

# Longitudinal Data Collection

CCTS Biostatistics Core

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For repeated data collection on the same instrument within the same record, REDCap has two approaches.

1. Longitudinal data collection
2. Repeating instruments

These approaches can also be combined.

## Which Option Should I Choose?

You might use **longitudinal data collection** if:

- There is a pre-defined number of events with or without temporal order.
- The Scheduling module is needed.

You might use **repeating instruments** if:

- An unlimited or unknown number of repeated measures are expected.

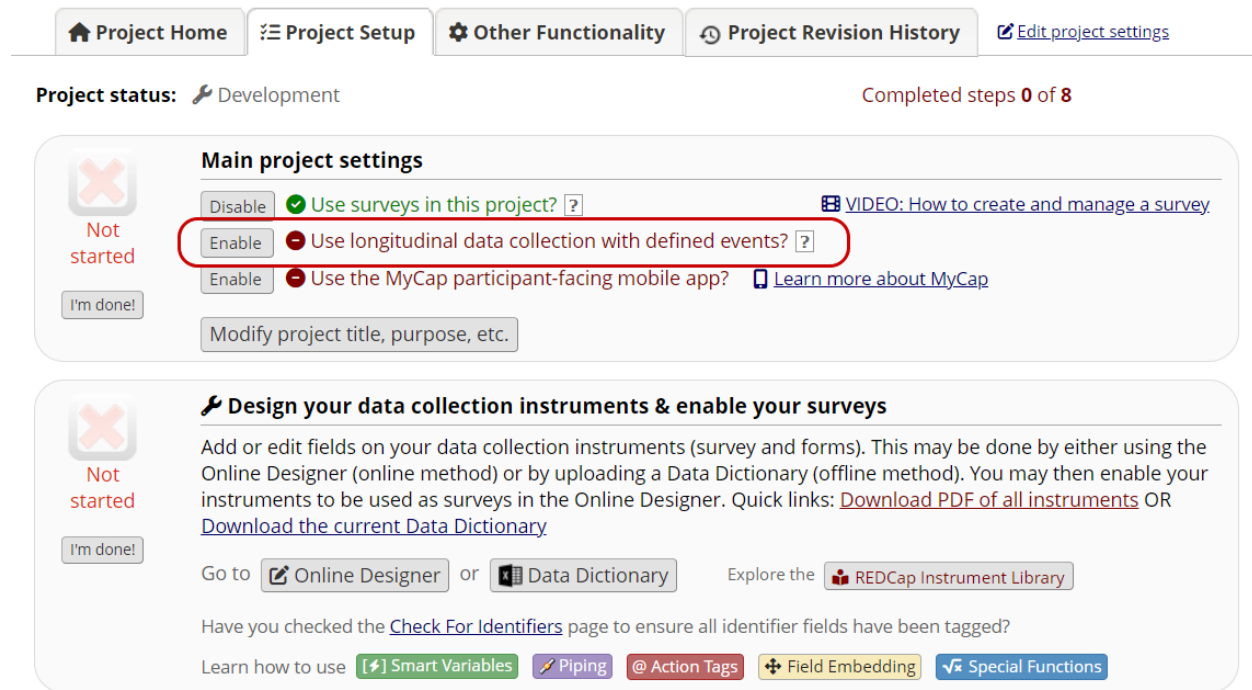
You might use **longitudinal data collection + repeating instruments** if:

- There is a pre-defined number of events with or without temporal order.
- Within one or more defined events, data collection will be repeated an unlimited or unknown number of times.

## Longitudinal Data Collection

### Enable Longitudinal Data Collection in Main Project Settings

When your project is in development status, open the Project Setup page. Under Main Project settings, click **Enable** next to “Use longitudinal data collection with defined events.” You can enable this option any time when in development status.



The screenshot shows the REDCap Project Setup interface. At the top, there are navigation tabs: Project Home, Project Setup, Other Functionality, Project Revision History, and Edit project settings. Below the tabs, the project status is 'Development' and 'Completed steps 0 of 8'. The main content area is divided into two sections. The first section, 'Main project settings', has a 'Not started' status and an 'I'm done!' button. It contains three settings: 'Use surveys in this project?' (checked), 'Use longitudinal data collection with defined events?' (unchecked and highlighted with a red circle), and 'Use the MyCap participant-facing mobile app?' (unchecked). The second section, 'Design your data collection instruments & enable your surveys', also has a 'Not started' status and an 'I'm done!' button. It provides instructions on how to create instruments and includes links to the Online Designer, Data Dictionary, and REDCap Instrument Library. It also mentions checking the 'Check For Identifiers' page and lists various features like Smart Variables, Piping, Action Tags, Field Embedding, and Special Functions.

