Version 8.5.2 - (released 6/22/2018)

BUG FIXES & OTHER CHANGES:

- **Improvement:** 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).

- **Improvement:** A new setting has been added to both "DDP Custom" and "DDP on FHIR" that, if enabled, will convert source system timestamps (i.e., dates of service associated with temporal fields such as labs) from GMT time into local/server time. If the source system (e.g., EHR) has temporal data with dates/times of service that are being output in Greenwich Mean Time (GMT), setting this option to 'Yes' will automatically correct all associated timestamps so that they appear in local time in the DDP adjudication popup. This option was added because some EHRs/external systems might output associated timestamps in GMT/UTC time rather than in local time. Note: This uses the server's timezone setting in PHP.INI to determine what the "local time" is. This option can be enabled at the bottom of the "DDP Custom" page or "DDP on FHIR with EHR Launch" page in the Control Center.

- Change: Added "Postal Code (France)" as a new field validation type.

- Bug fix: When clicking the "Download upgrade script" button in the REDCap Upgrade Module (as opposed to copy-and-pasting the contents of the textarea box on that page), the upgrade script would mistakenly be missing the SQL query "REPLACE INTO redcap_history_version...". This would not have any adverse effects on the systems though. (Ticket #43372)

- Bug fix: When viewing reports, the same SQL query would mistakenly get run many times unnecessarily, thus reducing performance on the report page. (Ticket #42764)

- Change: 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.

- Bug fix: When clicking the "Fix calcs now" button when viewing the results of Data Quality rule H, if the first instrument of an event is locked for a given record, then any calc fields existing on that same event (even on other instruments) would mistakenly not have their values fixed by DQ rule H. (Ticket #23433)

- Bug fix: Fixed incorrect instructions in an error on the Configuration Check page in the Control Center. (Ticket #43672)

- Bug fix: When exporting a Project XML file that contains multiple choice fields that have choice labels containing a "less than" sign followed immediately by a number or letter, it would mistakenly truncate that choice label in the XML file. (Ticket #43675)

Version 8.5.1 - (released 6/14/2018)

BUG FIXES & OTHER CHANGES:

- **Medium security fix:** A user access vulnerability was found in External Modules that have plugin pages that require authentication, in which a malicious user could potentially gain access to a module's plugin pages without having first logged in to REDCap (assuming the module installed in REDCap has plugin pages associated with it - many modules do not). This means that information displayed on that module page might be publicly accessible (able to be viewed without logging in) if a malicious user knows how to navigate to a particular External Module's plugin page and manipulate the query string URL in a very specific way. Note: This would not grant anyone access to other pages in the REDCap project but only to that particular module's plugin page to which they are manipulating the URL (i.e., standard REDCap pages are not affected by this; only module pages are vulnerable).

- **Minor security fix:** When using the Double Data Entry module and merging two records into a new third record, if a File Upload field has a file that has been uploaded for either record, then the merge process would mistakenly display a text box to allow the user to enter a value (such as a different Doc ID) for the File Upload field, which does not make sense to allow during the merge process. However, this could allow the user to inadvertently enter the Doc ID of a file to which they do not have access (in the current project or in another project to which they have access), thus allowing them to have unauthorized access to a file if they have some special knowledge regarding how REDCap stores documents. From now on, users are no longer given the option to enter a value for a File Upload field on the merge page, and thus they can only choose one of the two existing options. (Ticket #42221)

- Bug fix: Many project pages would not function at all if using MySQL version 8.0 or higher. (Ticket #42264)

- The outdated training video on Instrument Development was updated.

- Bug fix: When a calc field's value is being piped somewhere on the same form or survey page where the calc field is located, and if a Smart Variable is utilized in the calculation, then the calculated value might not get piped and propagated correctly when the page immediately loads. (Ticket #42687)

- Bug fix: When using WebDAV for file storage and uploading files larger than 2 GB in size, they would mistakenly fail to upload successfully. (Ticket #42416)

- Bug fix: When performing the EHR Launch for "DDP on FHIR", it might mistakenly display the erroneous error message "The 'state' parameter is incorrect!" for specific FHIR configurations. (Ticket #42583)

- Bug fix: When enabling the aggregate survey results display on a survey, if respondents are allowed to return to the survey without needing a return code, it would mistakenly still ask the respondent for a return code if returning directly to the aggregate survey results page. (Ticket #42568)

- Bug fix: The variable names of fields were mistakenly being displayed next to the field labels of fields on the survey's aggregate survey results page. It should not display the variable names on surveys but only on the "Stats & Charts" page within the project.

- Bug fix: When using the Dynamic Data Pull module (either DDP on FHIR or DDP Custom), the date comparison function for evaluating timestamps for temporal mapped fields might exclude some values if their timestamps fall right on the edge of the date range. This means that some values might mistakenly not appear in the list of DDP values to adjudicate from the EHR/source system. For this to occur would likely be rare. (Ticket #42444)

- Bug fix: Cross-event branching logic or calculations would mistakenly not evaluate correctly for unchecked checkboxes referenced on other events. (Ticket #42585)

- Change: For DDP on FHIR, 25 more LOINC lab codes were added to the DDP field mapping process.

- Bug fix: When using certain Smart Variables inside the query of an SQL field, if that SQL field's value is being piped somewhere on the same form or survey page where the field is located, then if the value of the SQL field has already been saved, the SQL field's value would mistakenly not get piped when the page loads but only when the field's value was modified again while on that page. (Ticket #41868)

- Bug fix: When a field's value is being piped into the field label of a required field, in which that required field is submitted on a survey or form without a value, the resulting popup error "Some fields are required!" would mistakenly display the pre-piped version of the field labels in the popup rather than performing the piping before displaying the labels. (Ticket #42577)

- Bug fix: When using the Data Search feature on the "Add/Edit Records" page in a longitudinal project, if a value is entered that has a match inside a record name (record ID field), then some of the options returned in the search would often not navigate the user to a data entry page when clicked but would instead mistakenly just reload the "Add/Edit Records" page. (Ticket #42965)

- Bug fix: When using the To-Do List to process a "move to production" request, in which the request has been moved to "low priority" status, it would display the erroneous error message "Error: Request not valid", thus preventing the administrator from processing the request. (Ticket #43036)

- Bug fix: Record names displayed in the Participant List would not wrap to the next line but would mistakenly get truncated, thus preventing users from viewing the full record name in some cases. (Ticket #43059)

- Bug fix: REDCap Messenger would mistakenly run in the background when using the EHR Launch functionality in the "DDP on FHIR" module. This could mistakenly lead to some JavaScript errors, which might get displayed in the EHR interface.

- Bug fix: When using AWS S3 or WebDAV for file storage, some uploaded files (even those imported via the API or Mobile App) might have a copy mistakenly left in the /redcap/temp/ directory on the web server under a random name, in which the temp files never get deleted. (Ticket #43127)

- Bug fix: For certain server configurations or directory structures, the Cron Jobs page in the Control Center might go into an infinite loop and never fully load the page. (Ticket #43144)

- Bug fix: If branching logic or calculations are used for a field on a survey page, in which the logic/calc references the current survey's Form Status field, it would mistakenly assume the Form Status value to always be "" (blank) rather than the true status value of 0, 1, or 2. This does not affect data entry forms but only survey pages.

- Change: 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. (Ticket #38955)

- Bug fix: The database variable "collation_connection" was not getting set correctly when initializing the database connection. In most cases, this would not affect anything at all since it would only affect institutions who had recently performed a fresh installation (not an upgrade) of REDCap 8.5.0 and then afterward migrated to a new server or upgraded MySQL in which the collation_connection setting in MY.CNF (or MY.INI) was different from the original server.

