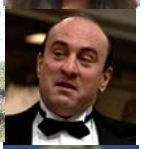
Resources that will be highlighted include:

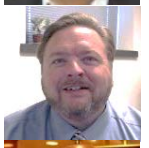
- Freezer monitoring
- Equipment software
- Data storage
- Data sharing
- LabKey

Research IT Information & Exchange Series

Our presenters today







- **Kira Moresco,** Research Laboratory Manager for the Emory Children's Center and the Health Sciences Research Building, Emory University Department of Pediatrics
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- **Robert Migliore,** IT Manager, Emory University Department of Pediatrics
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- **Todd Sharp, MSci, MBA, ITIL, MCP,** Research Technology & Enterprise Intelligence Programs, Manager, IS&T, Children's Healthcare of Atlanta
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- **Tom Quinn, MBA, PMP, CNMT** Division Director, Information Technology, Emory University School of Medicine
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- **Wayne Harris, MSPH**, Research Informatics Analyst, Emory Integrated Computational Core
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- **Patrick Maloney,** Information Technology Manager, Emory Continuing Education, Emory University
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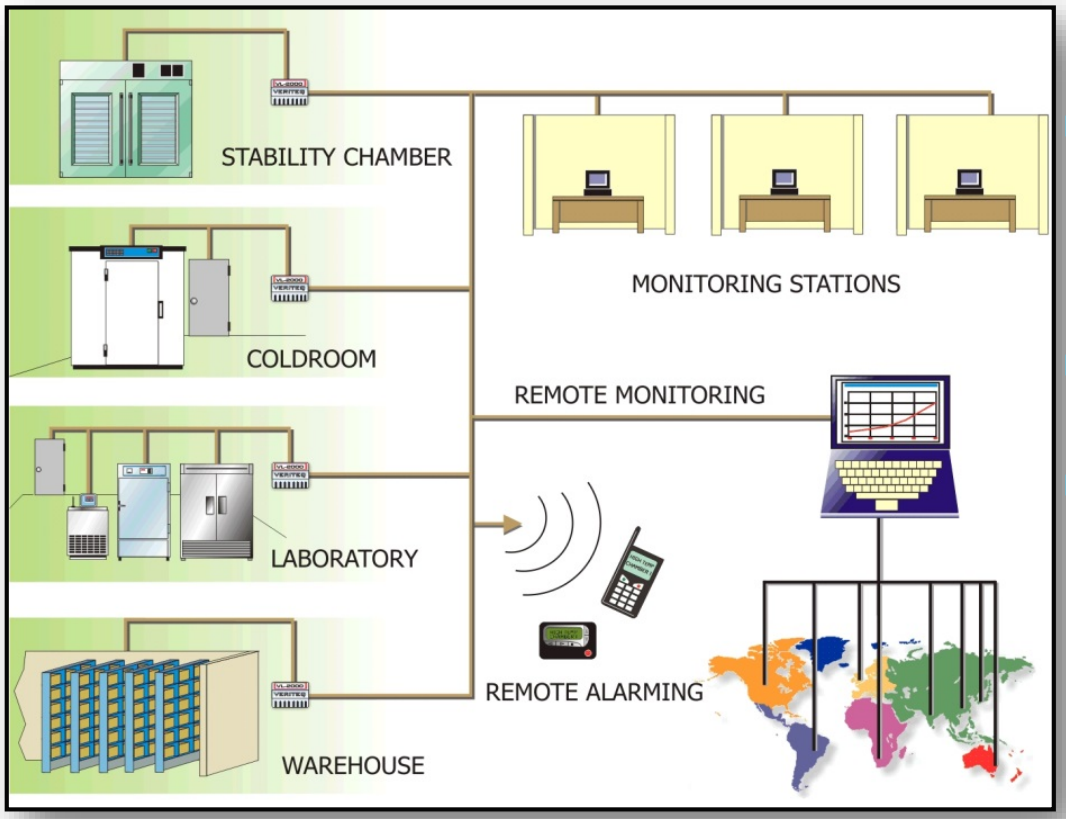
VAISALA