Figure 1: Enable Longitudinal Data Collection

## Define Events

A longitudinal project lets you define “events” so that you can use a data collection instrument multiple times for a single record. We recommend you create all instruments in the Online Designer or via the Data Dictionary before you define events and designate instruments to them.

After you have created your instruments, click *Define My Events* on the Project Setup page.

🏠 Project Home
☰ Project Setup
⚙️ Other Functionality
🕒 Project Revision History
[🔗 Edit project settings](#)

**Project status:** 🛠️ Development Completed steps **0** of **9**

Not started

I'm done!

### Main project settings

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Disable

Disable

Enable

Modify project title, purpose, etc.

✔️ Use surveys in this project? [?](#) [📺 VIDEO: How to create and manage a survey](#)

✔️ Use longitudinal data collection with defined events? [?](#)

🛑 Use the MyCap participant-facing mobile app? [📄 Learn more about MyCap](#)

Not started

I'm done!

### 🛠️ Design your data collection instruments & enable your surveys

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Add or edit fields on your data collection instruments (survey and forms). This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). You may then enable your instruments to be used as surveys in the Online Designer. Quick links: [Download PDF of all instruments](#) OR [Download the current Data Dictionary](#)

Go to 📄 Online Designer or 📄 Data Dictionary Explore the 📖 REDCap Instrument Library

Have you checked the [Check For Identifiers](#) page to ensure all identifier fields have been tagged?

Learn how to use ⚡ Smart Variables 🔗 Piping @ Action Tags ➕ Field Embedding ✔️ Special Functions

In progress

I'm done!

### 🛠️ Define your events and designate instruments for them

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Create events for re-using data collection instruments and/or set up scheduling.

Go to Define My Events
or
Designate Instruments for My Events

Figure 2: Click Define My Events

Create each event by filling out each required field, described below.

Arm 1: Arm 1 +Add New Arm

Arm name: **Arm 1** [Rename Arm 1](#)

	Event # <small>[event-number]</small>	Days Offset	Offset Range Min / Max	Event Label <small>[event-label]</small>	Custom Event Label <small>(optional)</small>	Unique event name <small>(auto-generated) [event-name]</small>	Event ID <small>(auto-generated, unchangeable) [event-id]</small>
🗑️ ✖️	1	1	-0/+0	Baseline		baseline_arm_1	34731
🗑️ ✖️	2	90	-7/+7	3 month follow-up		3_month_followup_arm_1	40065
🗑️ ✖️	3	180	-0/+0	6 month follow-up		6_month_followup_arm_1	40066
🗑️ ✖️	4	365	-0/+0	1 year follow-up		1_year_followup_arm_1	43177
<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid #ccc; padding: 2px 5px; display: flex; align-items: center;"> <span style="font-size: 0.8em;">Add new event</span> <div style="border: 1px solid #ccc; padding: 2px 5px; flex-grow: 1;"> <input style="width: 90%; border: none;" type="text"/> </div> </div> <div style="border: 1px solid #ccc; padding: 2px 5px; display: flex; align-items: center;"> <span style="font-size: 0.8em;">Days</span> <div style="border: 1px solid #ccc; padding: 2px 5px; flex-grow: 1;"> <input style="width: 90%; border: none;" type="text"/> </div> </div> <div style="border: 1px solid #ccc; padding: 2px 5px; display: flex; align-items: center;"> <span style="font-size: 0.8em;">-0</span> <div style="border: 1px solid #ccc; padding: 2px 5px; flex-grow: 1;"> <input style="width: 90%; border: none;" type="text"/> </div> <span style="font-size: 0.8em;">+0</span> </div> </div> <div style="margin-top: 5px; font-size: 0.8em;"> <span style="color: blue; text-decoration: underline;">Convert from other units</span> </div> <div style="margin-top: 5px; font-size: 0.8em;"> <span style="color: gray;">Descriptive name for this event</span> </div> <div style="margin-top: 5px; font-size: 0.8em;"> <span style="color: gray;">Custom Event Label (optional)</span>  <span style="color: gray;">Example: [visit_date], [weight] kg</span> </div>							

Figure 3: Define My Events

**Event #:** An “event” may be a temporal event, such as baseline or follow-up data collection, or a task to be performed. Each event will be associated with one or more instruments, and each instrument can be associated with one or more events. Add as many events as you’ll need for repeated measures in your

study. If different numbers of repetitions are planned for different instruments, create enough events for the maximum number of repeated measures.

