Using REDCap for Clinical Data Management
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>2</td>
</tr>
<tr>
<td>Create a new project</td>
<td>3</td>
</tr>
<tr>
<td>Adding fields</td>
<td>4</td>
</tr>
<tr>
<td>Exercise 1</td>
<td>6</td>
</tr>
<tr>
<td>Adding instruments</td>
<td>15</td>
</tr>
<tr>
<td>Exercise 2</td>
<td>15</td>
</tr>
<tr>
<td>Adding branching logic</td>
<td>17</td>
</tr>
<tr>
<td>Exercise 3</td>
<td>17</td>
</tr>
<tr>
<td>Advanced branching logic</td>
<td>19</td>
</tr>
<tr>
<td>Exercise 4</td>
<td>19</td>
</tr>
<tr>
<td>Data Entry</td>
<td>20</td>
</tr>
<tr>
<td>Exercise 5</td>
<td>21</td>
</tr>
<tr>
<td>Data Export</td>
<td>21</td>
</tr>
<tr>
<td>Report Builder</td>
<td>23</td>
</tr>
<tr>
<td>Exercise 6</td>
<td>23</td>
</tr>
<tr>
<td>APPENDIX I – Advanced REDCap features</td>
<td>25</td>
</tr>
<tr>
<td>Setting a Project as Longitudinal</td>
<td>25</td>
</tr>
<tr>
<td>Data dictionary</td>
<td>27</td>
</tr>
<tr>
<td>Promote project to production</td>
<td>28</td>
</tr>
<tr>
<td>Using Surveys</td>
<td>29</td>
</tr>
</tbody>
</table>

## Purpose

Through this hands on session, delegates will learn how to:

- create a project
- add fields
- add branching logic
- validate fields
- enter/export data
- create reports

## Pre-requisites

Delegates have been given access to the REDCap training server
Create a new project

1. Log into REDCap [http://sscmredcap-training.epi.bris.ac.uk/redcap/] and select ‘Create New Project’ tab

For the project title, enter Practice Project - [your name], under Purpose, select Just for Fun and under Start project from scratch, select Create an empty project.

The Project Setup page will be displayed. Click on Online designer.
2. In the Online Designer, a new instrument called My First Instrument has been automatically created for you. Rename this to Forma Fitness Sport Club Registration by using the Rename option in the Choose action button.

3. Click on the instrument name to start editing. The questionnaire has one field, Record_Id.

Adding fields

1. Use Add a field or Add Matrix of Fields to add fields

Notes on field types

Section Header - Use the Begin New Section field type. A quirky REDCap behaviour: you need to create at least one field for the section before you create a Section Header.

For short text, dates and numbers – Use the Text Box field type. Add field Validation for dates and numbers. Use the Notes Box field type for recording paragraphs.

Yes - No, True - False – these fields will provide two radio button options.

Use the Slider field for a visual analogue scale.
Use **Labels displayed above slider** to add information and a range to a **Slider** field.

Use the **Multiple choice** or **Checkboxes** field types to choose **Single/Multiple choice**.

Add options in the **Choices** box. First add the code number to be used in the statistical analysis, followed by a comma and the text to be displayed for the user.
Exercise 1

Create the Forma Fitness Sport Club Registration form.

Using the edit button, rename Record ID as Client Id then Save.

Use the Add Field button to set up each field. Note that a Section Header cannot be created until there is at least one variable field following it, so begin by creating the Date questionnaire completed field.

Prefix variable names with bf_ (booking form) followed by the question description (e.g. bf_compl_dte, bf_gender, etc). Note that variable names cannot contain spaces or uppercase characters.
REDCap supports the use of HTML tags such as `<span style> <i> <b>` to format text in a field label. Several styles are used in this course booklet and you can request a more comprehensive document at the end of the course.

For the **Forma Fitness** title use tags to change the formatting of the text.

As before, the Section Header cannot be created until there is a variable field following it so create the **Gender** field before the section header **Your Details**.
**Sports and Physical Activity Participation**

In order to provide you with the best option, we are interested in your current level of activity.

- **Do you take part on regular sports or physical activity (at least once a week)?**
  - Yes
  - No

- **Do you attend a gym or leisure centre?**
  - Yes
  - No

- **On how many occasions do you participate in sport and physical activity a week?**
  - 0
  - 1 - 2
  - 3 - 4
  - 5 - 6
  - 7 - 8
  - More than 8

- **Do you currently participate in any of the following activities? (Please select all that apply)**
  - Jog
  - Run
  - Cycle
  - Football
  - Basketball
  - Tennis
  - Badminton
  - Weights
  - Yoga
  - Other

  If other, please specify:  

- **Field Type:** Begin New Section (with optional text)

- **Field Label:**
  
  &lt;span style="font-size: 16pt; color: #0B0B61">Sports and Physical Activity Participation&lt;/span&gt;
  &lt;span style="font-weight: normal;">In order to provide you with the best option, we are interested in your current level of activity.&lt;/span&gt;

- **Field Type:** Yes - No

- **Question Number (optional):**

- **Field Label:**
  
  Do you take part on regular sports or physical activity (at least once a week)?