ViewLinc Continuous Monitoring System

General Information



- Real-time monitoring
  - ULT
  - Cold Storage
  - Incubators
- Alarming
  - Threshold dependent
- Automated reporting
  - Customizable for each user

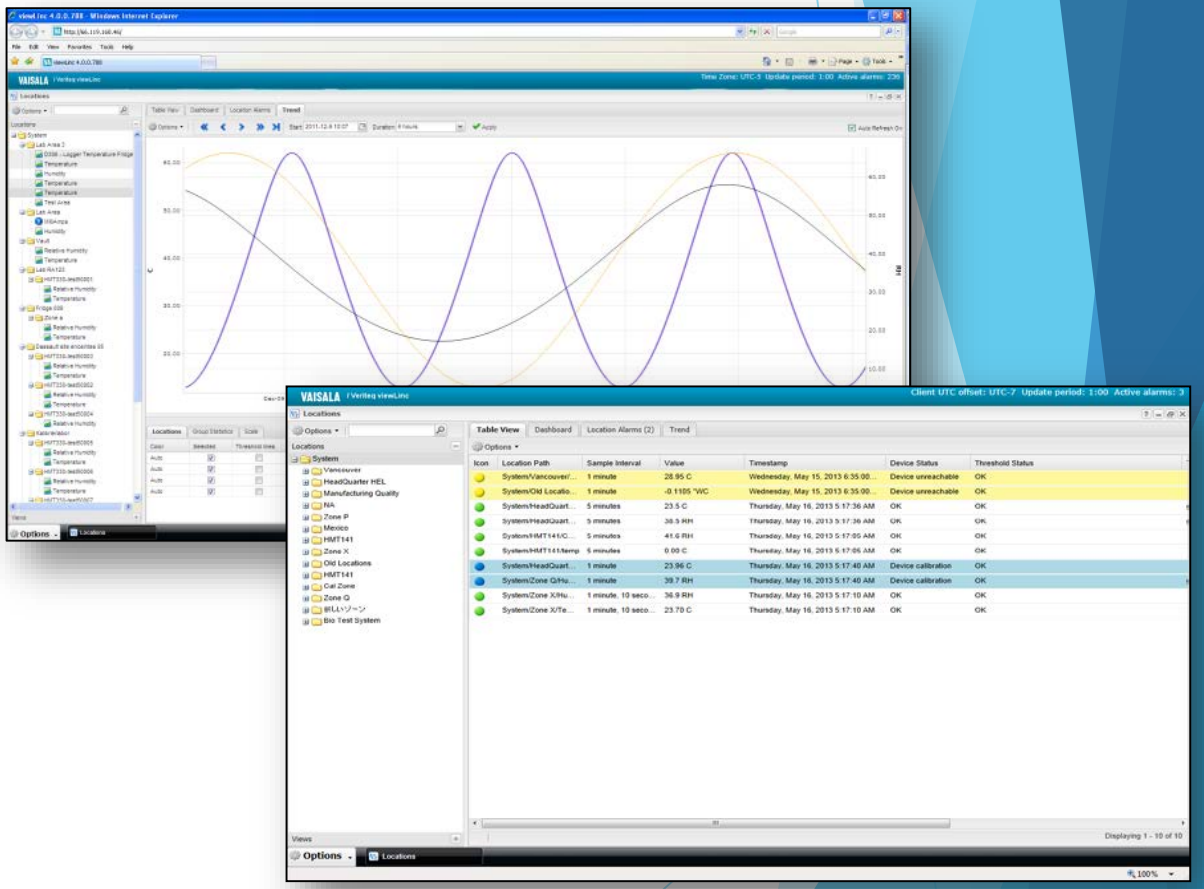
Hardware: DL Series Loggers

- Connect to network
  - PoE
  - Multi-Port Ethernet
- 10-year Battery
  - Low energy Use
- Capabilities
  - Temperature
  - Humidity
  - Contacts
  - Doors
  - Analog signals
  - Differential Pressure