*Important:* Don't make separate events for different data collection steps if there is no repeating data collection on a single instrument. For example, if you administer an intake form only once, at baseline, and an evaluation form only once, six months later, you should **not** create two separate events, even though data collection happens at different times.

**Days Offset:** This is an optional setting, available if you have enabled the **Scheduling module**. Use Days Offset when a fixed time interval between events will be applied to all subjects. If you don't need this option, just put the event's serial number (1, 2, 3...).

**Unique Event Name (auto-generated):** When you use piping, branching logic, or calculated fields, or otherwise refer to a variable by name in a longitudinal project, you must prepend the unique event name to access the correct version of the repeated field. For example, you might use [baseline\_arm\_1][weight] to refer to the weight measurement taken during the baseline event.

**Arm:** This is an option when there is more than one data collection structure of events and repeating instruments. For example, if you have two cohorts with different numbers of data collection events linked to different instruments, or different schedules of data collection, they may be assigned to separate arms.

*Important:* Don't make separate arms if you have multiple groups with the same number of events and linked instruments.

### Designate Instruments for My Events

After you have defined your events, click **Designate Instruments for My Events**. Make sure each instrument is linked to at least one event. If an instrument isn't linked to any events, it will not show in the data entry form.

Since you have defined multiple events on the [Define My Events](#) page, you may now select which data collection instruments that you wish to utilize for each event by using the table below. This allows you to enter data on any data collection form multiple times for any given project record. Any and all data collection instruments can thus be used for any event defined.

Click the *Begin Editing* button to change the relationships below by designating which forms you wish to utilize for which events. When you are finished making changes, click the *Save* button to finalize your changes.

[Upload or download instrument mappings](#)

[Begin Editing](#) [Save](#) [Select All](#) | [Deselect All](#)

Data Collection Instrument	Baseline (1)	3 month follow-up (2)	6 month follow-up (3)	1 year follow-up (4)
Eligibility Questionnaire (survey)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pediatric Asthma Caregiver's Quality of Life (survey)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Testing fields by request	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asthma Control Test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4: Designate Instruments for My Events

### Scheduling and Calendar

Follow-up event dates are automatically generated based on the Days Offset entered on the "Define My Event" page, but they are modifiable within individual records.

**Scheduling**

VIDEO: How to use the scheduling module (7 min)

Create Schedule View or Edit Schedule

The Schedule Generator will allow you to **generate a new schedule** based upon your Events and their Days Offset that have been defined on the [Define My Events](#) page. You may generate a schedule for a new or existing Record ID below by selecting a Start Date, which will be used as the starting point for projecting schedule dates using your Days Offset. Once scheduled, you may then view it on the [Calendar](#), after which, if desired, you may also perform data entry for that calendar event. You may create a new project record here while performing scheduling or you may choose a currently existing one that has not yet been scheduled.

Add new Record ID:  OR

Start Date:  M/D/Y

Generate Schedule

**Projected Schedule for "1"** (NOTE: The dates below have NOT yet been scheduled.)

The projected schedule below was automatically generated for Record ID "1" based on your pre-defined Events. You may change the value of any dates generated below simply by clicking inside the date box and selecting a new date. Any dates generated below that fall on weekends will be listed in red. Click the [Create Schedule](#) button to finalize this schedule, which will then be added to the Calendar.

Time (optional)	Date / Day of Week	Event Name
<input type="checkbox"/>	05/19/2023 Friday	Baseline
<input type="checkbox"/>	08/16/2023 Wednesday Range: 08/09/2023 - 08/23/2023	3 month follow-up
<input type="checkbox"/>	11/14/2023 Tuesday	6 month follow-up
<input type="checkbox"/>	05/17/2024 Friday	1 year follow-up

Create Schedule Cancel

Figure 5: Scheduling

Schedules appear on the Calendar with a link to the record’s data entry forms.

