REDCap

Research Electronic Data Capture

New Features & Improvements

AT THE FOREFRONT UChicago Medicine

THE UNIVERSITY OF CHICAGO BIOLOGICAL SCIENCES

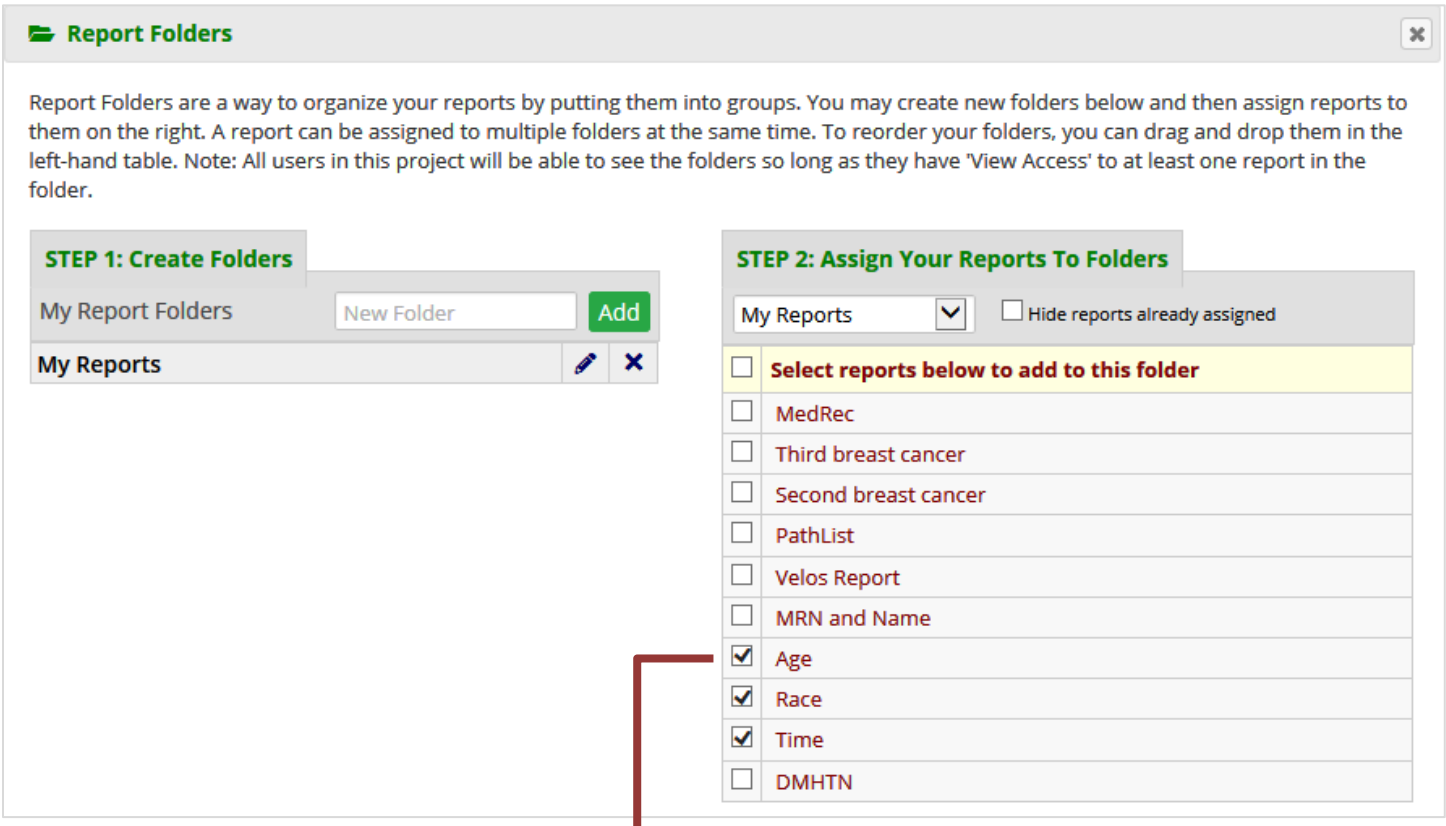
CENTER FOR RESEARCH INFORMATICS

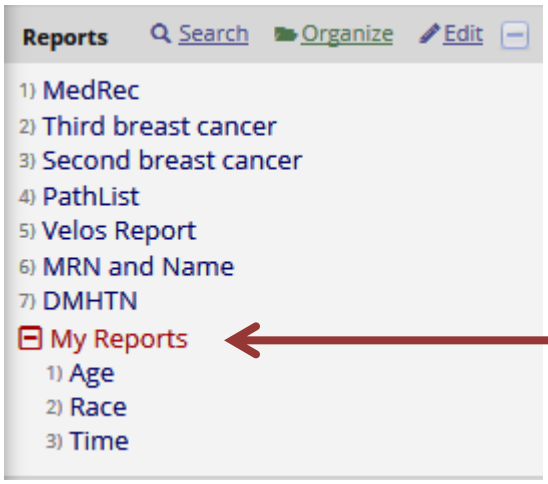
Version 8.9.2 - © 2019 Vanderbilt University

NEW FEATURES:

Report Folders

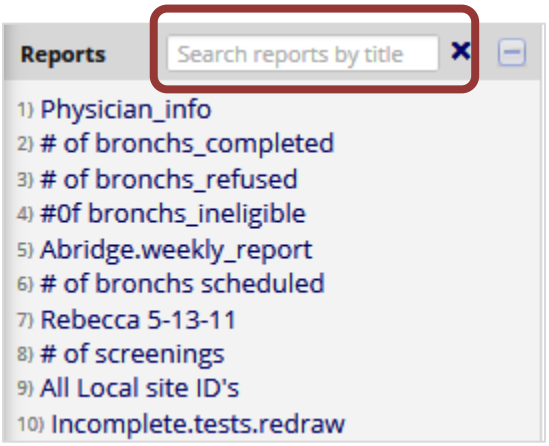
◦Reports can now be organized into folders in any given project. If a user has "Add/Edit Reports" privileges, they will see an "Organize" link on the left-hand project menu above the project's reports. They will be able to create folders and then assign their reports to a folder, after which the project's reports will be displayed in collapsible groups on the left-hand menu.





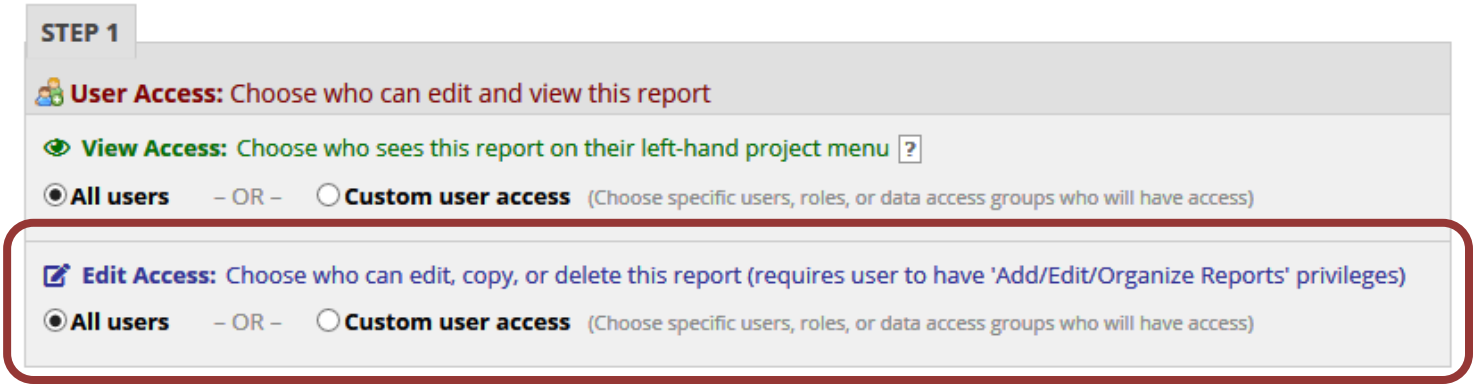
Report Search

◦A new search feature exists on the left-hand menu to allow users to search within the title of that project's reports to help them navigate to a report very quickly.