Software: ViewLinc

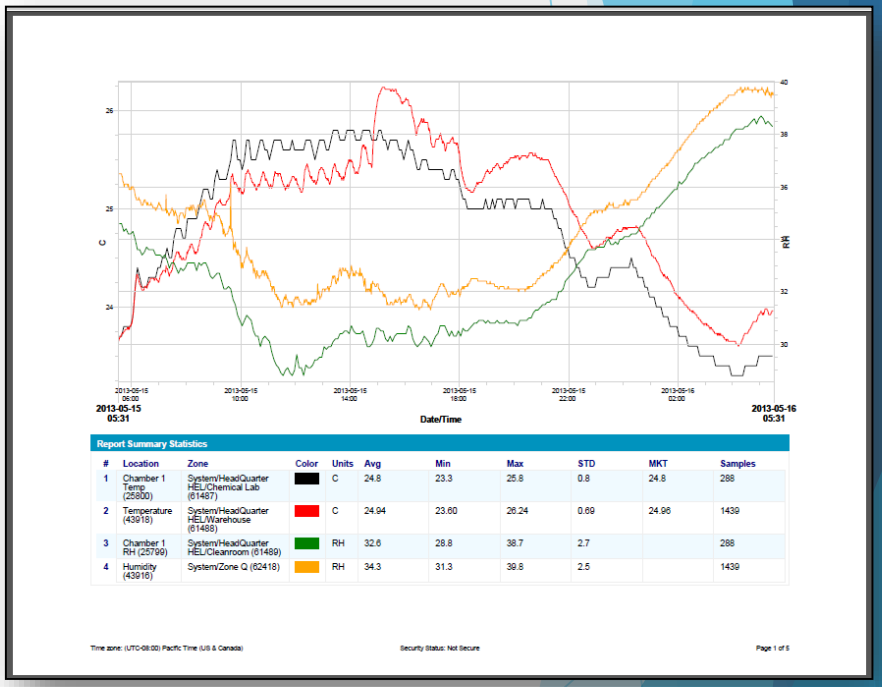
Web Application Database

- All monitored locations on single software installation
- Accessed from web browsers
- Configurable
  - User credentials
  - User permissions
  - User views
- Alarm Notifications
  - Text
  - Email
  - Triage
- Display and Records
  - Real Time Data
  - Historical Data



Software: Audit Trail/Reports

- Audit Trail
  - Gap free records
  - Event log provides a record of any actions taken by ViewLinc users.
  - Provides comments section explaining corrective action.
- Reports
  - Customizable for zones or individual units.
  - Automated reports generated on predetermined schedule.
  - On demand reports generated by user on an as needed basis.



Operating Costs: Hardware & Network

Logger Configuration	Temperature Range	Cost
DL 1016 – 1 Probe Logger	-95C to 70C	$546
DL 1016 – 2 Probe Logger	-95C to 70C	$736
DL 1416 – 3 Probe Logger	-95C to 70C	$1180
DL 1416 – 4 Probe Logger	-95C to 70C	$1337
LN_2 Logger (4 channels)	NA	$623
- LN_2 Temperature Probe	-200C to 200C	$96
DL 2000 – Temperature & Relative Humidity	-35C to 85C 0-100%RH	$761

Network Device	Capability	Cost
Vnet Cradle	One Logger	$252
Digi Ethernet	Two Loggers	$730
Digi Ethernet	Four Loggers	$990

Emory Network	Frequency	Cost
Data Port Activation	One Time	$75
Data Port Fee	Monthly	$21

Investigators are encouraged to discuss potential configurations vs cost with facility manager.

Questions

Lab Equipment Software – Best Practices

Department Data Storage

Robert Migliore
IT Manager
Department of Pediatrics

Lab Equipment Software – Current Environment

- Wide variety of software to run lab equipment and analyze results
- Wide variety of computer configurations
  - Off network, off domain, no anti-virus programs, etc.

Lab Equipment Software – Best Practices

- Engage DOP IT early in procurement, setup and troubleshooting
  - Assist with purchasing equipment
  - Opportunity for IT to learn system from implementation
- Back up, Back up, Back up
  - Backup licenses, backup software, backup contact information

Questions?