The Calendar application can be used as a project calendar within this project to help organize your schedule and keep track of any upcoming events. It will allow you to add or modify calendar events and then view them either in a daily, weekly, or monthly format below. To add a new note or calendar event to any day, click **+New** at the top of that day's box to begin entering the information. Since you have already defined multiple events for this project, you may additionally [generate a schedule](#) using your pre-defined Events, which will then be added to the calendar.

Day Week Month Agenda Sync Calendar to External Application

May 2023 Print Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
+ New	+ New 1	+ New 2	+ New 3	+ New 4	+ New 5	+ New 6
+ New 7	+ New 8	+ New 9	+ New 10	+ New 11	+ New 12	+ New 13
+ New 14	+ New 15	+ New 16	+ New 17	+ New 18	+ New 1 (Baseline)	+ New 20
+ New 21	+ New 22	+ New 23	+ New 24	+ New 25	+ New 26	+ New 27

Figure 6: Calendar

### Preview Exported Data

Reports and data exports will include multiple rows for a single record ID, one for each event for which the record has data. The auto-generated column called `redcap_event_name` will indicate the event associated with each row. A row will only contain data for instruments completed as part of the associated event; fields

from non-repeating, non-associated, or incomplete instruments will appear blank.

record_id	redcap_event_name	child_age	english_flu	ethnicity	specify_eth	height	weight	bmi	guardian	treated	eligibility_c	pediatric_a	depression	symptom_	symptom_syn
1	1 baseline_arm_1	9	1	1		100	20	20	1	1	2		4	1	1
3	1 3_month_followup_arm_1												3	1	1
4	2 baseline_arm_1	9	1	1		120	30	20.83333	1	0	2			0	0
5	3 baseline_arm_1	6	1	2		120	50	34.72222	1	1	2		7	1	0
6	3 3_month_followup_arm_1												6	0	1
7	3 6_month_followup_arm_1												6	0	0
8	4 baseline_arm_1	6	0	1		110	35	28.92562	0	1	2			0	0
9	5 baseline_arm_1	3	0	1					0	1	2	#####	7	0	0
10	6 baseline_arm_1								0	1	2			0	0
11	7 baseline_arm_1			2					0	1	2			0	0

Figure 7: Exported Data

## Repeating Instruments

By enabling repeating instruments, you can collect data on a single instrument an unlimited number of times without defining the number or schedule ahead of time. You may use this if, for example, you want clinic patients to submit the same assessment weekly with no defined end date.

### Enable Repeating Instruments

On the Project Setup page, click **Enable** next to “Repeating instruments and events” in the “Enable optional modules and customizations” section.

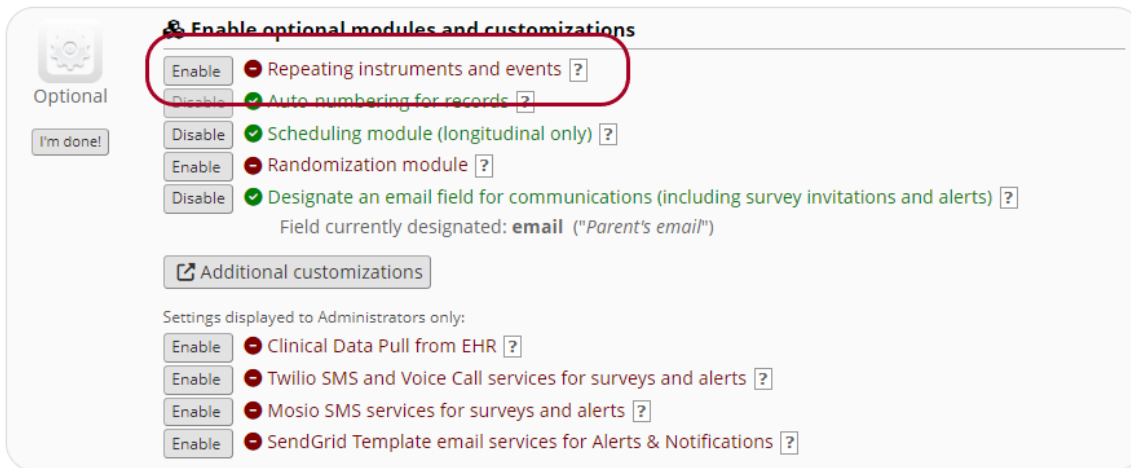


Figure 8: Enable Repeating Instruments and Events

Check the the box next to each instrument that should repeat indefinitely. Note that any selected instruments will repeat independently, potentially different numbers of times.

