



THE UNIVERSITY
of
WISCONSIN
MADISON

WNPRC Electronic Health Record
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- What is the Wisconsin National Primate Research Center?
- What is the EHR project?
- Why Choose LabKey Server?
- Live demonstration



What is WNPRC?

- Wisconsin National Primate Research Center (WNPRC)
 - Maintains a colony of non-human primates
 - ~1500 living animals
 - 40 years of data
- Diverse responsibilities
 - Routine care of the animals
 - Regulatory compliance / reporting
 - Research



What is the EHR?

- Electronic Health Record
 - All information about an animal
 - Clinical, laboratory and administrative information

- A Large Project
 - Data on >8000 subjects
 - Over 5 million records
 - Diverse user base (700 total, 200 frequent)



Why We Chose LabKey Server

- Project timeline required platform with proven track record
- LabKey Server used by major research enterprises
- Robust data sharing capabilities
 - Pre-existing support for multiple commonly used platforms
- Support for external analysis and visualization tools
 - R, Perl, Protovis
- LabKey is free and open source.
 - All components including database (PostgreSQL) are also open source
- No EHR resources spent on these capabilities



- ARRA Funded Project
 - 2 year timeline
 - Nov 2009 – Nov 2011
- Contracted LabKey for development of features in core
- EHR built over the LabKey platform using client API
 - See presentation tomorrow for more detail



Integrates Into All Aspects of Operations

- Has changed how our users relate to the information
 - Easier access results in more utilization
 - Lowers the activation energy to perform tasks

- We can quantify our success:
 - ~7500 visits / month
 - ~70,000 pageviews / month
 - and growing...



Live Demonstration





Electronic Health Record



Below are the sections of the Electronic Health Record. If there are additional reports you would like, please submit a request [here](#).

By Animal:

- Animal History
- Animal Search

By Dataset:

- Browse All Datasets
- Clinical Remarks
- Housing Queries
- Protocol and Project Queries

By Location:

- Search By Room, Floor or Cage
- Irregular Obs By Location
- Clinical Remarks By Location

Today At WNPRC:

- Blood Draw Schedule
- Irregular Observations
- Treatment Schedule - AM
- Treatment Schedule - PM
- Treatment Schedule - Night
- Treatment Schedule - All
- Forms Completed Today

Entire Colony:

- Animal Utilization By Category
- Blood Draw Summary
- Colony Population By Age
- MHC Genotype Summary
- Population Summary
- Room Utilization
- Viral Challenges
- Weight: 10% Drop In Last 30 Days
- Weight: 10% Drop In Last 90 Days
- Weight: 10% Drop In Last 6 Months
- More Reports

Validation and Alerts:

- Animals Without Assignments
- Cage Review
- Cages Lacking Dimensions
- Housing: Condition Problems
- Housing: Double Entries
- Loners
- Rooms Without Obs Today
- TB: Untested In >4 Months
- Unweighed In Past 45 Days

Misc:

- About the EHR Project
- Compare Lists of Animals
- Run SQL Directly
- Search WNPRC SNOMED Codes
- Search ALL SNOMED Codes

Data Entry:

- Enter Data
- Download Paper Forms

Request Services:

- Views Requests
- Request Biopsy
- Request Blood Draws
- Request Clinpath Services
- Request Clinpath Services (old)
- Request Necropsy
- Request Project

Admin:

- EHR Admin Page
- Manage EHR Study
- Manage Lookup Tables

All Your Data Under One Roof

Animal History

Type of Search: Single Animal Multiple Animals Current Location Entire Database

Enter Subject Id:

Multiple ways to search

Tabbed access to all data in system

Assay Assignments Clinical Clin Path Colony Management General Pathology Physical Exam Today At WNPRC

← history Full History Plus Obs Irregular Obs Problem List Procedure Codes Surgical History Tasks Treatment Orders Treatments Treatment Schedule Weights

Combine Subjects: No Yes

Weight (kg)

Min Date:

Max Date:

Date

Date	Weight (kg)
1995-08-01	0.5
1997-01-01	2.5
1998-06-01	4.5
1999-11-01	5.5
2001-04-01	8.0
2002-09-01	9.5
2004-02-01	9.0
2005-07-01	10.0
2006-12-01	8.5
2008-05-01	9.5
2009-10-01	9.0
2011-03-01	10.5

Powerful Search Capabilities

Animal Search

This page contains reports identify animals based on multiple criteria.