"Edit Access" for Reports

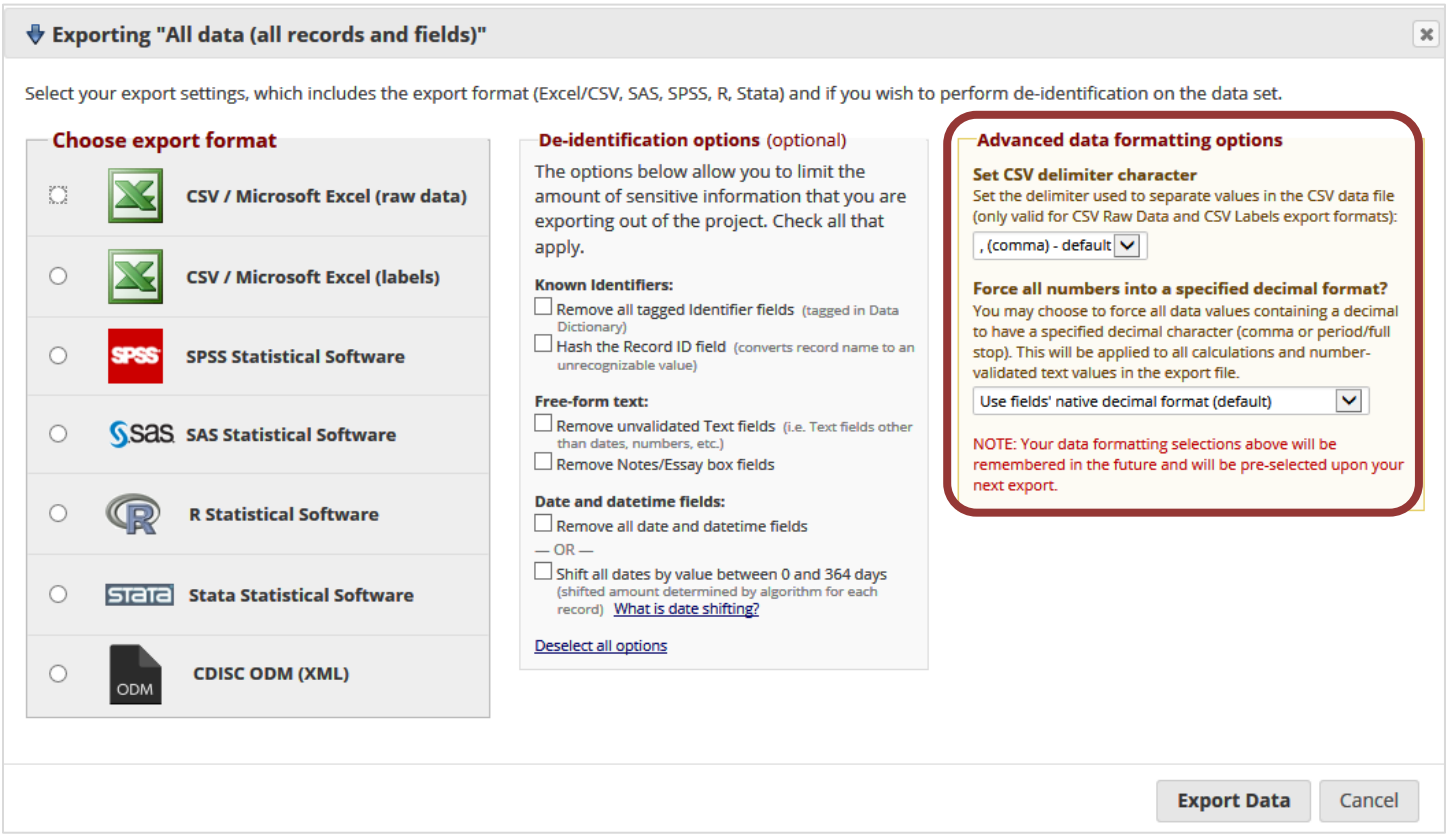
◦In addition to setting "View Access" when creating or editing a report, users can now set the report's "Edit Access" (under Step 1) to control who in the project can edit, copy, or delete the report. This setting will be very useful if one wishes to prevent certain users from modifying or deleting particular reports.



New options for Data Exports

◦Improvement: When exporting a report, a new "Data formatting options" section appears in the export dialog to allow users to choose the CSV delimiter character to be used in CSV Raw Data and CSV Labels exports. Options include comma (default), tab, semi-colon, pipe, and caret. This is useful in certain cases when the resulting data file needs to have another delimiter, such as a tab, for example. In addition, the two API methods "Export Records" and "Export Reports" have a new analogous parameter "csvDelimiter" that will set the CSV delimiter character if using "csv" as the format in the API request. See the API documentation for full details.

◦Improvement: When exporting a report, a new "Data formatting options" section appears in the export dialog to allow users to optionally force all numbers into a specified decimal format. It will default to "Use fields' native decimal format", but provides the choices "Use period/full stop" and "Use comma" as the decimal character for all numbers. This will allow projects that have fields with period/full stop decimals (calc fields, number validated fields) and those with comma decimals (comma-as-decimal validated fields) to all be exported in the same uniform number format, thus providing greater consistency in the data being exported. In addition, the two API methods "Export Records" and "Export Reports" have a new analogous parameter "decimalCharacter" that will set specified decimal format for all numbers in the API request. See the API documentation for full details.



PDF Auto-Archiver & e-Consent Framework

PDF Auto-Archiver:

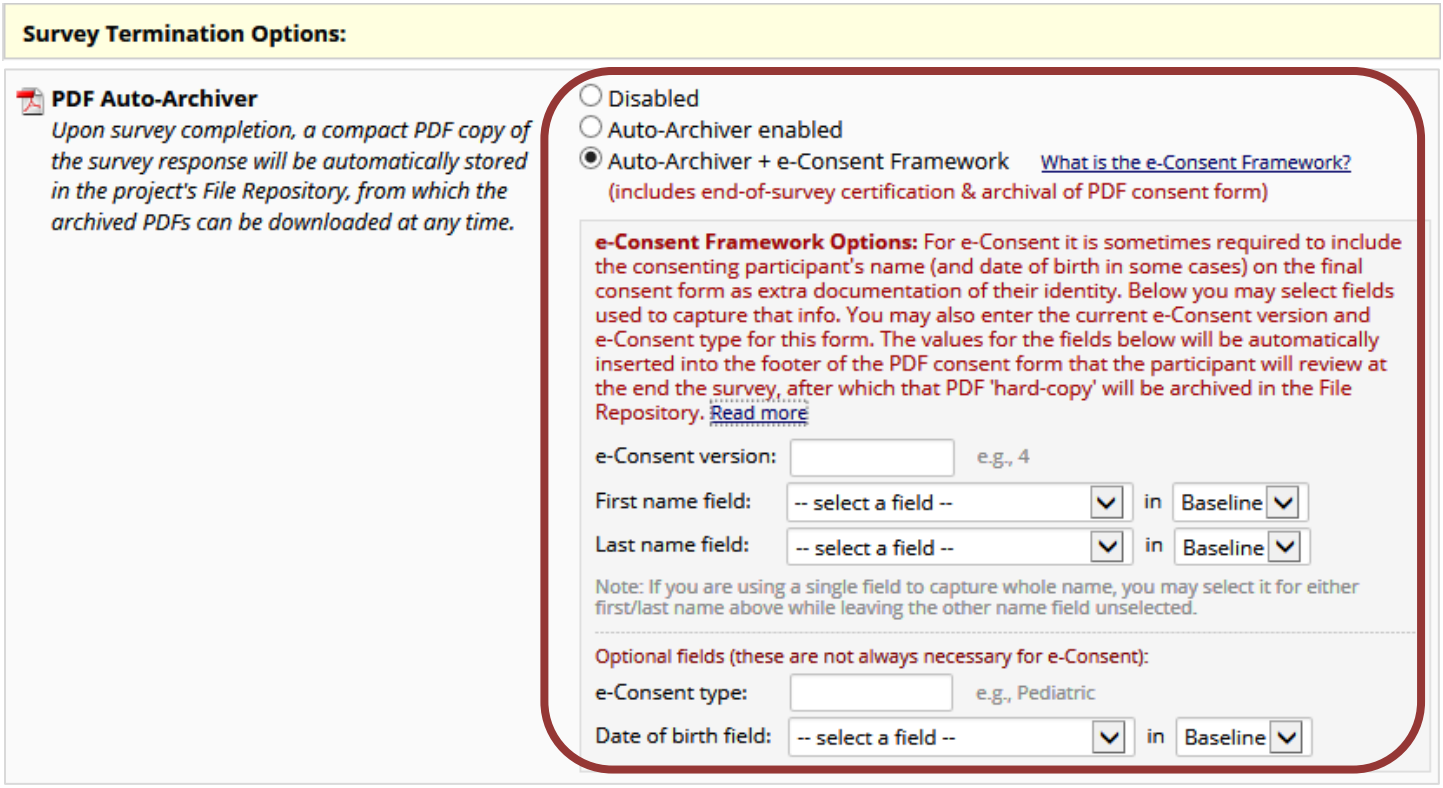
◦Upon survey completion, a compact PDF copy of the survey response can be automatically stored in the project's File Repository, from which the archived PDFs can be downloaded at any time. This setting is located on the Survey Settings page in the Online Designer, thus it can be enabled for any given survey in a project.

e-Consent Framework:

◦This feature, which works together with the PDF Auto-Archiver, provides functionality for user's to implement electronic consent (e-Consent) using a survey as the consent form, such as for capturing the consent of a research study participant.

◦The e-Consent Framework option adds two things to the typical survey-taking process. 1) Before a participant completes the survey, an extra certification page is added to end of the survey that displays an in-line PDF copy of their survey responses in which they will be asked to confirm that all information in the document is correct. Once they confirm all is correct, the survey will then be marked as complete. The survey will not be considered complete until they fulfill the certification step. 2) Upon completion of the survey, a static copy of their responses in the form of a consent-specific PDF will be stored in the project's File Repository. The consent-specific PDF will have the values of the e-Consent Framework Options inserted at the bottom of each page in the PDF. These values (i.e., name, date of birth, etc.) are added to the PDF as extra documentation of the identity of the person who is consenting.

