

Proficient - Project Dashboards

Project Dashboards

Project Dashboards are pages with dynamic content that can be added to a project. They can utilize special Smart Variables called Smart Functions, Smart Tables, and Smart Charts (described below) that can perform aggregate mathematical functions, display tables of descriptive statistics, and render various types of charts, respectively. User access privileges are customizable for each dashboard, and anyone with Project Design privileges can create and edit them.

A Wizard is provided on the Project Dashboard creation page to help users easily construct the syntax for Smart Functions, Smart Tables, or Smart Charts, and a basic list of helpful examples is also included. Example dashboard:

<https://redcap.link/dash1>

- Setting project dashboards as “public”

1. If enabled at the system-level (described in detail below), any project dashboard can be enabled as “public”, which means it can be accessed at a unique URL that does not require any authentication. Making a dashboard public is useful if you wish for people to view it without having to be REDCap users or log into REDCap. Public dashboards are simply standalone pages that can be viewed by anyone with a link to them.

2. Users can opt to create a custom/short url (via the <https://redcap.link> service) for any project dashboard that is enabled as “public”.

3. System-level setting to allow/disallow public dashboards (on the User Settings page in the Control Center) - By default, normal users will be able to set any project dashboard as public. If you do not want users to do this or even know about this feature, you can completely disable it on the User Settings page. Alternatively, it can be set to “Allow public dashboards with admin approval only”. If set to allow public dashboards after approval by an admin, the admin will receive the request from the user via the To-Do List page (and via email, if the email notification setting is enabled on the To-Do List page), and after the admin approves the request, the user will receive an email regarding the response to their request.

- Setting to control data privacy on public dashboards and other public pages

1. The User Settings page in the Control Center has a setting to define the “Minimum number of data points required to display data for any Smart Charts, Smart Tables, and Smart Functions on a *public* project dashboard, survey queue, or survey page”. By default, it is set to a value of “11”. While only aggregate data is displayed in Smart Charts, Smart Tables, and Smart Functions, if any of these utilize very few data values, it might pose a threat to an individual’s data privacy if these are being displayed on *public* dashboards and other public pages (i.e., where authentication is not used).

2. If someone is viewing a public page that has Smart Charts, Smart Tables, and Smart Functions that utilize data that does not meet the minimum data point requirement, instead of displaying the chart/table/number on the page, it will instead display a notice saying “[INSUFFICIENT AMOUNT OF DATA FOR DISPLAY]” with a pop-up note with details about the minimum data requirements.
3. Project-level override: While this behavior is controlled by a system-level setting, the system level setting can be modified by an administrator via a project-level override for any given project on the “Edit A Project’s Settings” page.
4. Note: This setting does not get used when viewing project dashboards inside a project (i.e., at a non-public URL).

- PDF export: Each project dashboard can be exported as a one-page PDF file.
- Dashboard cache: To prevent server performance degradation, each project dashboard will have its content cached (stored temporarily) automatically for up to 10 minutes at a time rather than generating its content in real time every time the dashboard is loaded. It will note at the top right corner of the dashboard page when the dashboard content was last cached. If a user is viewing the dashboard inside a project (i.e., not via a public dashboard link), they have the option at the top right to “Refresh” the dashboard at will, which will refresh/generate its content in real time. Note: The refresh option will only be displayed on the page when the dashboard content is at least 30-seconds old.

Smart Functions

- Smart Functions are aggregate mathematical functions that are utilized as Smart Variables. The following Smart Functions exist: [aggregate-min], [aggregate-max], [aggregate-mean], [aggregatemedian], [aggregate-sum], [aggregate-count], [aggregate-stdev], and [aggregate-unique]. Each represents the mathematical functions minimum, maximum, mean/average, media, sum, count, standard deviation, and unique count, respectively. Each must have at least one field attached to it that follows a colon - e.g., [aggregate-mean:age]. Multiple fields may be used in each one, which will perform the function over all the data values of all the fields. By default, the functions will utilize all data values for all records in the project. To limit the data values being utilized to a subset of the total project data, see the Smart Variable documentation on how to apply filters, such as attached unique report names, DAGs, and other parameters
- Note: When using [aggregate-count:record_id], in which “record_id” in this example represents whatever the variable of the Record ID field is, it performs a special count that does not literally count the number of data values but instead

returns a count of the total number of records in the project. This is a quick way to display the total record count of the project.

- Smart Functions can be used anywhere in a project where piping is allowed, and can even be used inside calculations, branching logic, and other conditional logic (report filters, alert conditions, etc.).