- Bug fix: If using custom link text for the Smart Variable [survey-link] when used inside a survey invitation's text, it would mistakenly fail to use the defined custom link text for the Smart Variable and instead would revert to using the survey title as the link text.

- Change: Added "Postal Code (Germany)" as a new field validation type.

Version 8.5.0 - (released 5/29/2018)

NEW FEATURES, BUG FIXES, & OTHER CHANGES:

- **New feature: DDP on FHIR with EHR Launch**
  - REDCap's "DDP on FHIR with EHR Launch" feature provides the ability to launch a REDCap window while inside an EHR and to quickly and seamlessly import clinical data from the EHR into a REDCap project. As a built-in module in REDCap that can be enabled by an administrator, this feature can interface with any EHR system that has "SMART on FHIR" web services enabled.
  - What is DDP on FHIR? DDP on FHIR (Dynamic Data Pull from EHR) is a special feature for importing data into REDCap from an EHR (electronic health record system), such as Epic, Cerner, etc. It provides an adjudication process whereby REDCap users can approve all incoming data from the EHR before it is officially saved in their REDCap project. DDP on FHIR can only be enabled by a REDCap Administrator, so you should contact them if you wish to utilize DDP on FHIR for this project.
  - How the DDP on FHIR works: DDP on FHIR has the ability to fetch data from the EHR system both manually in real time and automatically at a regular interval. From the EHR interface, DDP on FHIR can create new records in a DDP-enabled REDCap project. Additionally, if a user knows the patient identifier (e.g. medical record number), then they could optionally enter the MRN for a record in a DDP-enabled REDCap project, after which it will then go and immediately retrieve the patient data from the EHR in real time.
  - For more documentation on "DDP on FHIR", please see https://redcap.vanderbilt.edu/redcap_v8.5.0/Resources/misc/redcap_ddp_fhir_setup.zip To view a 5-min overview video of DDP, please see https://tinyurl.com/redcapddp (note: this video is not specific to DDP on

FHIR since the video was originally created for DDP Custom years ago, but it contains most of the functionality in DDP on FHIR (i.e., it does not showcase the EHR Launch feature of DDP on FHIR).

- **Improvement: 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. (Ticket #25326)

- Change/improvement: Protection has been added to help prevent the REDCap database connection's client character set (e.g., latin1, utf8, utf8mb4) from being affected 1) due to changes to the MY.CNF (or MY.INI for Windows) configuration file in MySQL, 2) due to a server upgrade, or 3) due to migrating to a new servers. The current database connection's client character set will be stored in the redcap_config database table, and if the client character set ever changes on its own due to one of the reasons above, REDCap will automatically keep using the existing character set from the redcap_config table in order to maintain the correct encoding to prevent data corruption.

- Change/improvement: New installations of REDCap will utilize utf8mb4 as the default character set for both the database columns (previously set to utf8[mb3]) and client connections (previously set to that of the database server), which is defined in the MY.CNF (or MY.INI for Windows) configuration file in MySQL, or set to latin1 if non-existent. This default has been changed because utf8mb4 encoding can allow for a greater variety of non-Latin characters to be stored in the database. Existing installations will not be able to utilize utf8mb4 encoding but instead will keep using their existing encoding (if other than utf8mb4).

- Bug fix: When installing REDCap, it would mistakenly not auto-set the value of the REDCap Base URL on the install page.

- Bug fix: If using MariaDB 10.2 (or higher) for the REDCap database, the REDCap Control Center would display the erroneous error message "Your REDCap database structure is incorrect!". (Ticket #28083, #32131, #41911)

- Bug fix: When using the "Add/Edit Branching Logic" popup in the Online Designer, if certain Smart Variables are used in the branching logic, and then the user selects a record from the "Test logic with a record" drop-down, it might display an erroneous message saying the the logic is not syntactically correct.

- Bug fix: When performing a data import of radio buttons in a matrix that has ranking enabled, it would sometimes display an erroneous error message if two or more matrixes of questions are being imported at one time, thus preventing the import from completing. (Ticket #39804)

- Bug fix: When using Dynamic Data Pull (either DDP Custom or DDP on FHIR) and the MRN field is being used as the Secondary Unique Field in the project, then if an MRN is entered on a form and the "Duplicate value!" error message popup is displayed, it would mistakenly not be possible to close the popup, thus causing the user to have to reload the page. (Ticket #41879)

Version 8.4.5 - (released 5/22/2018)

- Change/improvement: For DDP on FHIR (for early adopters), the number of labs that are listed in the field mapping process has been greatly reduced to a more curated list that now excludes irrelevant LOINC fields that might not ever be used in an EHR. This should make it easier to find relevant labs from the EHR during the mapping process.

- Change/improvement: When using DDP Custom or DDP on FHIR, Step 1 of the field mapping process in a project now displays the "select all/deselect all" links for categories even when sub-categories exist for that category. In previous versions, it would not display the "select all/deselect all" links for categories when sub-categories existed, which made it difficult to select lots of fields in a category that were themselves not in a sub-category. So this reduces the number of clicks required in some cases.

- Fixes for External Module framework (https://github.com/vanderbilt/redcap-external-modules/releases/tag/8.4.5a)

Version 8.4.4 - (released 5/17/2018)

- Change: If one or more external modules have been made "discoverable" in the system or if one or more modules have been enabled in a project, the "External Modules" link that is displayed on a project's left-hand menu will no longer appear for users unless they 1) have Design/Setup privileges or 2) have been given explicit user permissions for configuring at least one module enabled in the project. In previous versions, if at least one module had been made "discoverable", then the "External Modules" link would always appear in every project for every user, which proved to be undesirable for many users at many institutions. So this change has been made so that the link appears less to users who do not need to see it. Note: The link will still always appear to REDCap administrators, and also will still appear to users that have module configuration rights or Design/Setup privileges when modules have been either enabled in the project or made "discoverable" in the system.

- Change: For installations where only administrators can move projects to production, more protection has been added with regard to admins approving requests to move projects to production so that if a user makes a request, then cancels it, and then makes another slightly different request for the same project, it will no longer allow the canceled request to be approved, even if an administrator clicks the link to the request in an email. This provides better protection against a project's data from accidentally getting erased when moving to production. (Ticket #39772)

- Bug fix: When calling the API method "Export Project XML" and setting the parameter "returnMetadataOnly" as FALSE, it would mistakenly not return data but would only ever return just the metadata.

- Bug fix: The Smart Variables [survey-queue-link] and [survey-queue-url] were mistakenly not working when used inside the email subject or email message for an Automated Survey Invitation.

- Bug fix: When piping a project variable inside the email subject for an Automated Survey Invitation, it would mistakenly not successfully pipe the field's data unless that same variable was piped into the email message also.