◦A participant's IP Address is also recorded and displayed in the File Repository after the e-Consent process, but this option to collect the IP address can also be optionally disabled at the system level by your local REDCap Administrator.



Survey Wizard

This survey is designed to help you work through the steps of setting up and selecting the right distribution model of survey. It addresses when to enable survey functionality, what to consider when choosing a survey model, and reviews survey setting options. The wizard is found in the Help & FAQ tab.

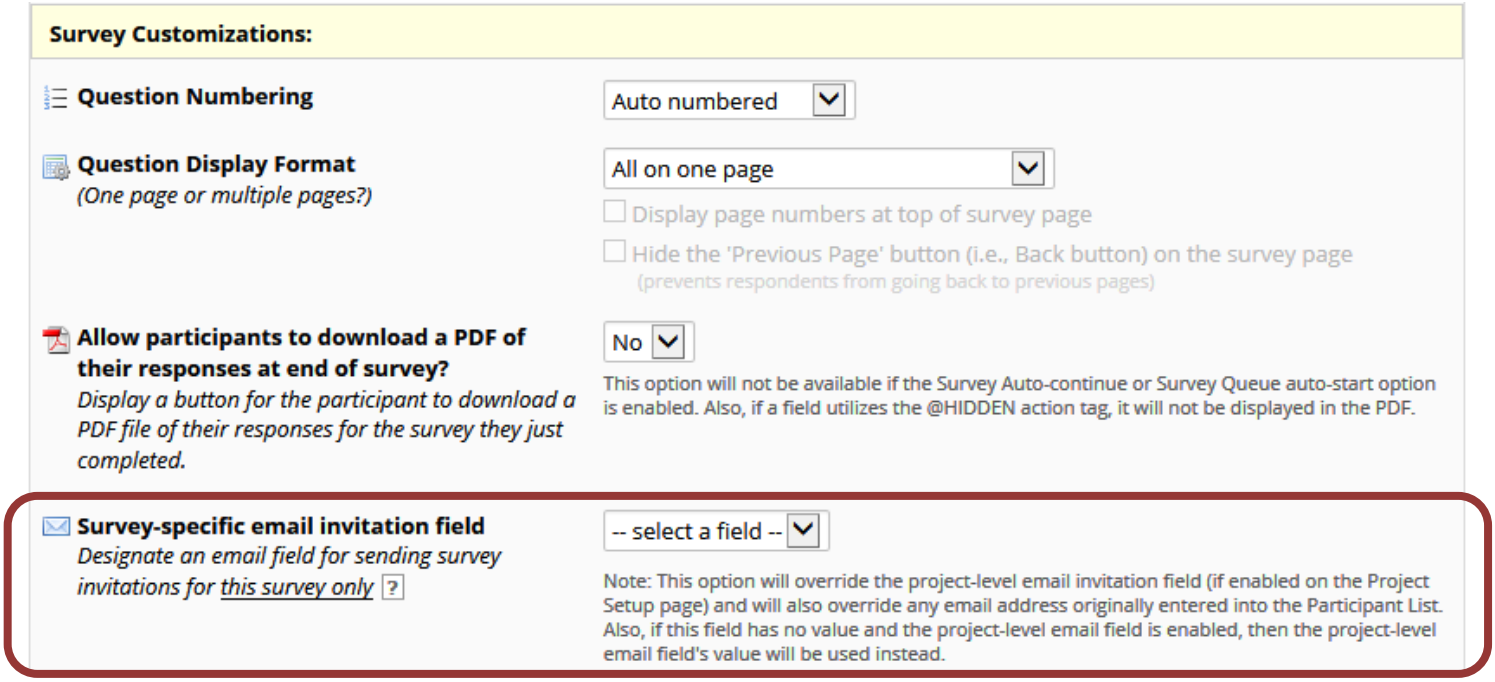
(URL: https://redcap.vanderbilt.edu/surveys/?s=43TD4MRF8A)

Survey-specific email invitation fields

◦This is a new option on the Survey Settings page that can be enabled for any given survey, in which a user may designate an email field for sending survey invitations for that survey only.

◦The email field being utilized for the survey can exist on any instrument in the project, and you may use a different email field on each survey. You may also use the same email field for multiple surveys.

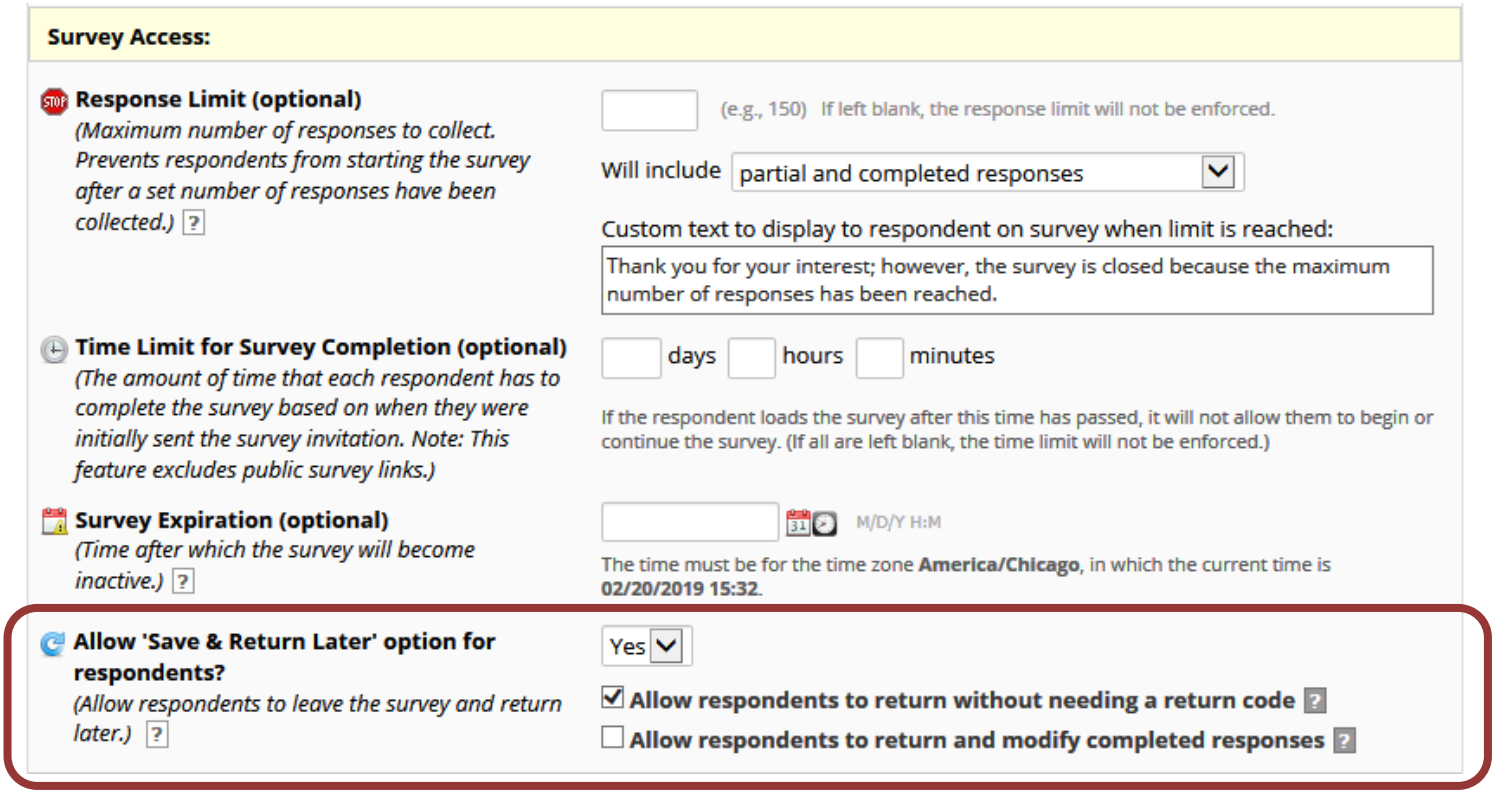
◦This feature is similar to the project-level email invitation field except that it is employed only for the survey where it has been enabled. This allows users to have data entry workflows that require multiple surveys where the participant is different for each survey. Using this feature, multiple people can be emailed a survey invitation, after which all the survey data they enter goes into the same record in the project.



Survey Return Code Option

◦New option allows respondents to return to a partially completed or fully completed survey response without needing a return code. When enabling "Save & Return Later" for a survey on the Survey Settings page, it will still default to requiring a return code in order for a respondent to continue the survey where they left off. But a user may opt to allow respondents to return to and continue their survey with only the survey link (i.e., without needing a return code in addition to the link) to view and modify their previous responses on that survey.

◦Note: A warning exists in bold text in the informational popup for this feature that states the following: "If you are collecting identifying information (e.g., PII, PHI), for privacy reasons it is HIGHLY recommended that you leave the option unchecked so as to enforce a return code."