Data Storage – Current Environment

- High-performance secure server storage in LITS-managed data centers
- Securely accessible by one or many users from Windows, Apple, and Linux systems across the network (K:, L:, P: and S: drives for Window users)
- HIPAA-compliant, nightly backups and offsite disaster recovery

Cloud Storage – Emory Box

Cloud-based document sharing for faculty, staff and students from anywhere supporting many popular desktop and mobile devices

Features:

- HIPAA-compliant
- 100GB individual quota
- 5GB Max file size
- Complete information at http://it.emory.edu/box/

Emory Box - Tools and Apps

- Box Sync - a tool that allows you to mirror data stored on Box to your desktop. You can then navigate and modify content stored on the Box website through your computer's native file browsing interface, without using a web browser.

- Box Notes - easy-to-use document creation tool that functions natively in Box and also as a separate, downloadable application for your desktop.

- Box for iPhone, iPad and Android - Access, manage, and share all of your content while on the go from your smart device

Emory Box –Emory Trusted Storage Comparison

	Emory Box	Emory Trusted Storage
Location	Cloud-Based	On Campus
Types of information	Approved • HIPAA Not Approved • PCI DSS • FISMA • Any document considered part of the official medical record	Approved • HIPAA • PCI DSS • FERPA • (check on FISMA data)
Max file size	5 GB	No set limit
Max storage space	100GB	Based on pricing

Emory Box –Emory Trusted Storage Comparison

	Emory Box	**Emory Trusted Storage**
Location	Cloud-Based	On Campus
Department of project level "folder	Yes	Yes
Access	Web based Emory data policy does not require Emory data network credentials (netid) This user account must be either: • Emory Box account • Another Academic Box account • Box Lite (free) account	Network accessed based Requires • Emory data network credentials (netid), • VPN access • File location permissions and mapping
Cost to Emory sponsor	$0	$70/TB/Year

Questions?

Children's Data Storage and Sharing for Research

Todd Sharp

Research Technology & Business Intelligence Programs

Children's Healthcare of Atlanta, Manager, IS&T

todd.sharp@choa.org / 404.785.5870 – Anything else, questions, etc.

research@choa.org / Research Data Use Agreements, Data Sharing, Applications, etc.

data@choa.org / Specific Research Data and Report Requests

Children's℠
Healthcare of Atlanta
Dedicated to All Better

Children's Data Storage Overview

- Directory Storage on Network
- 'Big Data' / Data Science – Hadoop 500TB+
- Policy Exception List – Other Cloud Collaboration
- Varonis – Cloud enabling secure private file shares
- Cloud – Pilots for O365 Storage, AWS, More

Children's Data Sharing Overview

- Pediatric Research Alliance
  - Children's – Available data going back to 1985
  - Georgia Tech – CMS – Three part agreement w/PI Request Form
  - Emory – Maternal / Newborn Data Collaboration