Browse Animals:

- All Living WNPRC Animals
- All WNPRC Animals
- Assigned To Breeding
- All Living WNPRC Macaques Plus MHC Typing
- Living With SIV
- MHC SSP Data
- Single Housed Animals
- TB: Untested In Past 4 months
- Unassigned Animals
- Unassigned Rhesus Plus MHC Typing
- Unweighed In Past 45 Days

Other Searches:

- Population Summary By Species, Gender and Age
- Find Animals Housed At WNPRC Over A Date Range

Search Animals

Id:	Starts With	<input type="text"/>
Gender:		<input type="text"/>
Status:		<input type="text"/>
Avail:	Starts With	<input type="text"/>
Hold:	Starts With	<input type="text"/>
Species:		<input type="text"/>
Dam:	Starts With	<input type="text"/>
Sire:	Starts With	<input type="text"/>
Origin:		<input type="text"/>
Birth:	Equals	<input type="text"/>
Age (Years, Rounded):	Equals	<input type="text"/>
Age (Years, Rounded):	Equals	<input type="text"/>
Death:	Equals	<input type="text"/>
First Arrival at WNPRC:	Equals	<input type="text"/>

Canned Reports

Easy, Multi-parameter Searches

Complex Integration Across Datasets Without Ever Seeing Code

From any table,
one click access
to wealth of data
about the animal

The screenshot shows a software interface with a top navigation bar containing 'VIEWS', 'EXPORT', 'PRINT', 'PAGE SIZE', and 'MORE ACTIONS'. Below this is a 'Columns' section with a 'Filter' and 'Sort (1)' area. The main area is titled 'Available Fields' and contains a tree view of fields: 'Id' (checked), 'DataSet', 'Age' (expanded to show 'Birth', 'Age (Years, Rounded)', 'Age (Months)', 'Age (Years)', 'Age (Days)', and 'Age'), 'Age Class', and 'Arrival Date'. A 'Show Hidden Fields' checkbox is at the bottom right of the tree. A yellow banner below the tree reads: 'This view is not editable, but you may save a new view with a different name.' Below the banner are 'DELETE' and 'REVERT' buttons. At the bottom, a table header is visible with columns: 'Id', 'Date', 'Charge Type', 'Quantity', 'Unit Cost', and 'Total L'. The table content is empty, with the text 'No data to show.' below it.

Real-Time Data Entry

Treatments

ADD RECORD | ADD BATCH | DELETE SELECTED | SELECT ALL | DUPLICATE SELECTED | BULK EDIT | APPLY TEMPLATE | SAVE AS TEMPLATE

Id: ?

Begin Date: ?

End Date: ?

Project: ?

Account: ?

Short Name: ?

Treatment: ?

Qualifier: ?

Route: ?

Frequency: ?

Drug Conc:

Dosage:

Volume:

Amount:

Remark: ?

Ordered By: ?

Records

Id	Begin Date	End Date	Treatment	Frequency	Vol	Vol Units
	2011-10-06		penicillin g	Daily - AM		[]

Page 1 of 1

No data to display

Immediate Feedback on Errors

- Entered as data is collected
- 1000s of records entered daily
- Can be used on mobile devices like iPADS