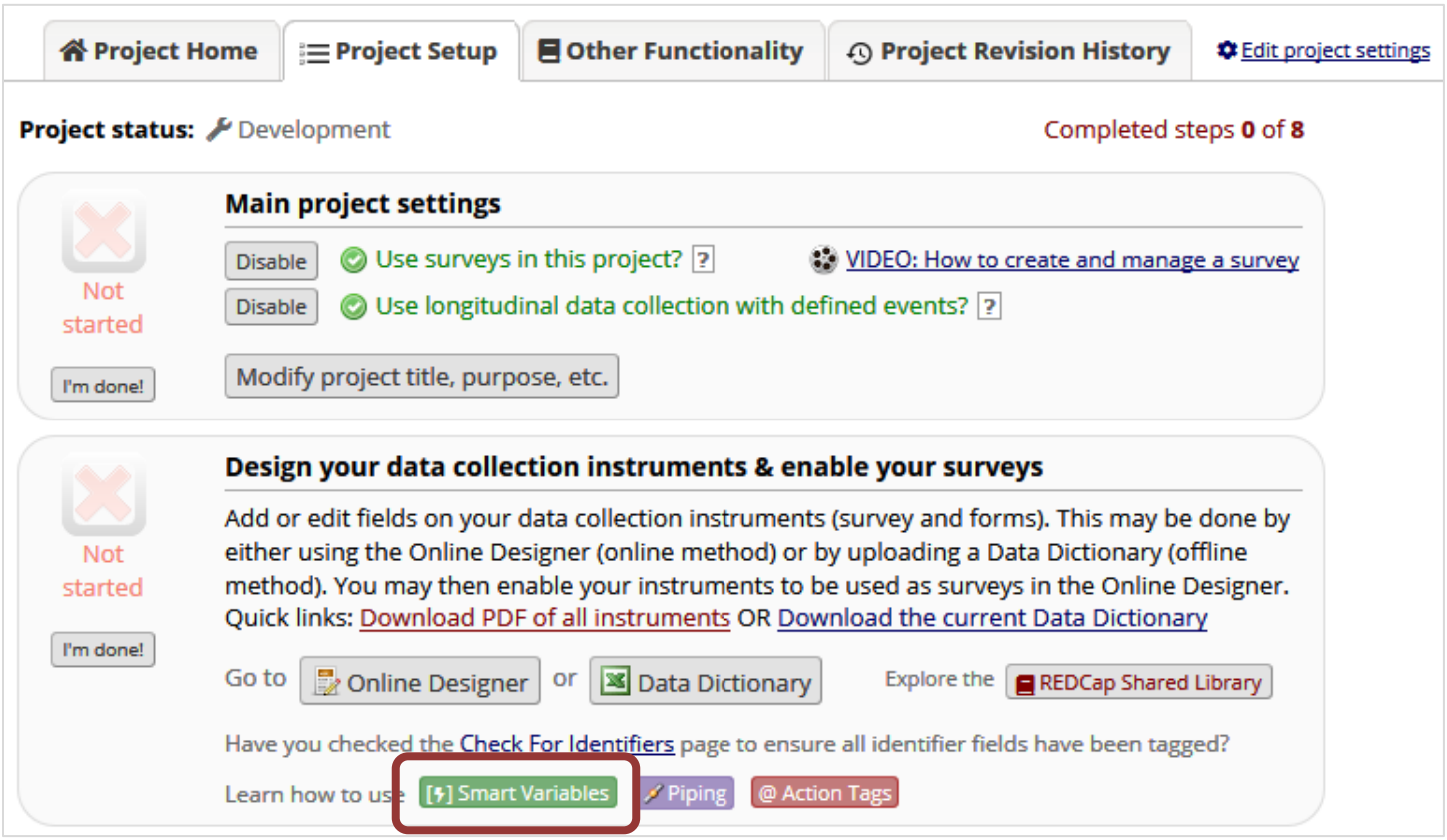
Smart Variables

◦Smart Variables are dynamic variables that can be used in calculated fields, conditional/branching logic, and piping. Similar to using project variable names inside square brackets - e.g., [heart_rate], Smart Variables are also represented inside brackets - e.g., [user-name], [survey-link], [previous-event-name][weight], or [heart_rate][previous-instance]. But instead of pointing to data fields, Smart Variables are context-aware and thus adapt to the current situation. Some can be used with field variables or other Smart Variables, and some are meant to be used as stand-alone.

◦35 Smart Variables are available. They can reference things with regard to users, records, forms, surveys, events/arms, or repeating instances. Documentation and examples for using Smart Variables are included on the Project Setup page, Online Designer, and other places throughout REDCap in a popup and alternatively as a standalone page.

◦Note: While Smart Variables can be used for filters in reports and for filters for Custom Record Status Dashboards, they are not yet able to be utilized in Data Quality rule logic.

◦Learn more here: https://redcap.uchicago.edu/redcap_v8.9.2/Design/smart_variable_explain.php



Piping can now be used for Checkbox Fields

◦Piping from Checkbox fields is slightly different than with other field types because checkboxes allow for multiple saved values. There are options to display a list of checked choices, unchecked choices, or a specific choice.

◦[my_checkbox:checked] - Appending ':checked' will display a comma-delimited list of choice labels that have been checked - e.g., 'Sunday, Tuesday, Thursday'. Note: If neither ':checked' nor ':unchecked' is appended to the variable, then it will default to ':checked'.

◦[my_checkbox:unchecked] - Appending ':unchecked' will display a comma-delimited list of choice labels that have NOT been checked - e.g., 'Monday, Wednesday, Friday, Saturday'.

◦[my_checkbox(code)] - If a coded value of the checkbox is included inside parentheses after the variable name - e.g., [my_checkbox:(2)] - then it will output the word 'Checked' or 'Unchecked' regarding whether or not that specific choice has been checked off.

◦Please note that while the checkbox piping options listed above will return the text labels, you may also append ':value' to the variable to return the raw value instead of the label. For example, [my_checkbox:checked:value] and [my_checkbox:unchecked:value] might return '1, 3, 5' and '2, 4, 6, 7', respectively, and [my_checkbox(2):value] will return 1 or 0 if checked or not checked, respectively.

New syntax for referencing fields on repeating instances in piping, logic, and calculations

◦Fields that exist on a repeating instrument or on a repeating event can be referenced using a new syntax (note: repeating events and instruments are used the exact same way). This is done by appending the “repeat instance” number to the field inside square brackets – e.g., [weight][2], which points to repeating instance #2 for the field “weight”.

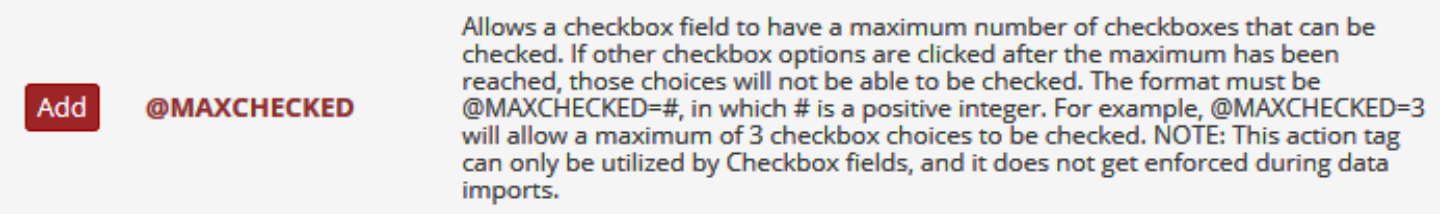
◦Please note the distinction that unique event names should be *prepended* to variables whereas repeating instance numbers must be *appended* to them. For example, if the field “weight” exists on a form in the event “Visit Data” in a longitudinal project, you might reference instance #2 for that field on that specific event with the following: [visit_data_arm_1][weight][2].

◦Smart Variables (described further down) can be used in place of the repeating instance number, in which there are 5 instance-related Smart Variables: [previous-instance], [next-instance], [current-instance], [first-instance], and [last-instance]. For example, if you wish to use @DEFAULT action tage to carry over data from the previous instance of a repeating instrument, it might be set up as follows: @DEFAULT=”[weight][previous-instance]”.

New action tag: @MAXCHECKED

◦Allows a checkbox field to have a maximum number of checkboxes that can be checked. If other checkbox options are clicked after the maximum has been reached, those choices will not be able to be checked. The format must be @MAXCHECKED=#, in which # is a positive integer. For example, @MAXCHECKED=3 will allow a maximum of 3 checkbox choices to be checked.

◦NOTE: This action tag can only be utilized by Checkbox fields, and it does not get enforced during data imports.