- Bug fix: When downloading a PDF of an instrument that contains a matrix of fields, the matrix headers might mistakenly overlap the radio buttons or checkboxes of the first field in the matrix under specific circumstances. (Ticket #40969)

- Bug fix: When using record auto-numbering for a data import (via Data Import Tool, API, or Mobile App) that contains data for a repeating instrument or repeating event, then all the data for a given record in the import might be reduced from multiple instances/events of data to a single event/instance of data, thus causing much of the data to mistakenly not get imported. (Ticket #41283)

- 8.4.4: Bug fix: Due to changes to non-versioned files in previous versions of REDCap 8.4.X, plugin files not located in the /redcap/plugins/ directory would mistakenly fail to load. (Ticket #40608, #41404)

- Bug fix: When viewing the "Stats & Charts" page, if a field has some missing values, and the user clicks the link to view the record names that have missing values, it might mistakenly return incorrect records-instances. This only occurs in projects having repeating instruments or repeating events. (Ticket #37674)

- Bug fix: When importing data (via Data Import Tool or API) into a longitudinal project and setting true/"yes" for the import option "Allow blank values to overwrite existing saved values?" when importing blank values for checkbox fields into a longitudinal event for which the checkbox's instrument is not designated, it would display the erroneous error that the checkbox field "exists on an instrument that is not designated for the event". (Ticket #37627)

- Bug fix: When adding a new field to an instrument on the Online Designer while in Draft Mode, if the field is being added between a section header and another field, in which the instrument begins with that section header, then the new field would get successfully created but would mistakenly not be visible in the Online Designer on that instrument, thus leaving it in a quasi-orphaned state. (Ticket #41359)

- Fixes and updates for External Module framework (https://github.com/vanderbilt/redcap-external-modules/releases/tag/8.4.4)

Version 8.4.3 - (released 5/11/2018)

BUG FIXES & OTHER CHANGES:

- **Major bug fix:** When using the designated email invitation field (project-level or survey-level versions of the email field) and saving a value for the email field on a survey or data entry form, when REDCap attempts to synchronize the value across all events/instances where the field is located, it would mistakenly not add the value to events or instances where the email field has never had a value saved. This could result in the email field's value appearing to be lost/deleted in some contexts. (Ticket #40615)

- Bug fix: When uploading a data dictionary containing Smart Variables in either branching logic or calculations, it would mistakenly display an error and prevent the user from completing the upload.

- Bug fix: When piping text that contains a dollar sign followed by a number, it would often mistakenly remove the dollar sign and the number that immediately follows it when displaying that piped text.

- Bug fix: When a record is selected on a project's Logging page, under certain specific conditions it might mistakenly display "Perform instrument-event mappings" logged events.

- Updates and fixes for External Modules framework

- Bug fix: When viewing the Participant List for a project using the Twilio telephony module for surveys, if a user attempts to change the invitation preference for a participant in the participant list, then the popup window might mistakenly get obscured by the page footer. (Ticket #40150)

- Change/improvement: When a table-based user account is created or has their password reset link emailed to them, the email now includes extra text to remind them to set up their password recovery security question after logging in. (Ticket #40324)

- Bug fix: When opening the Data History popup for a given field on a data entry form, in certain cases it might mistakenly display the logged events for another field (for the same record) if the other field's variable name exists as the last portion of the current field's variable name (e.g., the field "his_field" would return logged events for the field "this_field" for the same record-event).

- Bug fix: If running REDCap on certain versions/configurations of PHP 5.3, it would not be possible to upgrade or install REDCap. (Ticket #40852)

- Bug fix: There was mistakenly no way to force REDCap to verify the SSL certificate if using SSL/TLS for the database connection, thus it assumed that it should never need to verify it. Since some institutions require SSL certificate verification when using an encrypted database connection, the line "$db_ssl_verify_server_cert = true;" should be added to the database.php file in order to force SSL certificate verification for the database connection. Note: The line of code below was added to the database.php file in the REDCap downloadable install zip file. $db_ssl_verify_server_cert = false; // Set to TRUE to force the database connection to verify the SSL certificate

- Change/improvement: On the "Stats & Charts" page, the variable name is now displayed next to the field label for each field displayed on the page.

- Bug fix: When viewing a record on the Record Home Page, on certain occasions if a user clicks on a repeating instrument that has a gray status icon, it might mistakenly create instance 2 as the first instance of that repeating instrument, rather than creating instance 1. This appears to affect only repeating instruments, not repeating events.

- Bug fix: In a longitudinal project that is using the Smart Variables [first-instance] or [last-instance] that are appended to a project variable name in logic, calcs, or piping, it would mistakenly return a blank value if the unique event name is prepended to the variable name.

- Bug fix: When using the randomization module in a project, in which one of the randomization strata fields has a choice that is hidden using the action tag @HIDECHOICE, then when randomizing a record on a data entry form, it would mistakenly display the choices in the randomization popup that should be hidden for the strata field. (Ticket #38987)

- Bug fix: When using a [X-event-name] Smart Variable inside branching logic to reference a field on another event, it would mistakenly display the branching logic error popup.

- Bug fix: When piping data from a matrix checkbox field to a place on the same page, it would mistakenly not pipe it correctly until the page was reloaded. (Ticket #41037)
- Bug fix: When a calc field exists on a repeating instrument or repeating event, and a field on another form/event triggers that calc field, then if no data had ever been entered into the calc field's form, it would mistakenly change the form status icon to red when instead it should stay gray (since only the calc field has data on that form). (Ticket #40940)

Version 8.4.2 - (released 5/1/2018)

BUG FIXES & OTHER CHANGES:

- **Major bug fix:** If a slider field with a saved value on a form or survey gets focus (via tabbing into the field or if the field is the first field on a form), then if the user does not change the value of the slider after putting focus on it, then it would mistakenly remove the slider's existing value, thus erasing its value if the user saves the form/survey. (Ticket #40445)

- Change/improvement: Slight performance improvement on "Add/Edit Records" page for longitudinal projects using the Custom Record Label.

- Bug fix: When adding a project as a project template in the Control Center, the popup dialog might fail to display if some projects contain certain special characters in their project title. (Ticket #40283)

- Bug fix: When the Response Limit option has been set for a survey, instead of displaying the custom text on the survey page whenever the limit has been reached, for specific versions of PHP it would mistakenly just display a blank page. (Ticket #39659)

Version 8.4.1 - (released 4/29/2018)

BUG FIXES & OTHER CHANGES:

- **New REDCap class method for developers: REDCap::getReport** – Plugin, hook, and module developers may utilize this method to return a report, which has been created in a project, in one of the following formats: Array, JSON, CSV, or XML. This is the REDCap class equivalent of the "Export Reports" API method.

- Bug fix: In some very rare cases, branching logic, calculations, and various conditional logic would not get parse correctly and would cause errors. (Ticket #39856)

- Bug fix: On some specific server configurations, the REDCap Upgrade module would not set certain server path constants correctly. (Ticket #40203)

- Bug fix: In certain cases, the @NONEOFTHEABOVE might not work on surveys or forms and might cause the user to get stuck and have to reload the page. (Ticket #40182)

- Bug fix: After running Data Quality rule H, the "Fix calcs now" button would mistakenly not work. (Ticket #40285)

- Bug fix: For longitudinal projects using a public survey on multiple arms, regarding all arms except the first arm, the public survey link would mistakenly be blank on the Public Survey Link page. (Ticket #40311)

- Bug fix: When survey invitations are being scheduled for many participants at once on the Participant List, in which some piping is being performed in the invitation's subject or body, then it might take an abnormally long time to complete the scheduling of all those invitations and might even time out and fail on certain occasions.

- Changed: 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. (Ticket #39949)

- Change/improvement: The main Control Center page now displays a warning message if any non-versioned files are outdated and need to be replaced. In previous versions, this warning would only appear on the Configuration Check page.

- Bug fix: When using the Twilio telophony module for sending survey invitations while also using Automated Survey Invitations that contain conditional logic containing datediff+today or datediff+now, if the ASI has "Participant Preference" as the invitation type, then in certain cases (but not all the time) it would mistakenly send the invitation via email rather than via the participant's preferred delivery method. And if those participants do not have an associated email address, then the invitation would simply fail to send, as noted in the Survey Invitation Log. (Ticket #29316)

- Bug fix: When piping checkbox fields with the "checked" or "unchecked" attribute, in certain cases it might mistakenly not display the correct checked/unchecked choices, respectively. (Ticket #39950)

Version 8.4.0 - (released 4/18/2018)

NEW FEATURES, BUG FIXES, & OTHER CHANGES:

- **New feature: 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. There are many possibilities.
  - 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.

