LabKey User Conference 2016: Tech Workshop

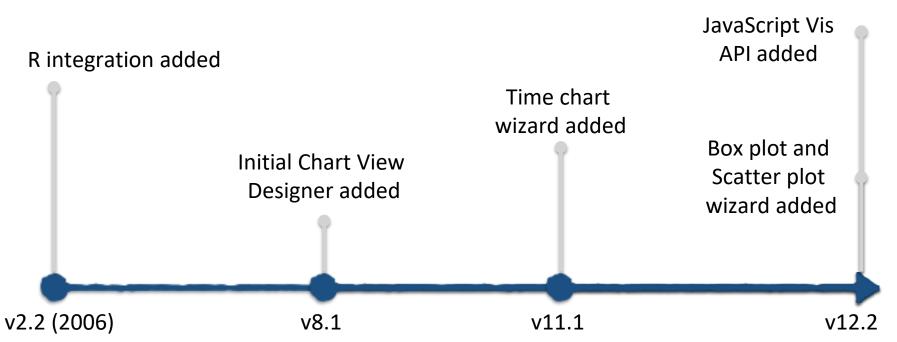
Cory Nathe Senior Software Engineer <u>cnathe@labkey.com</u>

10/07/16

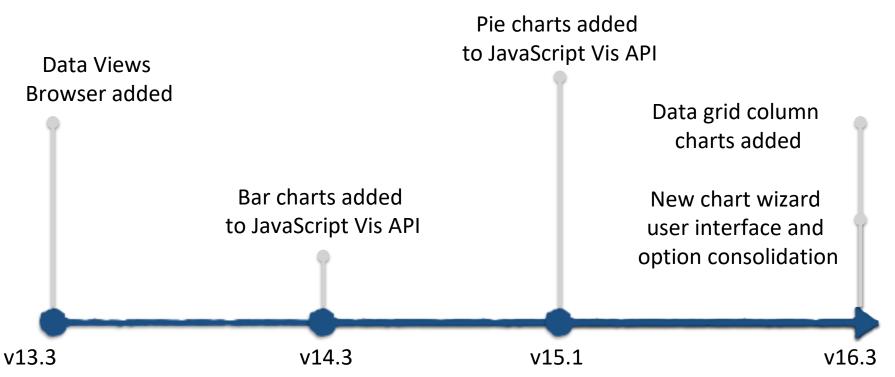


 History of visualizations in LabKey Creating and sharing visualizations in LabKey What has changed or been added in the last year? Potential future areas of focus <u>User</u> scenarios

### History of visualizations in LabKey



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# History of visualizations in LabKey

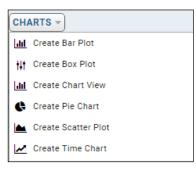
- v2.2 (2006)
  - R integration added
- v8.1
  - Initial Chart View Designer added
- v11.1
  - Time chart wizard added
  - JavaScript client-side reports added
- v11.2 v12.1
  - Time chart plotting multiple measures on a single axis
  - Time chart visit and date based x-axis, group aggregate lines, group by cohorts and subject groups
  - Time chart add support for error bars
- v12.2
  - JavaScript Vis API added combines the D3 and Raphael javascript libraries
  - Box plot and Scatter plot wizard added
  - Quick Chart added as data grid column menu option
  - Time chart new look and feel for chart editing environment
- v12.3
  - Time chart query-based columns available for charting
  - Box/Scatter plot allow color-coded data points

- v13.2
  - Knitr create dynamic R reports by interweaving R code in HTML or Markdown pages
  - Time chart improved scaling and trellising
  - Autogenerate thumbnails for charts
- v13.3
  - Data Views Browser added
  - Export charts (time, box, and scatter) to JavaScript
- v14.1
  - Brushing configuration options added to JavaScript Vis API
- v14.3
  - Bar charts added to JavaScript Vis API
  - Binning added to JavaScript Vis API
- v15.1
  - Time chart handle larger numbers of participants
  - Pie charts added to JavaScript Vis API
  - Levey-Jennings plot helper added to JavaScript Vis API
  - Survival Curve plot helper added to JavaScript Vis API
- v16.2
  - Timeline Report plot helper added to JavaScript Vis API
- v16.3
  - Data grid column charts added
  - New chart wizard user interface and option consolidation

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# Built-in report and chart types

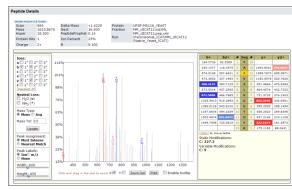
- From a data grid, the **Charts** menu includes (<u>docs</u>)
  - Box Plot
  - Scatter Plot
  - Time Chart Study Module
  - Bar Chart New in v16.3
  - Pie Chart New in v16.3
- From a data grid, the **Reports** menu includes (docs)
  - R Report
  - JavaScript Report
- From the Data Views webpart (docs)
  - All of the above
  - Attachment Report