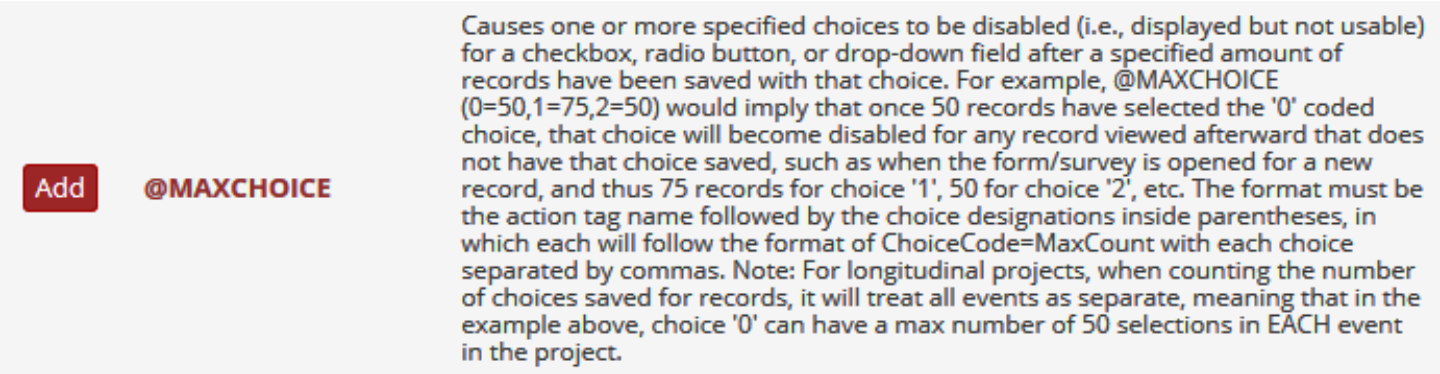


New action tag: @MAXCHOICE

◦Causes one or more specified choices to be disabled (i.e., displayed but not usable) for a checkbox, radio button, or drop-down field after a specified amount of records have been saved with that choice. For example, @MAXCHOICE(0=50,1=75,2=50) would imply that once 50 records have selected the '0' coded choice, that choice will become disabled for any record viewed afterward that does not have that choice saved, such as when the form/survey is opened for a new record, and thus 75 records for choice '1', 50 for choice '2', etc.

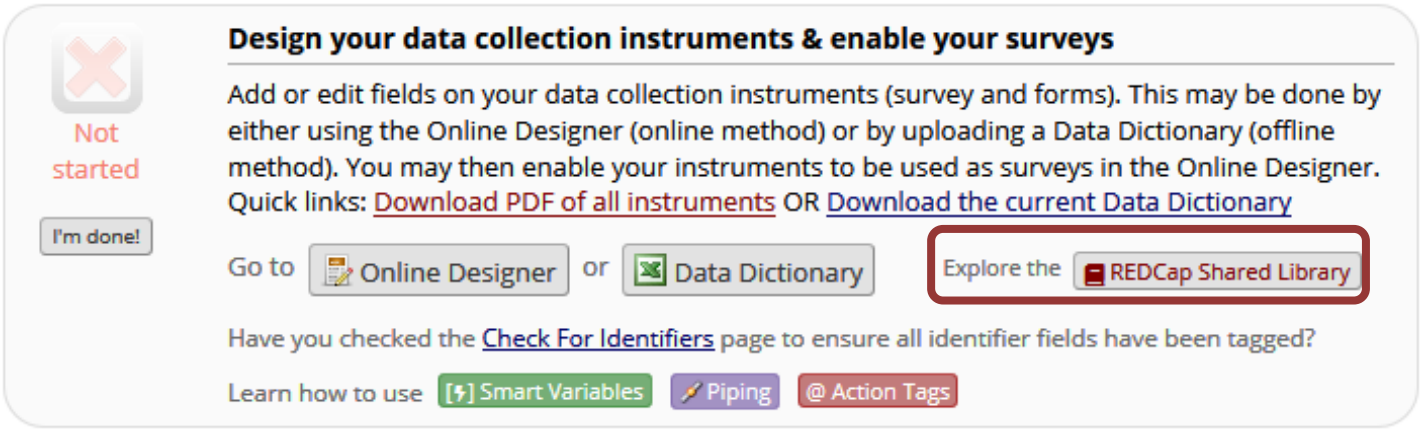
◦The format must be the action tag name followed by the choice designations inside parentheses, in which each will follow the format of ChoiceCode=MaxCount with each choice separated by commas. Note: For longitudinal projects, when counting the number of choices saved for records, it will treat all events as separate, meaning that in the example above, choice '0' can have a max number of 50 selections in EACH event in the project.

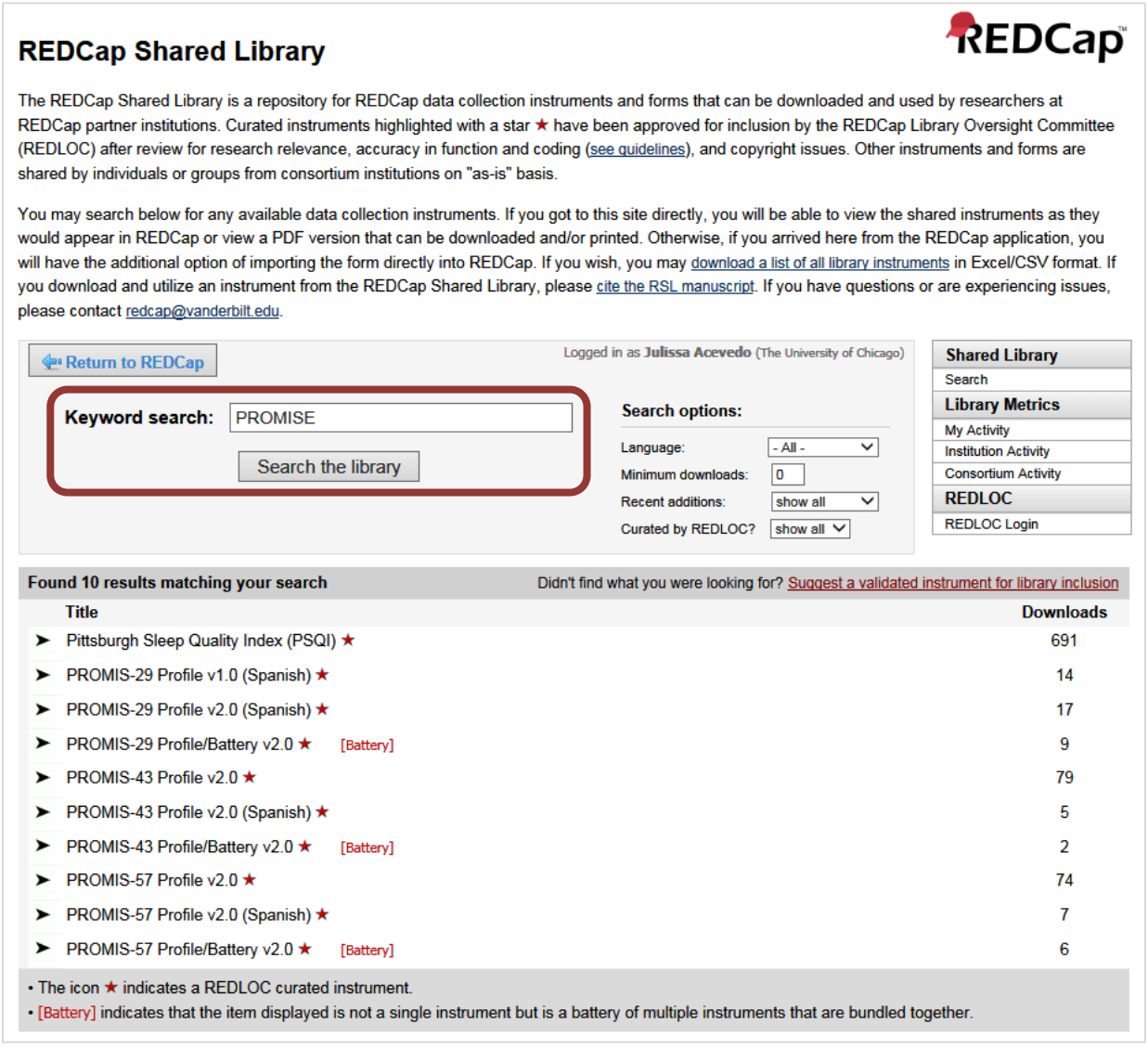
◦Note: This action tag not only gets employed when a form or survey is loaded but also when a form or survey is submitted in order to prevent users/respondents from going over the max amount specified. If a user submits a form/survey, at which point the maximum has been reached due to simultaneous users entering data just before them, it will not save that field's value (but will save all the other fields on the form/survey), and it will reload the form/survey and tell the user to make another selection for the field.



PROMIS Batteries

◦15 batteries of instruments are now available in the REDCap Shared Library. A battery is a set of instruments that can be downloaded from the Shared Library as a bundle, in which they are meant to all be taken together one after another within a single battery. When downloading from the Shared Library, the survey auto-continue feature will be enabled for these instruments to allow a participant to automatically continue from one to another to simulate the battery functionality.





New API method: Export Repeating Instruments and Events

◦This method allows you to export a list of the repeated instruments and repeating events for a project. This includes their unique instrument name as seen in the second column of the Data Dictionary, as well as each repeating instrument's corresponding custom repeating instrument label. For longitudinal projects, the unique event name is also returned for each repeating instrument.

◦Additionally, repeating events are returned as separate items, in which the instrument name will be blank/null to indicate that it is a repeating event (rather than a repeating instrument).

IMPROVEMENTS:

• Changed the text "Manage Survey Participants" to "Survey Distribution Tools", which more clearly describes the pages in that section.