- o 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.

- **Improvement: SQL fields can utilize Smart Variables**
  - o Utilizing Smart Variables in SQL fields can be very powerful because they allow the query to be truly dynamic and change from context to context or record to record, rather than it always being a static query that gets executed against the database.
  - o Note: When using Smart Variables inside the query of an SQL field, you do NOT need to wrap the Smart Variable in quotes or apostrophes because the Smart Variable itself will be replaced with a value already wrapped in single quotes. Also, the value of the Smart Variable will be SQL-escaped when placed inside the query so that no user can inject values to manipulate the query. This has no effect on how one constructs the query, but for security purposes it is good to know that this is being done.

- **Improvement: Custom Record Labels now use proper piping syntax and can also utilize Smart Variables.**
  - o 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.
  - o 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.

- **Improvement/change: New method for composing survey invitation text using Smart Variables for survey link**
  - o 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.
  - o If the user forgets to enter the survey URL Smart Variable in the text, REDCap will automatically suggest to them that they should.
  - o If using the Twilio telephony module for sending invitations, the standard instructional text will still be appended in the SMS message as in previous versions EXCEPT for the "Email invitation" and "SMS invitation (contains survey link)" invitation types, which require [survey-url] and/or [survey-link] in the SMS text in order for the participant to receive a survey link.
  - o 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.

- **New feature: 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 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]".

- **Improvement: 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.

- **Improvement:** 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.

- **Improvement:** 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]".

- **Minor security fixes:** Some Cross-Site Scripting (XSS) vulnerabilities were found on various pages in which a malicious user could potentially exploit them by manipulating the query string or POST parameters of particular

HTTP requests. Part of this batch of fixes includes a change in the REDCap API's "content-type" HTTP header for CSV exports from "text/html" to "text/csv" as an extra preventative measure to protect against XSS.

- **Major bug fix:** On some extremely rare occasions when loading a public survey, it might mistakenly display the data from a previous response rather than displaying the page with all fields blank.

- Change/improvement: If a REDCap installation is using two-factor authentication and has the Google Authenticator option enabled, then when new users initially verify their email address when first logging in to REDCap, it will now display the instructions for setting up the Google Authenticator app on that page after the email verification is successful. This will be necessary for installations that are utilizing Google Authenticator as the only two-factor option and also are not using Table-based authentication. (Note: This functionality does not apply to installations using Table-based authentication since that does not require email verification.)

- Bug fix: The "expand" link would mistakenly not work for the "Custom text to display at the top of the Help & FAQ page" textbox field on the General Configuration page in the Control Center.

- Bug fix: When deleting a repeating event instance on the Record Home page, it might mistakenly delete all files uploaded to any File Upload fields on other repeating instances of that event. (Ticket #37988)

- Various fixes and updates for External Modules framework

- Bug fix: When viewing the Survey Invitation Log in a project using the Twilio telephony services for surveys, it would mistakenly display the "Record" and "Participant Phone" headers for the wrong columns in the table.

- Bug fix: When using the REDCap Mobile App for a project that contains Descriptive fields that have inline images, if the file storage setting has been set to "WebDAV" on the File Upload Settings page in the Control Center, the images would mistakenly not get synced to the mobile app correctly.

- Bug fix: The action tags @NONEOFTHEABOVE and @MAXCHECKED would not work well together and would cause @NONEOFTHEABOVE to malfunction when using both tags on a single checkbox field. (Ticket #38119)

- Bug fix: When using a custom Data Quality rule to find a field with a blank value, in which the field exists on a repeating instrument, it would not always return the correct results. (Ticket #37067)

- Bug fix: When using the Google Authenticator app for two-factor authentication and an administrator clicks the "Send instructions via email" for 2-step login on the Browse Users page, it would mistakenly try to embed the QR code image in the email sent. But if the user was not currently logged into REDCap, then it would mistakenly display a broken image in the email contents instead.

- Various fixes and updates for External Modules framework

- Bug fix: The documentation for action tags @TODAY and @NOW mistakenly state that a field using either action tag would be disabled and not editable, which is no longer true but used to be true in older versions. (Ticket #32537)

- Bug fix: When uploading an instrument zip file in the Online Designer, it would mistakenly truncate the form name to 50 characters in length when instead it should be truncating it to 64 characters if the form name was longer than that.

- Bug fix: When using the PDF Auto-Archiver for a survey, if the project has all its data erased via the "Erase all data" button on the Other Functionality page or if the project is moved to production while opting to delete all records, then it mistakenly would not delete all the archived PDF files in the File Repository. (Ticket #38660)

- Bug fix: When clicking the "exclude" or "remove exclusion" link in the discrepancy results in the Data Quality module when using a non-English language for the text of that project, it would mistakenly only show the text in English right after clicking those links. It should instead display them in the project language. (Ticket #38408)

- Bug fix: If using an SSL database connection for MySQL, plugins and some external modules pages would mistakenly return an error and not load. After upgrading to this version, an administrator will need to download the zip file containing outdated non-versioned files on the Configuration Check page, and then follow the instructions there. (Ticket #37763)

- Change/improvement: Non-versioned files (e.g., redcap/index.php, redcap/surveys/index.php) now make a database connection via redcap_connect.php to determine the current REDCap version (when appropriate). In previous versions, those files would naively assume the highest numbered version that was inferred from the REDCap version directory name, which would sometimes lead to erroneous conclusions about the correct version number.

- Bug fix: On very rare occasions, creating a new user role in a project might mistakenly result in displaying an error to the user that states that an email could not be sent to the user, which does not make sense because there is no user in this context. This was supposedly fixed in the previous version but was not. (Ticket #37465)

- Bug fix: When deleting a form's data using the "Delete data for THIS FORM only" button at the bottom of a data entry page, if it is a repeating instrument, it would mistakenly fail to mention that this action would only delete the current repeating instance of the form, not all repeating instances of that form.

- Bug fix: The SQL mapping file for installing the DDP Custom demo web service might cause an SQL error and not execute successfully if DDP mapping has already been performed for any DDP Custom project in the system.

- Bug fix: The Dynamic Data Pull (DDP Custom or DDP on FHIR) module was mistakenly unable to utilize repeating instruments or repeating events for capturing temporal data.

- Change/improvement: Added stats for e-Consent Framework usage on the Control Center's System Statistics page.

- Change: 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.

- Change/improvement: When using the Copy Project button on the Other Functionality page, it now copies the Record Locking Customization settings for the project.

- Change/improvement: 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.

- Bug fix: When using AAF authentication, the cross-site request forgery (CSRF) protection would not work properly.

- Bug fix: When an unsuccessful login attempt occurs in REDCap, it now only logs the username value entered if the value is a valid REDCap user's username. If not, it instead logs it as "[not_valid_username]" in the redcap_log_view database table. This fixes a potential security hole in which some users might mistakenly enter their password in the username login field, in which it would log their password in plain text in the redcap_log_view database table and thus could be viewable to anyone with direct access to the backend database.