Smart Tables

- Smart Tables are tables displaying aggregate descriptive statistics in which the results of any or all of the following stats functions can be displayed for one or more fields: minimum, maximum, mean/average, media, sum, count, standard deviation, count of missing values, and count of unique values.
- Smart Tables are represented with the Smart Variable [stats-table], which accepts as a parameter the variable names (comma delimited) of all the fields to be displayed as separate rows in the table. There is no limit to the number of fields that can be used. For example, [stats-table:field1,field2,field3]. • By default, all available columns will be displayed in the table and are as follows: Count, Missing, Unique, Min, Max, Mean, Median, StDev, Sum. To display only a subset of the columns, you may provide any of the following designations (comma-separated) that represent a specific column in the table: count, missing, unique, min, max, mean, median, stdev, sum. For example, [statstable:field1,field2,field3:mean,max].
- By default, each stats table will have an "Export table (CSV)" link displayed immediately below it to allow users to download the table as a CSV file. But if users wish to hide the export link, they can simply attach ":no-export-link" to the Smart Variable, which will cause the link not to be displayed. For example, [stats-table:field1,field2,field3:no-export-link].
- Smart Tables can be used anywhere in a project where piping is allowed.

Smart Charts

- Smart Charts are various aggregate plots and charts utilized as different Smart Variables. The following plots are available for use: bar charts, pie charts, donut charts, scatter plots, and line charts. These are all represented by the following Smart Variables, respectively: [bar-chart], [pie-chart], [donut-chart], [scatter-plot], and [line-chart]. These Smart Variables accept one or more field names and also other optional parameters, as described below for each.

- Bar charts - Displays a bar chart for a single multiple choice field. It can optionally perform color grouping if a second field (multiple choice only) is provided. The fields must be comma-separated. For example, [bar-chart:field,grouping-field:parameters]. Bar charts have optional parameters that can be applied to alter their appearance. By appending the parameter “:bar-stacked” when two fields are used, the bars in the chart will appear stacked on top of each other rather than side by side. By default, bar charts are displayed with their bars going horizontally, but by appending the parameter “:bar-vertical”, the orientation will be changed to display vertically instead.
- Pie charts - Displays a pie chart for a single multiple choice field. For example, [pie chart:field:parameters].
- Donut charts - Displays a donut chart for a single multiple choice field. Note: A donut chart is essentially the same as a pie chart but with the center removed. For example, [donut-chart:field:parameters].
- Scatter plots - Displays a scatter plot of one number/date/datetime field for the x-axis and a second field (number field only) for the y-axis. (If a second field is not provided, a random value will be assigned for the y-axis.) It can optionally perform color grouping if a third field (multiple choice only) is provided. All fields must be comma-separated. For example, [scatter-plot:x-axis-field,y-axisfield,grouping-field:parameters].
- Line charts - Displays a line chart of one number/date/datetime field for the x-axis and a second field (number field only) for the y-axis. It can optionally perform color grouping if a third field (multiple choice only) is provided. All fields must be comma-separated. Note: A line chart is essentially the same as a scatter plot except with dots connected with a line. For example, [line-chart:x-axis-field,y-axisfield,grouping-field:parameters].
- Color blindness accessibility: Pie charts and donut charts have the ability for the user to enable color blindness accessibility, via a gray link displayed immediately below each chart, in which it overlays different patterns onto the colored pieces of the chart to make each color more distinct for many types of color blindness. This option to enable color blindness accessibility is stored in a secure cookie on the user’s device and will be used to remember this choice anytime a pie/donut chart is displayed on any

page for any REDCap project for that REDCap server.

- The colors displayed in each chart/plot are preset and are not modifiable.

- Smart Charts can be used anywhere in a project where piping is allowed **except** for inside the body of outgoing emails.
- Optional parameters for Smart Functions, Smart Tables, and Smart Charts
 - There exist various optional parameters that can be used with Smart Functions, Smart Tables, and Smart Charts to either filter the data used in them (e.g., via a unique report name) or to change their appearance (e.g., bar-vertical). See the descriptions for each below, which are all documented in the Smart Variables documentation.
 - `:R-XXXXXXXXXX` Unique Report Name - For Aggregate Functions, Charts, and Tables, filter the data being used by appending a Unique Report Name. Next to each report on the 'My Reports & Exports' page is its unique report name, which has 'R-' following by alphanumeric characters. By default, all Aggregate Functions, Charts, and Tables will use the values of all records in the project, but if a unique report name is appended to any of them, only data from that specific report will be used. Using a report as a surrogate to filter data is a very useful technique of performing complex filtering logic for Aggregate Functions, Charts, and Tables.
 - `:record-name "record-name"` - For Aggregate Functions, Charts, and Tables, filter the data being used to the **current record** by using the literal value 'record-name'. Note: This parameter will only work in a context where a single record is being viewed/accessed, such as on a survey page, data entry form, etc. This parameter can be used with any of the other parameters except unique report names.
 - `:event-name "event-name"` - For Aggregate Functions, Charts, and Tables, filter the data being used to the **current event** (longitudinal projects only) by using the literal value 'event-name'. Note: This parameter will only work in a context where a single record/event is being viewed/accessed, such as on a survey page, data entry form, etc. This parameter can be used with any of the other parameters except unique report names.
 - `:unique-event-names` Unique Event Names - For Aggregate Functions, Charts, and Tables, filter the data being used to specific events (longitudinal projects only) by providing an event's unique event name (found on the Define My Events page). You may use one or more unique event names (comma-separated). Note: This parameter can be used with any of the other parameters except unique report names.
 - `:user-dag-name "user-dag-name"` - For Aggregate Functions, Charts, and Tables, filter the data being used to the records assigned to the **current user's Data Access Group** by using the literal value 'user-dag-name'. Note: This parameter will only work in a context where an authenticated user