• The "Require Reason for Change" feature, which can be enabled in the Additional Customizations popup on the Project Setup page, no longer requires a reason when adding data to an empty data entry form (i.e., having a gray status icon). In previous versions, it would prompt the user for a reason even when adding new data to a form that had never had data entered before, which was deemed as unnecessarily aggressive, thus making the feature less useful to many users. So now in the event that data has never before been entered on the current instrument for a given record, the user will not be prompted for a reason (that is, until they return to the instrument at a later time and add/edit/delete data). Note: The Regulatory & Software Validation Committee has reviewed this change, and has approved it for general use.

• Added new note at top of Online Designer (when viewing an instrument's fields) that mentions using Action Tags and includes a link to open the Action Tag documentation popup to learn more about them.

• Modified the explanation text for @NOW and @TODAY action tags for greater clarity with regard to their usage.

• When using the Data Resolution Workflow's dashboard for data queries that have been opened via a custom Data Quality rule that contains two or more fields in its rule logic, it now displays the record number in the dashboard as a clickable link that goes to the Record Home Page for the record. Whereas in previous versions, the record number was not a link but only text.

• For a repeating instrument or an instrument on a repeating event, in which the instrument is enabled as a survey, if the current instance of the repeating instrument/event has not yet been saved, then it will now disable the Survey Options drop-down list at the top of the data entry form until the form has first been saved. And if a user tries to click the drop-down before that repeating form/event has first been saved, it will tell them to click the "Save & Stay" button before they can access the Survey Options. This will prevent ghost/placeholder instances from appearing in the Participant List, which occurred in previous versions. The previous behavior was regarded as generally undesirable, although not necessarily considered a bug.

• In the CSV Labels export data set, it now translates the choice labels Yes/No, True/False, and Checked/Unchecked in the CSV file if the project's language has been set to another language other than the default English.

• When a data export takes longer than three minutes, it provides an extra notice in the progress popup (i.e., "Exporting data...") that informs the user that the export process may possibly take longer than 30 minutes

and recommends that they not stop then restart the process, as it may cause it to take longer than usual. This message is to prevent users from repeatedly attempting long data exports, which in some cases could create performance issues on the REDCap server.

• A record's survey queue now only displays surveys that have been explicitly enabled in the survey queue for the project. In previous versions, it would display all completed surveys for that record, regardless of whether they were enabled in the queue. From here on out, if a user wants a survey to appear in the queue, then it should explicitly be enabled in the queue when set up on the Online Designer page.

• When adding new choices for a multiple choice field in the Online Designer, it will now display an error message if any choices have duplicate codings (e.g., two choices both coded as "4" - "4, Pink" and "4, 4"), thus letting the user know that they should remove any duplicates because duplicates will be automatically removed when saving the field.

• Record auto-numbering for data imports (Data Import Tool, API, and Mobile App). For the Data Import Tool, the user may enable the new setting “Force record auto-numbering”, and in the API, the new parameterforceAutoNumber=true can be used, which will create new record names that are auto-generated by REDCap during the import process. In an upcoming version of the REDCap Mobile App, the mobile app will provide this API parameter automatically for records created in the app that did not previously exist in the project on the server. Note: This feature can only be utilized for projects with record auto-numbering enabled. Also, a record number must still be provided as a placeholder during the data import (to associate multiple rows with the same record), but that record name will be automatically changed to a new record ID generated by REDCap.

• Attach PDF of responses in confirmation email - When using the “Send confirmation email” option on the Survey Settings page for a survey, that section now contains an additional option to “Include PDF of completed survey as attachment”, which will add the PDF of their responses sent to the participant in their confirmation email. This new option contains the following warning as a reminder to users: “WARNING: Since email is not considered a secure form of communication, the PDF attachment option is NOT recommended if the survey contains questions asking for identifying information (e.g., PHI).”.

• When a calc field's value is changed, it will now display a red border on the right edge of the calc field's text box to subtly indicate that the displayed value is different from the stored value in the database. And if the calculated value gets changed so that its value matches the stored value again, the red border will disappear. This will help users make note of when calculations have been triggered and if there is any disparity between the displayed value and the stored value.

• For PDF exports of data entry forms with data, if a field that is normally removed from exports due to users having export rights of "De-Identified" or "Remove all tagged Identifier fields" is being piped into a label, field note, etc. in the PDF file, that field value will no longer be piped in the PDF file but will instead be redacted (i.e., replaced with the text "[*DATA REMOVED*]"). This change is made to increase security/privacy regarding de-identification of data in data exports.

• Emails sent from REDCap now follow a more standardized format by including both HTML text and plain text in each email, thus making emails a bit more likely to be received by their recipients without them getting flagged as spam.

• On the Public Survey Link page in a project, a new button "Open Public Survey + Logout" has been added to increase security in case users want to open the public survey while ensuring that the participant cannot access their REDCap account in the other browser tab.

• When viewing a repeating instrument's data entry form for a record in a project, the "current instance" drop-down displayed near the top of the page no longer displays the instance number in a fraction format where it shows the total instances following by a slash (e.g., 2/5). It now only displays the instance number (and the custom label, if defined). This was changed because it led to confusion in cases where some instances were deleted, thus leaving gaps in the middle but still showing the max instance as the total instances, which is not the same thing and is confusing.
• For added flexibility, the Survey Queue setup dialog in the Online Designer will now display the project's first data collection instrument (assuming the instrument has been enabled as a survey), whereas previous versions did not allow the first instrument to be enabled in the Survey Queue.
• When clicking the "No Access" option for an instrument in Data Entry Rights when adding/editing a user's privileges on the User Rights page, it now automatically deselects the "Edit survey responses" checkbox if the instrument has been enabled as a survey.
• The field validation for North American phone numbers is now more permissible and allows a greater variety of numbers to be used, such as 8XX and 900 numbers.
• When piping field values into an @DEFAULT action tag when the piped value is blank/non-existent, it now no longer replaces the [variable] with "_____" but instead replaces it with "" (i.e., nothing), which is viewed as more preferable since the value is being input as a field value. This is only true for piping specifically within the @DEFAULT tag and not for piping in general.
• Fields whose values have numbers with a comma as the decimal mark (e.g., "3,14" - European number format) now work in calculated fields. In previous versions, using a number with a comma would result in a blank returned value for the calc field. Note: The calculated value that is returned from a calculation will still have a dot/period as the decimal mark (if it contains a decimal), so in this way, it will convert into all calc field input values into dot/period format when performing the calculation, thus still returning numbers in dot/period format as all previous versions have.
• The datediff() function can now utilize the “now” variable as one of the two date/time parameters (in a similar way as the “today” variable). This is not only true for calc fields, but also for ASI logic, DQ rules, report filters, etc. You may use a time, date, datetime, or datetime_seconds field with the “now” parameter in datediff. Note: If using a date field with “now”, it will assume midnight (00:00) for the time component for the date field.
• For PDF exports of data entry forms with data, if a field that is normally removed from exports due to users having export rights of "De-Identified" or "Remove all tagged Identifier fields" is being used in the Custom Record Label or Secondary Unique Field value in the PDF file, that field value will no longer be piped in the PDF file but will instead be redacted (i.e., replaced with the text "[*DATA REMOVED*]"). This change is made to increase security/privacy regarding de-identification of data in data exports.
• The action tags @TODAY and @NOW will no longer hide the Today/Now button, will no longer hide the date-picker icon, and will no longer make the field read-only by default. From this version onward, users will need to additionally use @READONLY in order to accomplish those things. For backward compatibility, the REDCap upgrade process will automatically replace all instances of the @TODAY and @NOW action tags with "@TODAY @READONLY" and "@NOW @READONLY", respectively, to maintain the existing behavior for fields already using @TODAY and @NOW.

• When field values get modified via the action tags @TODAY, @NOW, @LATITUDE, @LONGITUDE, and @USERNAME, it now displays the red side bar on the right side of the text field (just like calculated fields do when changed) to denote there was a value that changed.
• When adding/editing Automated Survey Invitations, the "Send after lapse of time" value for "days" may now be 4 digits in length (specifically up to 7300 days = 20 years), whereas previous versions limited the days unit to 3 digits. This change allows for a much longer wait time before sending the scheduled invitations.
• New "compact" option for PDFs of forms/surveys in which a compact-formatted PDF is produced that excludes fields that have no data saved and excludes unselected multiple choice options, thus producing a smaller PDF file. (Note: Section headers and descriptive fields will still be included.) On all pages that offer a PDF download option, there is now an extra "compact" option. The REDCap::getPDF() developer method and the "Export PDF file" API method both have the compact option added as a new parameter that can be passed to the method.
• For projects containing a large amount of records (i.e., thousands or tens of thousands), some pages in the project might become very slow, and if a user repeatedly attempts to open a page that is initially slow to open, often due to slow database queries being executed, then those queries can get backlogged on the database server and reduce performance over time. A new mechanism has been implemented that will improve server performance in these cases by actively killing off any abandoned MySQL processes that are still running on the server.
• The project Logging page now logs when a survey invitation is deleted or when its send-time is modified on the Survey Invitation Log, in which the logged event will display useful contextual information, such as the record name, survey title, and event name (if longitudinal).
• The project Logging page now logs when a survey invitation that was scheduled via ASI gets deleted due to the ASI option "Ensure logic is still true before sending invitation?", in which the logged event will display useful contextual information, such as the record name, survey title, and event name (if longitudinal).
• The project Logging page now provides useful contextual information for the ASI logged event "Automatically schedule survey invitation", in which it will display the record name, survey title, and event name (if longitudinal).
• When performing an API export in JSON format for the API methods Export Users, Export Project Info, Export Survey Participants, and Export Events, while the values in the API response were all correct, some API scripts were having trouble with the fact that some integers were returned in string format (surrounded in quotes) rather than as literal integers in the JSON response. Now they should all be returned as literal integers.
• If the secondary unique field is enabled and contains HTML tags in its field label, those tags will now be stripped out when displaying the label and value of the secondary unique field throughout a project, such as on a report, top of data entry page, and the left-hand project menu when a record is selected. This hash been changed because HTML tags in the field label could distort the user interface in unpleasant ways.
• If a field has branching logic, the Online Designer now displays the logic (up to the first 65 characters) on the field so that the user can view it easily without having to open the Add/Edit Branching Logic popup.
• When opening the "Add/Edit Branching Logic" popup in the Online Designer, it could sometimes be very slow to open if the project contains many fields, especially many multiple choice fields. The popup could even be slow when the selected field does not even have branching logic yet. To improve this, it now defaults to selecting the "Advanced" option first when the popup opens and only attempts to load the "Drag-N-Drop" draggable field choices when that option has been selected by a user. While this won't completely alleviate