- Bug fix: When adding a new user in REDCap (in several places throughout the application), if user attempts to create a username containing an ampersand, it would not allow it even though the error message says that ampersands are allowed. This error message text is incorrect because ampersands are not allowed in REDCap usernames. (Ticket #39267)

- Bug fix: When running Data Quality rule H, it might mistakenly not return some discrepancies in very specific cases. This would most often occur when the calculated value has a decimal while the saved value does not contain a decimal (and vice versa). (Ticket #38488)

- Bug fix: When using a Live Filter on the "Stats & Charts" page of a report, in which no results should be displayed for the selected Live Filter, it would mistakenly display all records in the charts and stats tables on the page. (Ticket #39349)

- Bug fix: When using conditional logic, report filters, etc., in which certain text is used inside double quotes or single quotes (i.e., text that is used internally by REDCap as special processing tokens), it would sometimes mistakenly return no results instead of the desired results. (Ticket #32295, #39418)

- Change: New DDP on FHIR setup instructions for Cerner were added to the DDP on FHIR zip file.

- Change: 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. (Ticket #39613)

- Bug fix: Inside the red box that appears at the top of the data entry form when viewing a survey response, it would mistakenly report that other users contributed to the survey response, even though those users may have entered data on another instrument for that record. This issue cannot be fixed for existing responses, but the issue will no longer occur for any new responses created. Additionally, the text that denotes the users that have contributed after the survey was completed would be incorrect if users may have entered data on another instrument for that record, but this issue (unlike the other one described above) will be fixed retroactively for existing responses and for new responses. Also, both of these issues would mistakenly include calc fields when determining contributors; however, calc fields will no longer be considered because they can be triggered from data being entered elsewhere for a record. (Ticket #38545)

- Bug fix: When exporting data to a stats package for a project that contains repeating instruments, the choices listed for the field "redcap_repeat_instrument" in the stats package's syntax file would mistakenly have the instrument label repeated multiple times for that field if that instrument were set to be repeating on multiple events in the project. (Ticket #38529)

- Bug fix: When viewing the Public Survey Link page of a project containing multiple arms, if the first data collection instrument is not designated for the first event of the current arm, it would mistakenly display the public survey link of another arm (typically the first arm). It now displays a warning on the page to inform the user to fix this issue by designating the first instrument for the first event of that arm. (Ticket #39647)

Version 8.3.2 - (released 3/15/2018)

NEW FEATURES, BUG FIXES, & OTHER CHANGES:

- **New feature: 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.

- **Improvement:** The REDCap::getParticipantEmail method has a new optional parameter ($instrument) that can be utilized, in which $instrument is the unique/back-end name of the data collection instrument. This parameter only needs to be passed when utilizing the survey-specific email invitation field for a given survey, in which there might exist a different email address for that specific survey than for other surveys in the project.

- **Improvement:** 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.

- Bug fix: When using the Data Search feature on the "Add/Edit Records" page, clicking the keyboard's down arrow button mistakenly no longer selects an option returned from the search. (Ticket #37144)

- Bug fix: In a longitudinal project, when a user clicks the "Delete data for THIS FORM only" button on a data entry form, if data exists on other events for the current record AND the form being deleted is the only form containing data on the current event, then that event would mistakenly still show up in reports and data exports even though it no longer contains any data and shows gray status icons for all the instruments in the event. In the previous version, this bug was fixed for most scenarios (traditional longitudinal and repeating instruments) except not for repeating events. This now fixes the issue for repeating events. (Ticket #35814, #37290)

- Bug fix: If a user requests that their project be moved to production by an administrator, in which the administrator does not use the To-Do List nor the link in the request email but instead just goes to the project directly to move it to production, then the original request would mistakenly not get removed from the To-Do List. (Ticket #37159)

- Bug fix: When searching by project title on the Browse Projects page when a username has not been entered in the user search box, it would mistakenly assume that a username named "Search" was entered. This only occurs when using Internet Explorer. This would also cause the user button at the top right of the page to mistakenly say "User does not exist". (Ticket #37497)

- Bug fix: On very rare occasions, creating a new user role in a project might mistakenly result in displaying an error to the user that states that an email could not be sent to the user, which does not make sense because there is no user in this context. (Ticket #37465)

- Change: On the Browse Users page, it will no longer display the "Verified" or "Not yet verified" flag next to a user's email address if the user is a Table-based user. This is because the email verification is only ever utilized for non-Table-based authentication. (Ticket #37474)

Version 8.3.1 - (released 3/9/2018)

BUG FIXES & OTHER CHANGES:

- **Improvement:** REDCap will routinely check to see if any External Modules have updates available for download in the REDCap Repo. If some do, it will display a message in the Control Center to allow an administrator to easily update the modules.

- **Improvement:** If the REDCap installation has been set to report its REDCap stats "manually" (rather than "automatically") on the General Configuration page, it will provide a new button on the Control Center "Notifications" page that says "Try auto-sending stats", which will double check if the server is able to send its REDCap stats automatically. And if the button is clicked and is successful, it will automatically set the installation's reporting method to automatic.

- **Improvement:** Sponsor Dashboard requests that are listed on the To-Do List page will now have the selected users' usernames in the To-Do List item's comment so that the administrator may reference this (if needed) while processing the request.

- **Improvement:** When the Google Authenticator option has been enabled while using two-factor authentication, it now displays a button on the Browse Users page in the Control Center that, when clicked, will email the user the instructions for setting up Google Authenticator for their REDCap account. This feature will be useful when all other two-step login options have not been enabled and the user cannot successfully log in to REDCap.

- Various fixes and updates for External Modules framework.

- Change: 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.

- Bug fix: On the Project Templates page in the Control Center, it would mistakenly display deleted projects in the project drop-down list when choosing a project to enable as a project template. (Ticket #36672)

- Bug fix: When the "Save & Return Later" setting is enabled on a survey and the "Allow respondents to return without needing a return code" option is checked, if a participant's email address is known when they click the "Save & Return Later" button on the survey page, it would mistakenly display some text on the page that implied that they would need a Return Code to return to the survey, which is incorrect. (Ticket #36729)

- Bug fix: In a longitudinal project, when a user clicks the "Delete data for THIS FORM only" button on a data entry form, if data exists on other events for the current record AND the form being deleted is the only form containing data on the current event, then that event would mistakenly still show up in reports and data exports even though it no longer contains any data and shows gray status icons for all the instruments in the event. (Ticket #35814)

- Bug fix: In a longitudinal project, the Scheduling module might mistakenly crash due to a fatal PHP error when attempting to generate a schedule for a record. This was often due to using either a negative Day Offset value or negative Offset Range value for certain Start Date values. Bug emerged in REDCap 8.2.2. (Ticket #36592)

- Bug fix: REDCap Messenger might throw a JavaScript error after being opened because certain web browsers are beginning to deprecate synchronous AJAX requests in JavaScript. (Ticket #36970)

- Change: 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.

- Bug fix: When using the @NOW action tag for a date field (rather than a datetime field), it mistakenly inserts the full timestamp into the date field, which results in a field validation error. It now instead inserts only today's date as a value into the field, as if @TODAY were used. (Ticket #36969)

- Bug fix: If a slider field on a survey or data entry form is set to display its numerical value, if "100" is selected for the slider, the text field would partially cut off the value being displayed. (Ticket #37048)

- Bug fix: When using "<>", "<", or "<=" in the choice labels for drop-down, radio, or checkbox fields on an instrument, they would not display correctly on the page but instead might omit those operators or instead display nothing as the choice label. (Ticket #37007)

Version 8.3.0 - (released 3/1/2018)

NEW FEATURES, BUG FIXES & OTHER CHANGES:

- **New features: 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 (if desired) on the Modules/Services Configuration page in the Control Center.
    - The e-Consent Framework feature can be disabled at the system level (if desired) on the Modules/Services Configuration page in the Control Center.
    - In addition to storing the e-Consent PDFs in a project's File Repository, you may also optionally enable the External Storage option (requires PHP 5.6.0+), which will automatically store the PDFs on a separate file server (using WebDAV or SFTP). This external file server may serve as a giant "vault" for your entire REDCap installation's consent forms. This is a system-level setting that can be enabled on the File Upload Settings page in the Control Center.