belongs to a project and has been assigned to a DAG in the project (this excludes survey pages and public project dashboards). This parameter can be used with any of the other parameters except unique report names.

- :unique-dag-names Unique DAG Names - For Aggregate Functions, Charts, and Tables, filter the

data being used to the records assigned to specific Data Access Groups by providing a DAG's unique group name (found on the Data Access Groups page). You may use one or more unique DAG names (comma-separated). Note: This parameter can be used with any of the other parameters except unique report names.

- :bar-vertical "bar-vertical" - Display a bar chart with the bars going vertically instead of horizontally (the default) by using the literal value 'bar-vertical'. Note: This parameter can be used with any of the other parameters.
 - :bar-stacked "bar-stacked" - Only for bar charts using two fields, display the bar chart with the bars stacked on top of one another for each choice. Whereas the default view is that the bars of each field are displayed side by side to show the color grouping. To enable this, use the literal value 'bar-stacked'. Note: This parameter can be used with any of the other parameters.
 - :no-export-link "bar-stacked" - Only for bar charts using two fields, display the bar chart with the bars stacked on top of one another for each choice. Whereas the default view is that the bars of each field are displayed side by side to show the color grouping. To enable this, use the literal value 'bar-stacked'. Note: This parameter can be used with any of the other parameters.
- NOTE: Using Smart Functions/Tables/Charts elsewhere in a project - While project dashboards are an excellent place to use Smart Functions, Smart Tables, and Smart Charts, it is important to know that Smart Functions/Tables/Charts can actually be used **almost anywhere** in a project, such as on data entry forms, on survey pages, and in report instructions (to name a few). You can use Smart Functions/Tables/Charts anywhere that piping can be used. Click the green "Smart Variables" button on the Project Setup page to learn more about them. Note: The only place that Smart Charts cannot be used is inside the body of outgoing emails.

- NOTE: Smart Functions/Tables/Charts do not yet work in the REDCap Mobile App; however, it is planned that they eventually will (to a certain degree).
- NOTE regarding permissions for Smart Functions/Tables/Charts:
 - DAG permissions (i.e., filtering out records not assigned to the current user's DAG) are NOT applied by default to Smart Charts/Tables/Functions but are only applied when the Smart Chart/Table/Function utilizes a unique report name as a parameter (thus mimicking the natural DAG-filtering behavior of reports themselves) OR when the Smart Chart/Table/Function utilizes the "user-dag-name" parameter. This means that if a user is assigned to a DAG and views a project dashboard with the Smart Chart [scatter-plot:weight], for example, the plot will display data for ALL records in the project and not just the user's DAG. To limit the plot to just data in the user's DAG, it could be changed to [scatter-plot:weight:user-dag-name] in this case.
 - Smart Charts/Tables/Functions that utilize a unique report name as a parameter for data filtering purposes will still function and display normally even if the user does not have explicit access to view that specific report referenced as a parameter.

PROJECT DASHBOARD EXAMPLE

Test Project PID 32199

Project Dashboard Example 1

Displaying information generated 6 minutes ago [Refresh](#)
[Edit](#) [Export as PDF](#)

SMART FUNCTIONS are aggregate mathematical functions that are applied across ALL records in a project. Smart Functions include **min, max, mean, median, sum, stdev, count,** and **unique.**
 This project contains **50 records.** The average age of all participants is **47.38** (stdev=30.93). The median weight is **109** (min: 47, max: 197).

SMART TABLES display descriptive statistics for fields with each field as a row in the table.
 Smart Tables can be displayed with ALL columns by default:

	Count	Missing	Unique	Min	Max	Mean	Median	StDev	Sum
Height (cm)	50	0	35	133	214	177.22	180	24.64	8,861
Weight (kilograms)	50	0	44	47	197	114.72	109	42.79	5,736
Race	50	0	7						
Gender	50	0	2						

Or with only specified columns:

	Mean	StDev
Age (years)	47.38	30.93
Weight (kilograms)	114.72	42.79
Height (cm)	177.22	24.64

SMART CHARTS can be used to display many types of charts for one or more fields in the project.

Display a **scatter plot** of two fields (x vs y):

Use **line charts** with two fields (x vs y):

Add a third field for grouping (by color):

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