the issue of the "Drag-N-Drop" option being slow when there are many fields, this will make it much more palatable in a majority of situations when branching logic is being added/edited in the Online Designer.

• Added new "Record ID" column in the Participant List table. In previous versions, the record ID was appended to the email address in the "Email" column. Having its own column will allow users to find specific participants more efficiently.

• Added new filter on the Survey Invitation Log table to allow users to filter the invitations by record ID.

• Added new "Record ID" column in the Survey Invitation Log table to allow users to find specific invitations more efficiently. Note: If the record name should not be displayed in order to preserve the anonymity of a response (e.g., participant identifier is not used, designated email field is not used), it will instead display an icon indicating that the record name cannot be displayed.

• The Survey Invitation Log now contains an extra column on the right-hand side to allow users to delete many scheduled invitations at once (rather than having to delete them one at a time).

• When exporting data to SPSS, the resulting SPSS syntax file now defines Text fields as A30000 rather than A500 to allow for Text fields with text longer than 500 characters.

• When using the designated email invitation field (enabled on the Project Setup page), if the field is located on an instrument that gets used on multiple longitudinal events or if it is located on a repeating instrument/event, all occurrences of the field will now be forced to have the same value. This means that if one value is entered for the field, that value will always be the value seen in other events or other repeating instances of the instrument. And if the value is changed on any event or repeated instance, then that value will be updated on all events or repeating instruments/events where the field has a value. This will keep the field's value in sync in all locations since the underlying assumption of the designated email invitation field is that there is really only one single value, which is the email address of the survey participant.

• The datepicker widgets and timepicker widgets that are displayed on data entry forms and survey pages now have their language abstracted so that it will display the months, days of the week, and buttons in the language set for the project.

• The BioPortal biomedical ontology web service is now called through a secure method (SSL/HTTPS) by REDCap. This will not affect how the ontology field search works, but provides more security by encrypting all the requests being sent from REDCap to the data.bioontology.org website.

• When using the Copy Project button on the Other Functionality page, it now displays an option to the user to copy all custom record status dashboards in the project.

• When using the Copy Project button on the Other Functionality page, it now copies the Record Locking Customization settings for the project.

• Added extra note at the bottom of the REDCap Messenger informational page that states that entering PHI or PII into a Messenger's conversation title is highly discouraged because conversation titles are much more visible than conversation text.

• Multiple choice fields can now have their raw value (as opposed to their choice label) piped inside an @DEFAULT action tag by appending “:value” to the variable name – e.g.,@DEFAULT=”[my_radio_field:value]”.

• Multiple choice fields can now have their raw value (as opposed to their choice label) piped by appending “:value” to the variable name – e.g., [my_radio_field:value]. Note: This can also be used for SQL Fields to display the raw value of the SQL Field drop-down.

• New method for composing survey invitation text using Smart Variables for survey link

◦When composing a survey invitation, the standard text and survey link are no longer automatically appended to the survey invitation text at the time the email is sent. Instead, users must now specify all the entirety of the text of the email (including the stock text and survey link that used to be appended automatically, if they wish) and therefore must supply [survey-url] and/or [survey-link] in the text if they wish to provide the participant with a link to the survey.
◦If the user forgets to enter the survey URL Smart Variable in the text, REDCap will automatically suggest to them that they should.
◦Note: All survey invitations that were scheduled prior to this upgrade will still have the standard text and survey link appended to their survey text. Additionally, during the upgrade to this version, all saved configurations for Automated Survey Invitations (ASIs) will have the standard text and survey link automatically appended to the saved ASI email text, thus allowing the ASI behavior to remain exactly the same after the upgrade and allowing it to be backward compatible.
• Custom Record Labels now use proper piping syntax and can also utilize Smart Variables.
◦Because Custom Record Labels existed long before the concept of piping was created in REDCap, they did not adhere to typical piping concepts – e.g., they could not use prepended event names; they would display the raw value of a multiple choice field whereas piping would instead display the label of a multiple choice field. There also used to be certain limitations Custom Record Labels, in which they could only use data from fields on the very first event (of the current arm). Now that Custom Record Labels can be used like regular piping, they can target fields on any event in a project, and they can also utilize Smart Variables.
◦Note: Any longitudinal projects existing before the upgrade that currently use Custom Record Labels will automatically have all fields in the Custom Record Label prepended with the [first-event-name] Smart Variable in order to maintain the existing behavior from previous versions that could only pull data from the first event of the current arm. So prepending [first-event-name] allows existing longitudinal projects to maintain the way they worked prior to the upgrade to this REDCap version.
• When viewing the Smart Variables documentation from a project-level context, it will now use the project-level language for the documentation, whereas if viewed outside a project-level context, it will use the system language. It was previously only displaying the documentation in the system language.
• Slight performance improvement on "Add/Edit Records" page for longitudinal projects using the Custom Record Label.
• On the "Stats & Charts" page, the variable name is now displayed next to the field label for each field displayed on the page.
• PDF Customization Options – Users may change or remove the “Confidential” text displayed in the header of all PDFs in a project. Also, instead of displaying the REDCap logo and REDCap website URL at the bottom right of all PDF pages, they can instead choose to display the text “Powered by REDCap” in small font. These two settings are project-level, so they will be applied to every page of a PDF for all instruments in a project (for both forms and surveys). These settings can be found in the Additional Customizations popup on the Project Setup page.
• Added "Postal Code (Germany)" as a new field validation type.
• When composing a survey invitation and clicking the "Preview" tab, instead of displaying the survey link as "Sample Survey Link" or "SURVEY TITLE", it now displays the actual survey title as the link text. Additionally, when clicking the "Send text email", this same thing now occurs in the email that is received.

• Extra protection has been added to the username/password form when using the E-signature feature on a data entry form in order to prevent browsers from auto-filling the username/password.
• Added "Postal Code (France)" as a new field validation type.
• The REDCap Mobile App v3.0 and later supports the Repeating Instruments and Events feature in REDCap projects. This version of the mobile app will be released on 6/22/2018 in the Google Play Store, and will also be released in the Apple App Store shortly thereafter (pending approval).
• Improved data export for biomedical ontology fields - If fields using the biomedical ontology auto-suggest feature are being exported to a stats package, it will now render those fields as multiple choice fields (rather than as free-form text fields) in the resulting stats package syntax file, in which all the cached choices for those ontologies will be output as separate choices (values and labels) for those fields in the syntax file. Note: Since some ontologies contain thousands of choices, all possible choices will not be output in the syntax file, but instead only the cached choices that have been saved in that REDCap project for those ontologies will be output as choices in the syntax file.
• A Data Access Group can no longer be deleted if one or more records are still assigned to it. If a user attempts to delete a DAG that contains records, it will prevent such and display an error message.
• Data Quality rule H (i.e., "Incorrect values for calculated fields") and auto-calcs (i.e., the process of calc fields being triggered by data imports or cross-form/cross-event calculations) can now handle Smart Variables that are used inside calculated field equations. In previous versions, such calc fields could only successfully run while on a data entry form or survey page.
• Smart Variables are now able to be utilized in Data Quality rule logic. Note: In many cases, Smart Variables in the logic may cause Data Quality rules to take much longer to complete, which is due to the fact that the logic has to be re-evaluated for *every* item being processed by the DQ rule, whereas normally the logic only needs to be evaluated just once at the beginning of when the DQ rule is executed.
• The REDCap Shared Library can now be disabled (if desired) at the project level by an administrator on the "Edit a Project's Settings" page in the Control Center. If disabled for a given project, all Shared Library buttons and all references to the Shared Library will no longer appear in the project.
• On the "Edit a Project's Settings" page in the Control Center, it now does not display the drop-down list of projects if viewing the settings of a specific project, but instead provides a link to "Select another project", which will then display the drop-down list. This helps the page load faster if there are many (>10,000) projects that exist in the REDCap system.
• Very small wording change to the certification text on the certify page when using the e-Consent Framework on a survey.
• When viewing a partially completed or fully completed survey response on a data entry form, the process of displaying the number of contributors to the response in the red box near the top of the page was resulting in very slow page loads in many circumstances. To provide a better user experience for this, it now displays a "View all contributors" link instead, which can be clicked to reveal the users who have contributed to that response.
• When viewing a partially completed or fully completed survey response on a data entry form, the text color and background color of the red box near the top of the page have been changed to reflect the state of the response more accurately (i.e., it is no longer displayed as a red box, which often evokes a sense of there being an error). If the response is partially completed, it is displayed as an orange box, whereas if it is fully

completed, it is displayed as a green box. The box color is thus consistent with the color instrument status icons used.