- **New feature: New method REDCap::getValidFieldsByEvents** for plugins, hooks, and modules. This method returns an array of field names belonging to instruments that are designated for specified events in a longitudinal project. The method also contains the option to include or exclude the project's Record ID field.

- **Improvement:** 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).

- **Improvement:** Checkbox fields may now be utilized in the DDP Custom or DDP on FHIR modules when importing data from external sources/EHRs. This will be useful because certain systems might record some non-temporal fields (e.g., race) as multi-value fields. Note: If multiple values are detected from the DDP source system/EHR for a field that is neither a temporal field nor a checkbox field, it will display a red warning message in the DDP adjudication popup informing the user that multiple values have been detected and that only one value can be imported unless they convert the field into a checkbox field.

- **Improvement:** The Configuration Check page in the Control Center now checks to see if the REDCap server can communicate with all the various third party websites/services that are used within REDCap. These include Twilio, PROMIS, BioPoral, Bit.ly, and IS.GD.

- Bug fix: When deleting an individual survey invitation or modifying an invitation's send time on the Survey Invitation Log, the logging would mistakenly state that "SYSTEM" performed the action rather than the user's username.

- Various fixes and updates for External Modules framework

- Bug fix: On the Field Comment Log page in a project, if a user is using the Internet Explorer web browser, clicking the "Apply filters" button would mistakenly cause it mistakenly to search for the keywords "Keyword" and "search" even when the "Keyword search" text box has been left blank. This would often cause it to return no results, which is confusing. (Ticket #36266)

- Bug fix: Projects that use repeating events or repeating instruments will now *always* output the "redcap_repeat_instrument" and "redcap_repeat_instance" fields in a report or data export, as well as the output of REDCap::getData, regardless of whether the report/export contains any repeating data or not. In previous versions, it would mistakenly only output those fields if any data in the report/export was repeating. This means that the number of columns would vary unpredictably based on the filters applied to the report/export (or based on the parameters passed to REDCap::getData), which is confusing and inconsistent with how reports/exports typically behave. (Ticket #36263)

- Bug fix: When a record is deleted in a project (either via the user interface or via API), the logging page would mistakenly display the event name for the logged event, which is confusing because the record as a whole was deleted, not just for a specific event. It now no longer displays the event name for the logged event, and if the project contains multiple arms, it will instead display the number and name of the arm from which the record was deleted. (Ticket #36358)

- Bug fix: When viewing the data entry form of a repeating instrument, in which the "Current instance" drop-down list is displayed at the top of the page, if a user clicks the "+" button inside the drop-down rather than clicking the "Add new" text, it would mistakenly take the user to an incorrect page.

- Bug fix: When viewing/exporting a report or using the REDCap::getData() method in a longitudinal project with multiple arms, in which the user is exporting data from an arm that currently has no records in it (i.e., the data set being returned should be empty because there is no data from that arm to return), then it would mistakenly output a list of all records from other arms but with blank/default values. (Ticket #36470)

- Bug fix: In a longitudinal project with multiple arms, in which a record exists on more than one arm, if a user clicks the "Lock all instruments across all events" on the Record Home page on a certain arm, it would mistakenly lock all the instruments/events on other arms in addition to the current arm. It should only lock the instruments on the current arm. Note: The unlocking process does not appear to be affected by this issue.

- Bug fix: When using DDP Custom or DDP on FHIR and adjudicating temporal data for several different events, if a field value is adjudicated in one event, it might mistakenly get marked as adjudicated for that same field in other

events. This causes the field to be hidden in the DDP adjudication popup when viewing the other events, so it makes it appear as if it has already been adjudicated when it has not.

- Bug fix: On certain occasions, the Scheduling module might mistakenly crash due to a fatal PHP error when attempting to generate a schedule for a record. This appears to only occur for PHP 5.3. (Ticket #36592)

Version 8.2.3 - (released 2/23/2018)

BUG FIXES & OTHER CHANGES:

- **Improvement/change:** To help with troubleshooting PHP errors occurring on the REDCap server, the line "global $log_all_errors; $log_all_errors= true;" can be added to the database.php file, which will log all PHP errors, warnings, and notices to the designated PHP log file. (Ticket #35868)

- **Improvement:** On the "Browse Users" page, the "View User List By Criteria" tab has a new display option "Has never logged in" to help administrators quickly find users (typically when using Table-based authentication) that have a REDCap account but have never actually logged in to REDCap.

- **Improvement:** The REDCap::getData method for plugins/modules now has an alternative way of passing parameters to the method. Rather than providing the method's parameters individually, they instead may be passed to the method in an associative array, in which each key in the array exactly matches the parameter names listed above (must match case). Note: Not all the parameters have to be included in the array, but only the ones one wishes to set explicitly. Example: $params = array('return_format'=>'json', 'filterLogic'=>'[age] >= 18', 'fields'=>array('dob','record_id')); $data = REDCap::getData($params);

- **Major bug fix:** If a longitudinal project has more than one arm and also has the Secondary Unique Field enabled, if a record exists in multiple arms, then whenever a user saves a value on a form or survey for the Secondary Unique Field, it would mistakenly set that value for all events in all arms for that record when instead it should only set that value for all events in the current arm.

- **Minor security fix:** Some Cross-Site Scripting (XSS) vulnerabilities were found on various pages in which a malicious user could potentially exploit them by manipulating the HTTP Referrer header of an HTTP request.

- Bug fix: When viewing a record on a data entry form that exists on a repeating event and then clicking a PDF download option to download that instrument with saved data, the resulting PDF would mistakenly contain all the repeated instances of the instrument for that record instead of just the current instance being viewed. This issue does not occur for repeating instruments but only for instruments on a repeating event.

- Bug fix: For a matrix of fields displayed in the Online Designer, the matrix headers were not aligning correctly with the radio button/checkbox for the fields. This only occurred when viewing a matrix in the Online Designer.

- Bug fix: When using the date-picker or datetime-picker widget to select a date/time on a form, survey, or other page in REDCap, the field validation alert might get called prematurely, which can cause it to be displayed to the user

unnecessarily or may even cause the user to get stuck (because the widget keeps displaying whenever it is closed) and have to reload the whole page. (Ticket #35735)

- Various fixes and updates for External Modules framework

- Bug fix: When uploading a file using Send-It, if the recipients text box is left blank when the submit button is clicked, it would forever say "Working...", in which the user would have to manually reload the page in order to start over. (Ticket #35986)

- Bug fix: When using the Record Status Dashboard in a project with Data Access Groups, if the paging drop-down has a specific page selected and then the user selects a Data Access Group from the DAG drop-down, it could mistakenly try to display a "page" of records that does not exist for the new resulting data set and thus would display "no records", which could be confusing. In this case, it will now revert back to page 1 if the selected page no longer exists for the new DAG selection. (Ticket #36053)

- Bug fix: When using the Randomization module in a project and attempting to randomize a record on a data entry form in which the @NOW or @TODAY action tag is used *and* piping is also being performed on the same form, then the "Randomize" button would fail to appear if the user was specifically using iOS (Mobile Safari web browser). (Ticket #35998)

- Bug fix: On the Sponsor Dashboard and Browser Users pages, it would mistakenly allow a user to utilize the actions "Reset password", "Set account expiration", and "Extend account expiration" on users that have been suspended. It should not allow those actions on suspended users.