A Productivity Tool

WNPRC LabKey Server

Search WNPRC LabKey Server

WNPRC WNPRC Units WNPRC Labs Electronic Health Record Quick Search Help

Data Entry

Manage Tasks Manage Requests

My Tasks All Tasks Tasks By Room Tasks By Id Review Required

VIEWS EXPORT PRINT PAGE SIZE DUPLICATE 1 - 100 of 592 Next Last

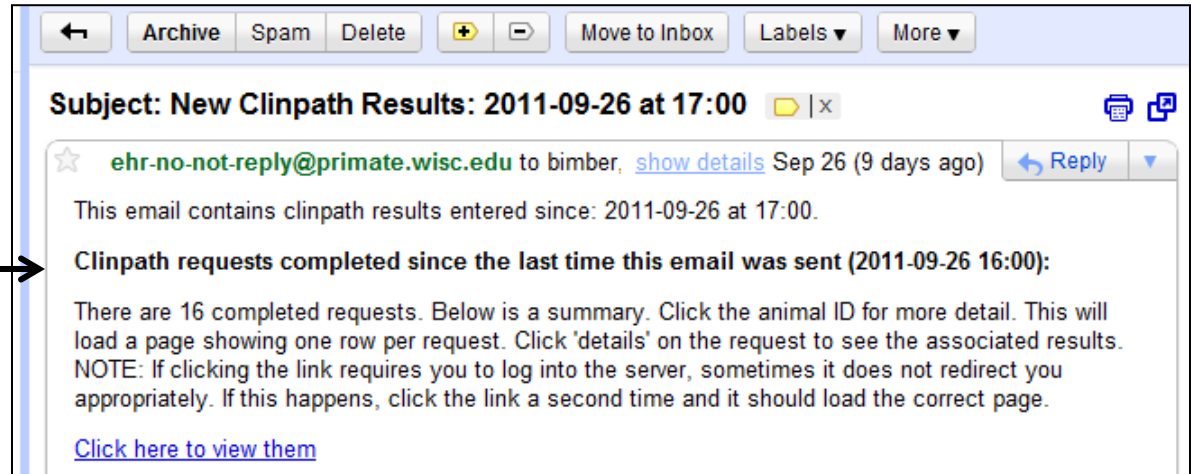
<input type="checkbox"/>	Task Id	Title	Due Date	Created	Status
<input type="checkbox"/>	19131	Problem List	2011-10-05 21:10	2011-10-05 21:11	Completed
<input type="checkbox"/>	19130	Treatment Orders	2011-10-05 21:09	2011-10-05 21:10	Completed
<input type="checkbox"/>	19118	Clinical Remarks	2011-10-05 15:13	2011-10-05 16:12	In Progress
<input type="checkbox"/>	19001	Problem List	2011-10-05 10:24	2011-10-05 10:25	Completed
<input type="checkbox"/>	18999	Treatment Orders	2011-10-05 10:21	2011-10-05 10:21	Completed
<input type="checkbox"/>	18994	Clinical Remarks	2011-10-05 09:31	2011-10-05 09:53	Completed
<input type="checkbox"/>	18775	Physical Exam	2011-10-04 09:10	2011-10-04 12:25	Completed
<input type="checkbox"/>	18780	Physical Exam - NWM	2011-10-04 09:00	2011-10-04 12:47	Completed
<input type="checkbox"/>	18628	Clinical Remarks	2011-10-04 08:23	2011-10-04 08:28	Completed
<input type="checkbox"/>	18623	Clinical Remarks	2011-10-04 08:19	2011-10-04 08:21	Completed
<input type="checkbox"/>	18617	Problem List	2011-10-04 08:15	2011-10-04 08:17	Completed
<input type="checkbox"/>	18499	Problem List	2011-10-03 17:29	2011-10-03 17:30	Completed
<input type="checkbox"/>	18327	Treatment Orders	2011-10-03 12:15	2011-10-03 12:17	Completed
<input type="checkbox"/>	18347	Clinical Remarks	2011-10-03 10:50	2011-10-03 13:06	Completed
<input type="checkbox"/>	16734	Clinical Remarks	2011-09-27 07:20	2011-09-27 07:46	Completed

Save drafts of forms. Track progress of current and future work from one place



More Than Just A Website

Automatic emails
push information
to users



Quality Control

- Real-time error checking on data at import
 - Immediate feedback to user
 - Catches many problems before they're even entered, at a time when they are easily fixed.
- Over 35 automated checks of the data run each day
 - Identify incomplete records
 - Alerts of conditions that should not exist (like an animal listed as housed in 2 places at once)
- Very easy to expand and adapt over time

Acknowledgements

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Management:

- Jon Levine
- David O'Connor
- Saverio 'Buddy' Capuano
- Jim Butts

Colony Records Staff:

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- Marta Koch
- Les Sander

ITSS:

- Tom Lynch
- Jayne Vanderwerker
- Aiping Wan

Clinical / Animal Care Staff:

- Jenny Coonen
- Christina Cruzen
- Jen Post
- Kristin Crosno
- Heather Simmons
- Molly Kelley

Any many more...