• When displaying the filename of an uploaded file on a File Upload field on a form or survey, if the filename is very long (>34 characters in length), it now truncates the filename with an ellipsis closer to the middle of the filename rather than at the end. This allows the file extension to be visible, whereas in previous versions it was impossible to tell what type of file it is without downloading it if the filename was long.

• Some language was hard-coded in previous versions. The following things have now had their text abstracted so that they is now translatable: the buttons for uploading/deleting files in the File Repository, the "Generate Schedule" button on the Schedule page, and the "Auto Logout Warning" popup.

• Elements on survey pages have been modified to work better for accessibility purposes, such as with screen readers.

• When exporting data in CSV format (raw data or labels) on the "My Reports & Exports" page, it now maintains all double quotes in free-form text, whereas previous versions would replace all double quotes with single quotes in a CSV export. Note: When exporting to stats packages, it will still replace double quotes with single quotes for compatibility purposes.

• A "Copy existing choices" link was added to the "Add Matrix of Fields" popup on the Online Designer page (just like the same link in the "Add New Field" popup on that same page) to copy the choices from an existing multiple choices field to that matrix of fields.

• When exporting data to SPSS, date and datetime fields are now represented as A500 and text fields as A1000 in the SPSS syntax file, whereas previously they were all represented as A30000, which could cause very slow processing when loading the data into SPSS.

• When exporting a data dictionary, it will now automatically prepend the Field Annotation column with a single space character if the value begins with an "@" sign. This is to prevent issues when loading the data dictionary into Microsoft Excel, which uses "@" to denote the beginning of an equation. When the data dictionary is re-uploaded back into REDCap, the extra space will be subsequently removed to maintain the integrity of the initial value in the data dictionary as it was exported.

•Improvements related to viewing or creating reports

◦New report option that will combine checkbox options into a single column of only the checked-off options. Previously, any checkbox fields in a report would have their choices represented as separate columns in the report, but with this new setting, they can now all be represented as a single column with comma-delimited values and comma-delimited labels. Note: If data is exported to a stats package on a report using this option, checkbox fields will be represented as text fields in the stats package's syntax file that gets generated by REDCap.

◦Report description – Users may now optionally set a description for a report, in which the description gets displayed as text below the report title on the report page. This allows users to provide instructions or explanatory text for the report. Note: HTML may be used in the description to add links or to style the text.

◦Change: When exporting a report, it now includes the report's title as part of the resulting export files' file name. This should make it easier to distinguish different exported data sets if a user is exporting several reports for a given project.

◦Improvement/bug fix: In previous versions it was very difficult (and sometimes impossible) to create reports with lots of fields in projects that contained >1000 total fields. In some cases, it would cause the Create Report

page to be very sluggish or even to crash in some cases. This should no longer happen, and users should be able to easily create reports with thousands of fields, if they wish, with no problem.

• Performance boost – Certain pages in projects with thousands or more records should now load much faster in most cases. This includes the Record Status Dashboard, various pages utilizing Data Access Groups, and certain reports. Reports A and B should especially see significantly faster loading (excluding when viewing “all” pages in report A or B).

• When a user copies a project via the "Copy the project" button on the Other Functionality page, it now logs the PID (project_id) and project title of the new project in the copied project, and it now also logs the PID and project title of the originating project in the newly created project. So now it should be much easier for users to see if someone copied a project, and if so, determine which project is the one that had been created from the original.

• The Record Status Dashboard will now remember the user's last selection for the "page number" drop-down and the "records per page" drop-down, so that when they return to the dashboard in that project in the future, it will already have their last selections pre-selected for those two drop-downs. Note: It already remembers the user's last selection for "dashboard displayed" and "data access group".

• New optional parameters added to the API Export Records method to filter data returned based on when a record was created or modified

◦dateRangeBegin – To return only records that have been created or modified *after* a given date/time, provide a timestamp in the format YYYY-MM-DD HH:MM:SS (e.g., '2017-01-01 00:00:00' for January 1, 2017 at midnight server time). If not specified, it will assume no begin time.

◦dateRangeEnd – To return only records that have been created or modified *before* a given date/time, provide a timestamp in the format YYYY-MM-DD HH:MM:SS (e.g., '2017-01-01 00:00:00' for January 1, 2017 at midnight server time). If not specified, it will use the current server time.

• Added the HTML tags <map> and <area> to the list of allowed tags that can be used in user-defined text (e.g., field labels, survey instructions).

• A project's Record ID field can now be used as a Live Filter in any given report, thus allowing users to easily view the report for a single record.

• When viewing the “Add New Field”/”Edit Field” popup in the Online Designer, it will now ask the user to choose the ontology service that they wish to use (it did not do this in previous versions), even though there is just one to choose. After choosing “BioPortal Ontology Service”, it will then display all the ontologies available for BioPortal, as it has done in the past. This extra step was added to allow for more custom ontology services to be added in the future. But for now, BioPortal is the only service currently available by default in REDCap.

• The language has been abstracted to allow for translation for the popup that appears on data entry forms and survey pages when a user leaves spaces at the beginning or end of a text box's value.

• When selecting a color for an item under "Custom survey theme options" on the Survey Settings page, the color-picker now allows users to provide the Hex color code (e.g., #0b5394) to choose the color of the item.

• Under the "PDF Customization Options" section in the Additional Customizations popup on the Project Setup page, a new option has been added: "Display or hide the Secondary Unique Field value (if enabled) at the top right corner of the PDF". This option will be useful, for example, when sending the PDF to a survey participant, in which the Secondary Unique Field value should not be known or viewable to the participant.

• If a user loads a data entry form without a record in context, in which it displays the Incomplete/Complete Records drop-downs for choosing a record (this page can only be navigated to by clicking the "Show data

collection instruments" link on the left-hand project menu and then selecting a form), if the project exceeds 25,000 records, it will truncate the drop-downs so that they only display the last 25,000 records ("last"=those at the end when viewing an ordered list of all records). This is to improve performance by preventing the page from having to output so much HTML to the client.

• On the "Add/Edit Records" page for projects in development status, the notice that real data should not be entered into a project while in development has been moved more to the top of the page to make it more prominent as a reminder to users.

• When importing data via the Data Import Tool and an error is detected in the data file, the header text of the error message has been changed slightly to prevent confusion so that users more clearly understand that the file was not fully uploaded.

• When importing data via the Data Import Tool, if a CSV data file is re-uploaded on the second page after the initial attempt (e.g., due to errors displayed after the first attempt), it now hides all the error messages on the page after clicking the Upload File button to re-upload the file. Thus it resets the page so that the user does not get confused thinking that the previous errors apply to the current upload if the re-upload process takes a while.

• The alert that is displayed on a survey page or data entry form that notifies the user that an unvalidated text field begins or ends with extra spaces has been disabled so that it no longer notifies users when this occurs. This is due to reports of general annoyance by several users at the feature. This feature may possibly be re-added in the future and modified to be more user friendly, but for now it has been disabled for all projects indefinitely.

• Users that do not have "Project Design and Setup" privileges will no longer be able to navigate to or view the Project Setup page in a given project. Since such users cannot effectively perform any actions on the Project Setup page (i.e., everything on the page is disabled), it does not make much sense for them to be able to access it at all.

• When copying a project, a new checkbox has been added to the Copy Project page to copy "all report folders". In the previous version, it would always copy all reports and report folders if the "all reports" option was checked, but now it allows reports to be copied without copying report folders, if need be.

• Data Quality rules A and B have always ignored checkbox fields. But since a checkbox field can be set as "required", in which it produces an error message if no checkbox option is checked, then DQ rule A and B appear to be inconsistent with regard to whether a checkbox field can truly be empty/blank. To make these consistent when interpreting the missingness of checkbox fields, DQ rules A and B will no longer ignore checkboxes but will return discrepancies for a checkbox if it has no options checked.

• A new "Filter by event" option was added to the Logging page: "Record deleted (only)". This allows users to display only the logged events in which a record was deleted in the project.

• A new search utility was added to the top of the “Help & FAQ” page to make finding keywords easier on the page. It allows for multiple word matches and also “exact phrase” matching. When performing the search, all matching questions/answers will be displayed on the page with the keywords being highlighted while non-matching questions/answers will be hidden on the page.

• Minor aesthetic improvements in the display of PDFs of forms/surveys, such as divider lines between questions and gray background color for section headers.

• The outdated training video on Instrument Development was updated.

• Updated the Help & FAQ page with new content.