Use Case: Data Integration and Enhanced Functionality Using R in Labkey

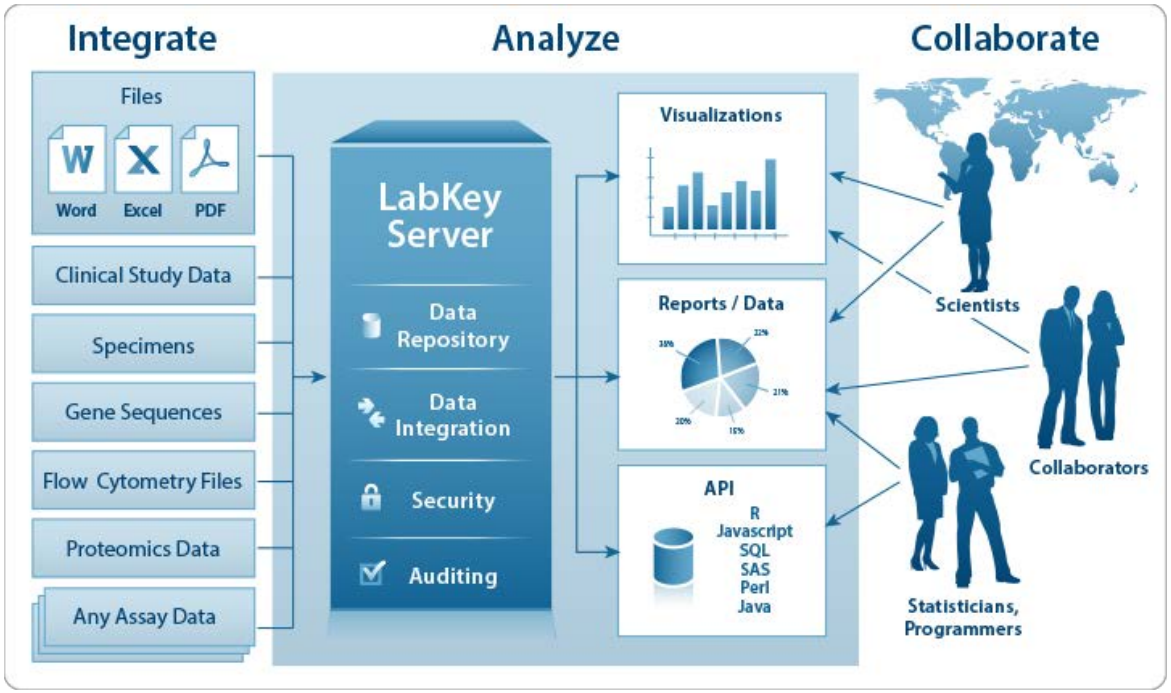
By: Wayne Harris, MSPH
Emory Integrated Computing Core

Previous Discussion

Excel
Access
REDCap (Emory & Children's)
LabKey

- Discussed strengths and weaknesses of these tools in the research setting

Labkey Server Description



Labkey Toolkit

Modules allow us to manage and manipulate data (backend)

- Building data tables (datasets and lists) to collect and store project data
- Importing and integrating data from external databases and schemas
- Interpret experimental assay data using built in or user created templates
- Collaborate with partners through website tools like message boards, wikis and portals
- Perform scripted functions like pipeline processing, ETLs and reporting
- Add additional functionality like R statistical tools, REDCap integration

Plugins allow us to manage the user interface and user data access

- Tabular views of data
- Viewing charts and reports
- Allows us to present content of the modules in the GUI (front end)

Using R in Labkey

The LabKey client library for R makes it easy for R users to load live data from a LabKey Server into the R environment for analysis

It also enables R users to insert, update, and delete records stored on a LabKey Server, provided they have appropriate permissions to do so.

All requests to the LabKey Server are performed under the user's account profile, with all proper security enforced on the server.

Use Case: Integrating and presenting data

(live demo)

We have data from 3 different data sources that we want to integrate

Hospital data, laboratory data, experimental data

We want to see summaries of tabular data

Charts and summary statistics

We want to see a chart data in one table defined by categories in another

I want to look at immune markers defined in one dataset according to groups defined in the imported dataset