Version 8.2.2 - (released 2/15/2018)

BUG FIXES & OTHER CHANGES:

- **Improvement:** The "Browse Projects" page has a new option to perform a keyword search on the project title to find projects more quickly. This option can be used with or without the username search at the same time on that page. When searching by project title, it will order the project list based on best match with the keywords entered.

- **Improvement:** 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.

- **Improvement:** Added new filter on the Survey Invitation Log table to allow users to filter the invitations by record ID.

- **Improvement/change:** 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.

- **Improvement:** 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. (Ticket #1905)

- **Improvement:** 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.

- **Change/improvement:** The Control Center login option "Disable autocomplete feature in user's browser for username/password fields on REDCap login page?" has been improved to work more dependably in more browsers. Also, other pages with "password" type fields, such as the File Upload Settings page in the Control Center, have also been improved to prevent accidentally injecting a user's username and password in places where not appropriate or not correct. (Ticket #35339)

- **Change/improvement:** If an administrator is moving a project in production back to development status and the project is in Draft Mode, it will now automatically create a Data Dictionary Snapshot of the drafted changes and store the snapshot on the Project Revision History page.

- **Major bug fix:** When using the "Save & Return Later" survey feature, and a participant has partially or fully completed a survey, in certain cases if they use the return code and enter it while using the public survey link (as opposed to a private/unique survey link), it might mistakenly create a new record instead of modifying the existing record.

- Bug fix: When viewing the Participant List of a survey that is a repeating instrument or is on a repeating event, REDCap would mistakenly add extra placeholder rows in the Participant List if the instrument is utilized on multiple events. These extra ghost/placeholder rows would point to non-existing instances of an instrument. Note: If these placeholder rows have already been created in the Participant List, then unfortunately they will not be able to be removed. (Ticket #34741)

- Bug fix: When a non-CSV file is being uploaded into a place where only CSV files are permitted (e.g. Data Import Tool, Data Dictionary), it would mistakenly provide a link to a Microsoft webpage that no longer exists. The link URL has now been replaced with a working link.

- Bug fix: When performing a data import in a project with repeating instruments or repeating events, in which the redcap_repeat_instance field is included in the import file but is mistakenly given a non-numerical value, then the data values on that row might mistakenly be saved in the database incorrectly. (Ticket #35143)

- Bug fix: In the Scheduling module when using a Start Date with the year 2038 or higher, it would mistakenly return dates in the year 1969 for the projected schedule that is generated. (Ticket #35178)

- Bug fix: When a sponsor sends a request via the Sponsor Dashboard, after a REDCap administrator approves the request, the confirmation email being sent back to the sponsor would mistakenly mention the approver's username in the email body rather than the requester's username.

- Change/improvement: When a sponsor sends a request via the Sponsor Dashboard, after a REDCap administrator approves the request, the confirmation email being sent back to the sponsor now lists the usernames of all the users to which the sponsor request was applied.

- Bug fix: Fixed compatibility issues when using REDCap with PHP 7.2. This includes a fatal PHP error on the REDCap install page, and a fatal PHP error when downloading a PDF of an instrument. (Ticket #35240)

- Bug fix: On the Data Dictionary upload page, it might mistakenly display some uninterpreted HTML tags and some misformatted text for warnings and errors on the page after uploading a Data Dictionary. (Ticket #35499)

- Bug fix: If running PHP 5.3 on the REDCap server, in certain situations the Configuration Check page might mistakenly fail to mention that PHP 5.4 or higher is required in order to use External Modules.

- Bug fix: When using the "Save & Return Later" survey feature with the option enabled to "Allow respondents to return and modify completed responses", if a respondent begins a public survey and clicks "Save & Return Later", and then returns to the partially completed survey using a private survey link (not using the public survey link as before) and completes the survey, and then returns to the completed survey again using the public survey link (not the private survey link), using the return code they obtained the first time they visited the survey (not the return code they obtained later that is tied to the private link), and then they click "Save & Return Later", it will mistakenly set the survey status back to incomplete even though the survey has been completed. (Ticket #35210)

- Bug fix: When downloading a "compact" PDF of a survey response for a survey that has question auto-numbering enabled, the question numbers displayed in the compact PDF will not be correct when compared to the real order in which the questions appeared on the survey page.

- Bug fix: When downloading a PDF of an instrument while on a data entry form, in which data has been modified on the form, after clicking a "download PDF" option it would mistakenly display a confirmation prompt letting the user know that they will be abandoning the page, which is not true. So the prompt is unnecessary and confusing.

- Bug fix: When downloading a file attachment for a Descriptive field on a survey, in which data has been modified on the survey page, it would mistakenly display a confirmation prompt letting the participant know that they will be abandoning the page, which is not true. So the prompt is unnecessary and confusing. (Ticket #35436)

- Change: 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.

- Bug fix: If a report is being sorted by the record ID field in descending order or the record ID field is sorted as asc/desc with one or two other sort fields, and the project has record auto-numbering enabled but the record ID field does not have integer/number validation, then the report would fail to order the results correctly.

- Bug fix: When viewing the "Stats & Charts" page for a report, slider fields and calc fields would mistakenly not have a scatter plot displayed for them.

- Bug fix: The field label of the Secondary Unique Field would mistakenly get displayed even if the field has no value. It should not display the label unless there is a value. (Ticket #35637)

- Bug fix: When importing data into a project in XML format via the API or via the plugin method REDCap::saveData(), in certain cases it would not gracefully handle an error in the XML but would instead mistakenly cause a PHP fatal error. (Ticket #35368)

- Bug fix: If a survey is using "Save & Return Later" with the option "Allow respondents to return without needing a return code" enabled, then if a participant clicks the "Save & Return Later" button at the bottom of the survey, in the email that REDCap sends to the participant with the survey link needed to continue the survey, the email text would mistakenly mention that a return code would be needed, which is not correct. (Ticket #33365)

- Change/improvement: 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.

Version 8.2.1 - (released 2/1/2018)

BUG FIXES & OTHER CHANGES:

- **Improvement:** A new system-level setting was added on the Control Center's "User Settings" page: "Allow normal users to modify the 'Repeatable Instruments & Events' settings for projects while in production status". This setting is enabled by default, but if disabled by an administrator, normal users will not be able to open or save the 'Repeatable Instruments & Events' popup dialog on the Project Setup page while the project is in production, in which only administrators will be able to do so.

- **Improvement/change:** The Font Awesome 5 iconic font and CSS toolkit is now included as part of REDCap.

- **Improvement/change:** 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).

- **Improvement/change:** 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).

- **Improvement/change:** 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).

- **Performance improvement:** 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.

- **Major bug fix:** When downloading the CSV export of a survey's Participant List, a race condition might occur if multiple users are downloading the list (or if multiple requests are coming from the same user) near-simultaneously, in which it could possibly return a Participant List export file that contains Survey Access Codes that do not really exist and are therefore not valid access codes. (Ticket #34862)

- Bug fix: The setting for "External Modules: Alternate module directories" on the Modules/Services Configuration page in the Control Center did not have clear examples and had confusing instructions.

- Bug fix: The dashboard page in the Randomization module might mistakenly not get rendered correctly and thus may not be viewable if malformed HTML exists in the field label or choice label of the randomization field or a criteria field.

- Bug fix: The "Set up Survey Queue" popup in the Online Designer would mistakenly note that the first survey instrument is not displayed in the popup and therefore cannot be used in the Survey Queue. However, this is no longer true (but was true in earlier versions), so that incorrect text has now been removed.

- Change: The icons used to represent projects with "archived" status now use the Font Awesome "archive" icon instead.