Repeat this instrument?	Instrument name	Custom label for repeating instruments (optional) Example: [visit_date], [weight] kg
<input type="checkbox"/>	Eligibility Questionnaire	<input type="text"/>
<input type="checkbox"/>	Pediatric Asthma Caregiver's Quality of Life	<input type="text"/>
<input type="checkbox"/>	Testing fields by request	<input type="text"/>
<input type="checkbox"/>	Asthma Control Test	<input type="text"/>

Figure 9: Select Repeating Instruments

When you use piping, branching logic, or calculated fields, or otherwise refer to a variable from a repeating instrument by name, you must append the instance number to access the correct version of the repeated field. For example, you might use `[weight] [2]` to refer to the second weight measurement taken.

### Preview Exported Data

Reports and data exports will include multiple rows for a single record ID, one for each instance of each repeating instrument. Exported data will include auto-generated columns for `redcap_repeat_instrument` and `redcap_repeat_instance`. Fields not associated with a row's instrument and instance will appear blank.

	A	B	C	D	E	F	G	T	U
1	record_id	redcap_repeat_instrument	redcap_repeat_instance	firstname	lastname	email	screen_date	howoft_helpless	child_symptoms__1
2	1			John	Smith	test@test.com	7/25/2023		
3	1	pediatric_asthma_caregivers_qual	1					6	1
4	1	pediatric_asthma_caregivers_qual	2					2	1
5									

Figure 10: Exported Data

## Longitudinal + Repeating Instruments

By using both longitudinal data collection and repeated instruments and events, you can repeat entire events or select instruments within each event. For example, you may wish to administer three different surveys at each weekly clinic visit. You might create a “Weekly Clinic Visit” event, designate the three survey instruments to that event, and repeat the entire event an open-ended number of times.

### Enable Repeating Instruments or Events

Follow the instructions above to define your events and designate instruments. Click `Enable` next to “Repeating instruments and events” in the “Enable optional modules and customizations” section. Use the dropdown menus and checkboxes to select events or instruments for open-ended repetition.

Event Name	Repeat entire event or selected instruments?	Instrument name (select instruments to repeat)	Custom label for repeating instruments (optional) Example: [visit_date], [weight] kg
Baseline	-- not repeating --	<input type="checkbox"/> Eligibility Questionnaire <input type="checkbox"/> Pediatric Asthma Caregiver's ... <input type="checkbox"/> Testing fields by request <input type="checkbox"/> Asthma Control Test	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
3 month follow-up	-- not repeating --	<input type="checkbox"/> Pediatric Asthma Caregiver's ...	<input type="text"/>
6 month follow-up	-- not repeating --	<input type="checkbox"/> Pediatric Asthma Caregiver's ...	<input type="text"/>
1 year follow-up	-- not repeating --	<input type="checkbox"/> Pediatric Asthma Caregiver's ...	<input type="text"/>

Figure 11: Select Repeating Instruments and Events

### Preview Exported Data

Reports and data exports will include multiple rows for a single record ID, one for each event and instance of repeating instruments. Exported data will include auto-generated columns for `redcap_event_name`, `redcap_repeat_instrument`, and `redcap_repeat_instance`. Fields will appear blank for non-repeating or irrelevant combinations of events and instrument instances.

	A	B	C	D	E	F	G	H	I	J	K	L
1	record_id	redcap_event_name	redcap_repeat_instrument	redcap_repeat_instance	depression_symptom	symptom	symptom	symptom	symptom	symptom	symptom	symptom_pe
2		1 3_month_followup_arm_1			3	1	1	1	1	0	0	0
3		1 baseline_arm_1	eligibility_questionnaire	1								
4		1 baseline_arm_1	pediatric_asthma_caregivers_quality_of_life	1	4	1	1	1	1	0	0	0
5		1 baseline_arm_1	pediatric_asthma_caregivers_quality_of_life	2	7	1	0	0	0	0	0	0
6		1 baseline_arm_1	testing_fields_by_request	1								
7		2 baseline_arm_1	eligibility_questionnaire	1								
8		3 3_month_followup_arm_1			6	0	1	0	0	0	0	0

Figure 12: Exported Data