We want to perform a simple statistical test on the data

Do a simple linear modelling analysis on the data

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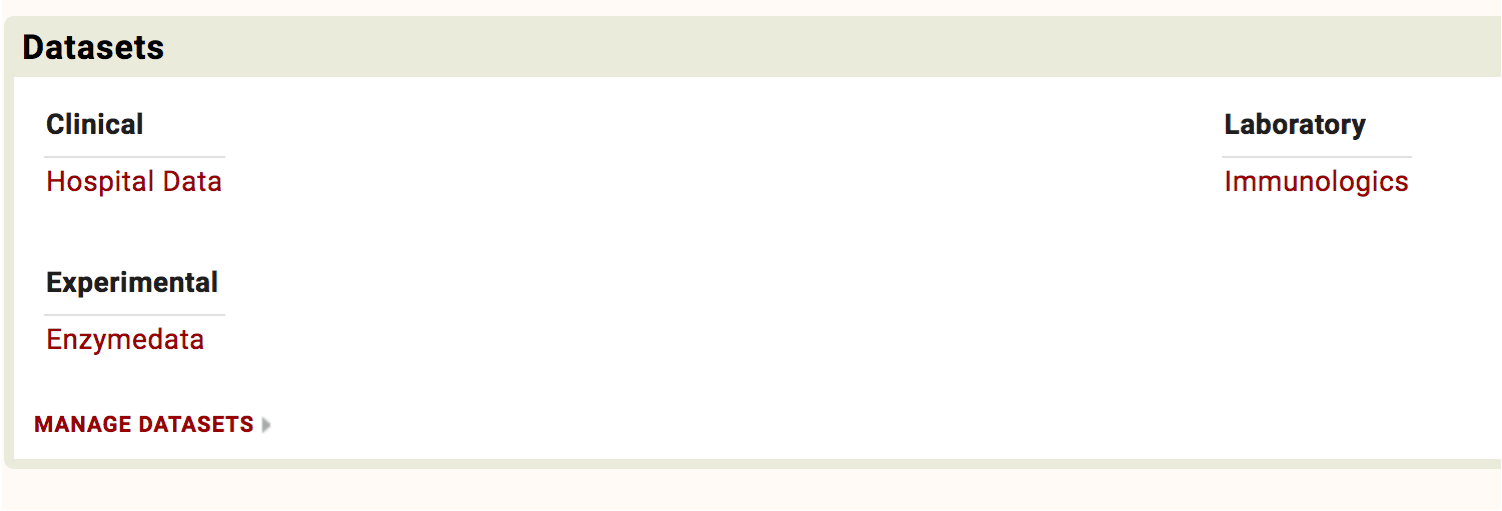

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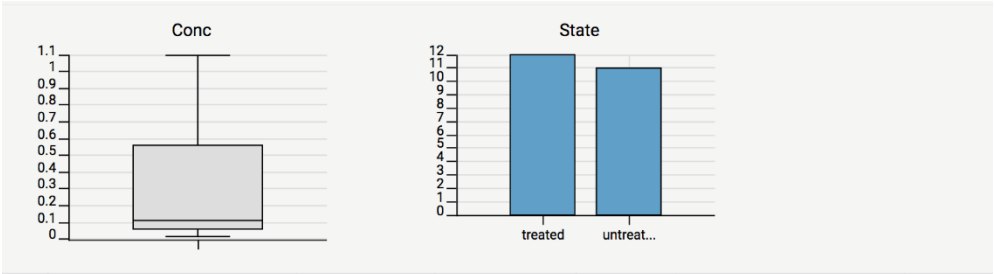

Participant ID	Visit	Visit ID	Date	Conc	Rate
AB030067	1.0000	1.0		0.02	76
AB030083	1.0000	1.0		0.02	47
AB030087	1.0000	1.0		0.06	97
AB030095	1.0000	1.0		0.06	107
AB030099	1.0000	1.0		0.11	123
AB030109	1.0000	1.0		0.11	139
AB030116	1.0000	1.0		0.22	159
AB030117	1.0000	1.0		0.22	152
AB030118	1.0000	1.0		0.56	191
AB030123	1.0000	1.0		0.56	201
AB030136	1.0000	1.0		1.1	207
AB030140	1.0000	1.0		1.1	200
AB030145	1.0000	1.0		0.02	67