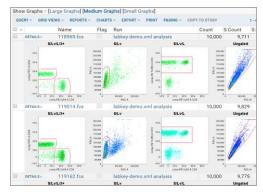


### Built-in assay visualizations

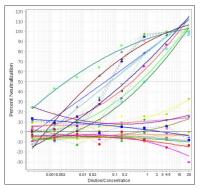
#### Proteomics (docs)



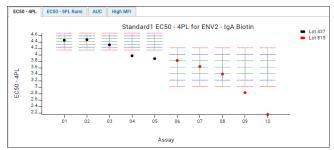
#### Flow Cytometry (<u>docs</u>)



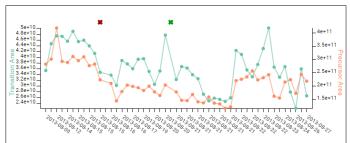
#### Neutralizing Antibody (docs)



#### Luminex (docs)



#### Panorama (docs)



### LabKey JavaScript Visualization API

LABKEY.vis.Plot JS API allows users to programmatically create a plot using configuration options to control which layers are included, scales, interactions, and look and feel.

#### Shapes / Geoms

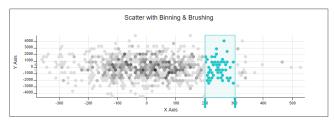
- Point / Bin /Path
- ErrorBar / BoxPlot / BarPlot

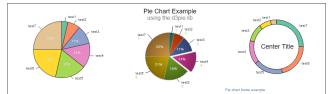
#### Interactions

- Callback function for point click
- Callback function for mouse over/out
- Brushing (1D, 2D)

Plot Helpers

 BarPlot, PieChart, LeveyJenningsPlot, SurvivalCurvePlot, TimelinePlot







### External data analysis

- LabKey Client APIs (<u>docs</u>)
  - Supported programming languages: JavaScript, Java, Perl, Python, R, SAS
  - Access data from study datasets, lists, external schemas, etc.
  - All APIs are executed within a user context with normal security and auditing applied
  - Export data grid as a script to get you started (docs)



- Export filtered data grids to a file
  - Formats: Excel (.xlsx and .xls), Text (tab, comma, colon, or semicolon separated)

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### Added in LabKey Server v16.2

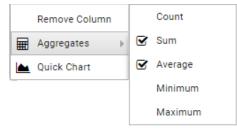
### Column visualizations

• Small charts for one column of data, including Bar Charts, Box Plots, and Pie Charts (docs)

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Ŧ		Participant ID	Date	Start Date	Country	Primary Language	Gender	Treatment Group	Cohort	Status of Infection
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	EDIT »	110349	2008-04-28	2008-04-28	USA	French	m		Group 2: HIV-1 Negative	
	EDIT »	119180	2008-04-20	2008-04-20	USA	English	f	No ARV	Group 1: Acute HIV-1	
	EDIT >	125478	2008-04-28	2008-04-28	USA	English	m	ARV	Group 1: Acute HIV-1	
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	EDIT »	120902	2008-04-29	2008-04-29	USA	German	t		Group 2: HIV-1 Negative	
	EDIT » EDIT »	133428	2008-04-29	2008-04-29	USA	German	t m	ARV	Group 2: HIV-1 Negative Group 1: Acute HIV-1	
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### Other changes or additions to v16.2

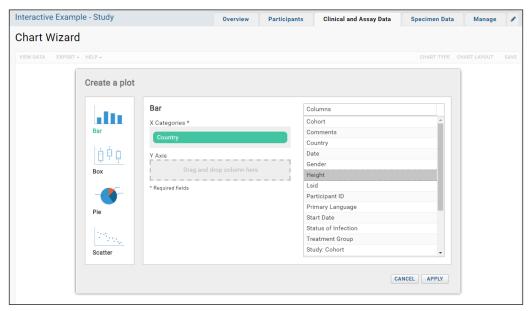
- Column aggregates and other menu options
  - Display aggregate values at the bottom of a data column (docs)
  - Quick "Remove Column" from a data grid (docs)



- Improved menu layout for data grids
  - "Grid Views", "Reports", "Charts" (docs)
- R Markdown v2
  - Markdown v2 is now supported when creating knitr R reports (docs)

### Changes in LabKey Server v16.3

- Updated chart wizard user interface with addition of Bar and Pie Chart
- Column visualization click-through to chart wizard



### Other additions to v16.3

LABKEY.vis.TimelinePlot added to the JavaScript Visualization API



### What has changed or been added in the last year?

Demo



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# Potential future areas of focus

- Additional column summary statistics
  - # blank values, count distinct, median, mode
- Incorporate Time Chart into the chart wizard user interface
- More chart types
  - line plots, grouped bar plots
- Basic statistics
  - t-test, chi-square, sum of squares
- Pivot charts and/or additional grouping mechanisms in plots
- More charting interactions and plot specific options
  - Brushing to filter/zoom, point highlighting, tooltips

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User scenarios

Demo



# Thank you

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