- Bug fix/change: When an administrator is processing a request submitted via the Sponsor Dashboard in which the things being requested are no longer applicable (e.g., if a user was requested to be suspended, but the user has been suspended through other means before the request was processed), it would display a confusing message to the administrator. Now in these situations it lets the administrator know that there is nothing to do and that they should contact to the requester to let them know that the request does not need to be completed.

- Improvement: A new "hide suspended users" option was added to the Sponsor Dashboard to allow sponsors to hide suspended users when viewing that page.

- Bug fix: For a survey that does not have "Save and Return Later" enabled, if a respondent returns to an incomplete survey response using a unique survey link, it would mistakenly display the "Start Over" button to allow them to erase their answers even if the response had been locked by a user on the data entry form. Respondents should not be able to modify data or erase data if the form has been locked. This has been changed so that if the response is locked, it

will not display the "Start Over" button and will inform the respondent that they cannot do anything until a survey administrator has unlocked their response. (Ticket #34676)

- Bug fix: Fields having any of the "Number (comma as decimal)" validations would mistakenly not have their scatter chart or descriptive stats displayed on the "Stats & Charts" page for a report.

- Bug fix: When copying an instrument via the "Copy" action in the Online Designer, if the instrument contains a "calc" field in which its equation has been left blank, it would display an error stating that the instrument could not be copied.

Version 8.2.0 - (released 1/25/2018)

NEW FEATURES, BUG FIXES, & OTHER CHANGES:

- **Medium security fixes:** Many Cross-Site Scripting (XSS) vulnerabilities were found in various pages in which a malicious user could potentially exploit them by manipulating the query string or POST parameters of an HTTP request.
- **Minor security fixes:** Some Cross-Site Scripting (XSS) vulnerabilities were found on the "Create users (bulk upload)" section of the "Add Users" page in the Control Center, in which a malicious user could potentially exploit them by manipulating the contents of the CSV file that an administrator uploads on that page to create new Table-based users.
- **New feature: Sponsor Dashboard**
  o The Sponsor Dashboard can be utilized by users who have been designated as a sponsor for another REDCap user. In many cases a sponsor is a secondary contact person for the user or someone that helps manage the account (or perhaps they requested that the account be created). The Sponsor Dashboard allows sponsors to manage their sponsored users by viewing various information about them, such as username, name, expiration, suspended status, and some general activity. The dashboard contains various functions to allow sponsors to make requests to REDCap administrators to help manage their sponsored users by performing the following actions: 1) resetting passwords (Table-based authentication only), 2) Setting/expiring a user's account expiration, 3) suspending users, and 4) unsuspending users.
  o A link to the dashboard will be displayed at the top of the My Projects page for any users that are a sponsor.
  o If an institution decides not to allow sponsors to use the Sponsor Dashboard, it can be disabled on the User Settings page in the Control Center.
  o Note: The User Settings page in the Control Center also contains a setting "Default amount to set/extend user expiration times", which sets the default time (in days) for setting or extending a user's account expiration time when requested by a sponsor. In the specific case where the expiration time is being set (not extended), the administrator has the ability to modify the exact expiration time during the request approval process.

- **Improvement: Major improvements to the "Browse Users" page** in the Control Center – Borrowing from the functionality of the new Sponsor Dashboard, administrators may now perform the following actions on many users at once: 1) resetting passwords (Table-based authentication only), 2) Setting/expiring a user's account expiration, 3) suspending users, and 4) unsuspending users.

- **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).

- **Improvement: 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.

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

- **Change/improvement:** 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. (Ticket #3082)

- Bug fix: If attempting to enable the Twilio SMS and Voice Call services on a REDCap server that is not publicly available to the web (i.e., on a private network or behind a firewall), it would mistakenly allow the Twilio module to be enabled in a project even if the Twilio Request Inspector had not been disabled for the Twilio account being used.

- Bug fix: If a survey is using "Save & Return Later" with the option "Allow respondents to return without needing a return code" enabled, then if a participant takes a survey using a public survey link and clicks the "Save & Return Later" button at the bottom of the survey, REDCap would mistakenly email them the public survey link rather than their private survey link which would normally allow them to return to their survey response to begin where they left off. The public survey link that gets emailed to them would mistakenly not allow them to continue their survey response.

- Bug fix: If text data that contains line breaks/carriage returns is piped into another field value via piping inside an @DEFAULT action tag, the piped text would mistakenly contain HTML break tags (e.g., <br>) rather than proper line breaks/carriage returns.

- Bug fix: If a project's "Character encoding for exported files" option (on the Edit A Project' Settings page) is set to "Chinese (UTF-8)", then the webpage would crash with a fatal PHP error whenever a user attempted to download a PDF of one or more data entry forms. (Ticket #32892)

- Bug fix: When piping a radio button field into another field's label on the same instrument, if the piped field is modified on that page, thus instantly piping the new selected value's choice label, the choice label being piped would mistakenly be non-bolded text, even though the rest of the field label remains as bolded text.

- Bug fix: For a project that utilizes the randomization module, if any of the strata fields being used in the randomization have field labels or field notes into which data is being piped, then the randomization dialog popup that displays these strata fields would mistakenly not have the data piped into their labels/notes. (Ticket #33282)

- Bug fix: When a project contains repeating instruments, and a report is created that contains fields from a repeating instrument, the "Stats & Charts" view of that report might mistakenly display an incorrect number of missing values for fields on a repeating instrument. (Ticket #32078)

- Bug fix: On a data entry form or survey that utilizes a calc field or certain action tags anywhere on the page, a random blank text field might mistakenly have a red sidebar appear on the input field for no reason.

- Bug fix: If an External Module is utilizing the API endpoint URL, and a new REDCap version has been placed on the web server but the upgrade has not been completed yet, then the API endpoint would mistakenly redirect to the wrong place. (Ticket #33520)

- Bug fix: For surveys that have no questions and have been set to "One section per page (multiple pages)" in their survey settings, it would mistakenly display the Form Status field on the survey page. (Ticket #33467)

- Bug fix: In a production project in draft mode when adding a matrix of fields in the Online Designer and assigning it a matrix group name that already exists, it mistakenly allows the user to add that matrix group name, but then subsequently displays an error message when the whole matrix setup is saved. (Ticket #33661)

- Bug fix: When using the Data Search feature on the "Add/Edit Records" page, the "Searching..." text/spinner would not accurately reflect the search request time but would mistakenly disappear on some long searches, thus making it appear that the search has completed when it actually has not. (Ticket #7805)

- Various fixes for External Modules framework

- The Help & FAQ page content was updated

- Bug fix: When using the @TODAY or @NOW action tag for a field on a survey instrument, although the action tags will correctly insert the date/timestamp when the instrument is opened as a survey page, it would mistakenly not do this on the data entry form. Note: This only occurs on an instrument that has been enabled as a survey and is being opened as a data entry form when the field has no value. (Ticket #33609)

- Bug fix: The "simultaneous users" check that prevents two different users from viewing the same record/instrument/event in the same project would not successfully stop a user from viewing the data entry form if the user already on the form performs one of the following actions: 1) upload a file onto a File Upload field, 2) download a file, 3) delete a file, or enter a value into the Secondary Unique Field (if enabled).

- Bug fix: In certain rare cases, if a respondent clicks the download link for a File Upload field on a survey page, it might mistakenly display an error page rather than downloading the file.
- Bug fix: When deleting a message in REDCap Messenger, in which a non-English language is being used for the system, it mistakenly would tell the user to type the translated version of the word "delete" for the local language;

however it was instead expecting the user to literally type the English word "delete", not the translation of the word. For technical reasons, the English word must be typed, so the instructions have been changed to clarify this. (Ticket #34174)