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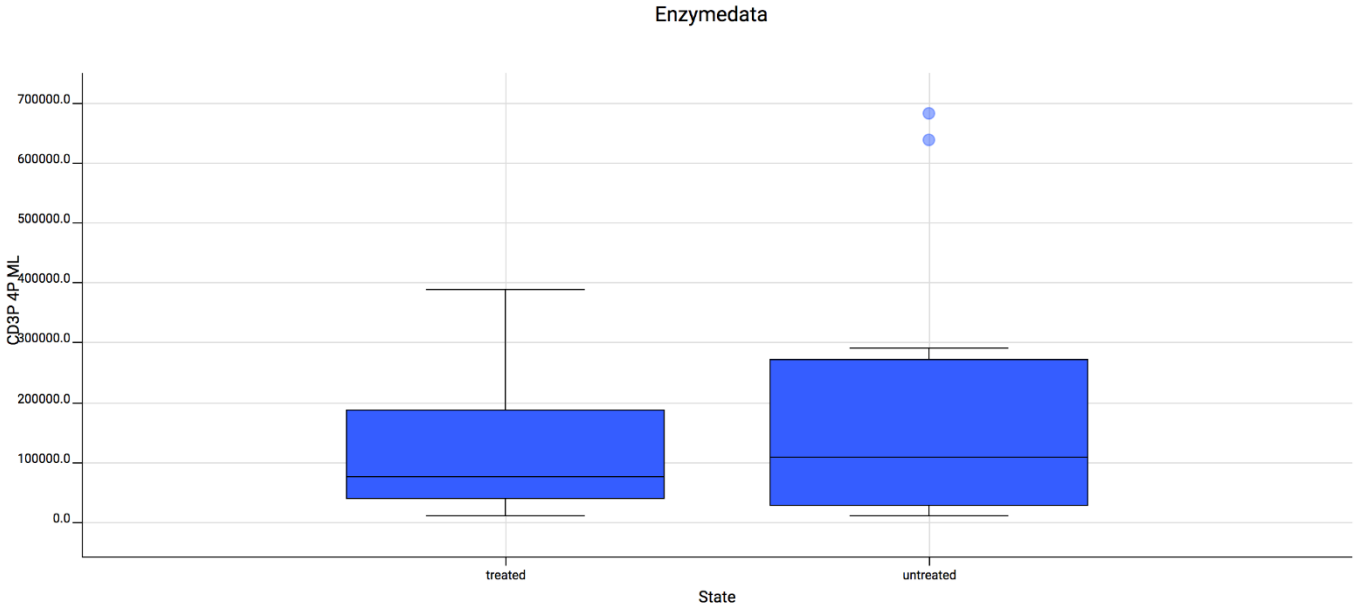

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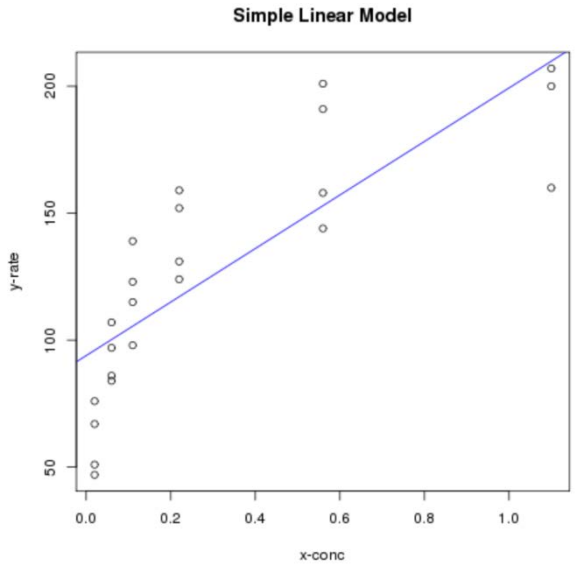


```
Call:
lm(formula = labkey.data$rate ~ labkey.data$conc)

Residuals:
    Min      1Q  Median      3Q     Max
-49.861 -15.247  -2.861  15.686  48.054

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)        93.92       8.00   11.74 1.09e-10 ***
labkey.data$conc  105.40      16.92    6.23 3.53e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 28.82 on 21 degrees of freedom
Multiple R-squared:  0.6489,    Adjusted R-squared:  0.6322
F-statistic: 38.81 on 1 and 21 DF,  p-value: 3.526e-06
```

Last Word

- Labkey server is offered as SAAS to the Emory University research community
- Supported by partnership between the Emory Integrated Computational Core (EICC) and Library and Informational Technology Services (LITS)
- Cost is $125/month or $1500/year (pro-rated)
- If you would like a more formal demo or more information about using Labkey for your project please contact me at

(Emory Integrated Computing Core)
Labkey.help@emory.edu