- **Choices (not modifiable):**
  1. Yes
  0. No
### Field Type: Yes - No

**Question Number (optional)**

Unspecified

**Field Label**

Do you attend a gym or leisure centre?

**Choices (not modifiable)**

1. Yes
2. No

### Field Type: Multiple Choice - Radio Buttons (Single Answer)

**Question Number (optional)**

Unspecified

**Field Label**

On how many occasions do you participate in sport and physical activity a week?

**Choices (one choice per line)**

1. 0
2. 1 - 2
3. 3 - 4
4. 5 - 6
5. 7 - 8
6. More than 8

### Field Type: Check boxes (Multiple Answers)

**Question Number (optional)**

Unspecified

**Field Label**

Do you currently participate in any of the following activities? (Please select all that apply)

**Choices (one choice per line)**

1. Jog
2. Run
3. Cycle
4. Football
5. Basketball
6. Tennis
7. Badminton

### Field Type: Text Box (Short Text)

**Question Number (optional)**

Unspecified

**Field Label**

If other, please specify

### Additional Information

**Variable Name** (utilized during data export)

- bf_gym
- bf_freg
- bf_act
- bf_other

**Required?**

- Yes
- No

**Identifier?**

- Yes
- No

**Custom Alignment**

Right / Vertical (RV)

**Field Note (optional)**

Small reminder text displayed underneath field.
### Nutrition

Would you like nutritional advice as part of your PT package?  
- [ ] Yes  
- [ ] No

On a regular week, please select the option that fits best:

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>1.2 days</th>
<th>3.4 days</th>
<th>5.6 days</th>
<th>Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have breakfast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I eat at least 5 portions of fruit/vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I eat meat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I eat fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I eat sweet/sugary snacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I eat crisps/chips</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We will be sending you a food diary for you to complete over one week.
If required, enter validation for text fields, for example allowing only numbers or dates to be accepted. Minimum and maximum values can be set so that in a question such as **How many days would you like to train per week?** validation could be fixed to allow only integers between 1 and 7.
Repeat for Supplements 2 to 5.
### Training Availability

Please tick all that apply.

<table>
<thead>
<tr>
<th>Time</th>
<th>Mondays</th>
<th>Tuesdays</th>
<th>Wednesdays</th>
<th>Thursdays</th>
<th>Fridays</th>
<th>Saturdays</th>
<th>Sundays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 9.00 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.00 to 12.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.00 to 17.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.00 to 19.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.00 to 21.00 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many days would you like to train per week?

[ ]

How many hours would you like to train per day?

[ ]

Please enter comments/training goals here

---

**Matrix Header Text (optional)**

*Training availability*<br>
*Please tick all that apply.*

**Matrix Rows**<br>
Each row represents a different field with its own label and variable name.

<table>
<thead>
<tr>
<th>Field Label</th>
<th>Variable Name</th>
<th>Question Number (options)</th>
<th>Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 9.00 am</td>
<td>of_9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.00 to 12.00</td>
<td>of_12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.00 to 17.00</td>
<td>of_17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.00 to 19.00</td>
<td>of_19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.00 to 21.00 pm</td>
<td>of_21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Matrix Column Choices**

**Other Matrix Info**

**Answer Format:**

- Multiple Answers (Checkboxes)

**Ranking:**

- Allow only 1 choice to be selected per column (radio buttons only)

**Matrix group name:**

- of_training_group

---

Maria Baquedano  v2.0
Adding instruments

Once you have completed the Forma Fitness Sport Club Registration section, use the at the top of the screen

A list of all existing instruments will be displayed. Select Create a new instrument from scratch.

Exercise 2

1. Create a new instrument called Office Use Only

2. Replicate the Office Use Only form adding appropriate validation.
**Adding branching logic**

Branching Logic may be employed when fields/questions need to be hidden under certain conditions. If branching logic is defined, the field will only be visible if the conditions provided are true (i.e. show the field only if...).

Use the **Branching Logic** button to add logic to a field.

You may specify the conditions in the Advanced Branching Logic Syntax text box or by choosing the Drag-N-Drop Logic Builder method which allows you to build your logic in a user friendly fashion by simply dragging over the options you want.

**Exercise 3**

1. Select the **Forma Fitness Sport Club Registration** form

2. The label *If you are/may be pregnant, please let us know so we can tailor your training accordingly.* only needs to be displayed if the answer to the question 'Gender' is 'Female'.

3. Use the **Branching logic button** for this label and use the Drag-N-Drop facility to select the logic. E.g. \([bf\text{\_}gender] \text{=} \text{Female}\)

4. **Drag-N-Drop Logic Builder**

   Displaying field choices for the following data collection instrument:
   
   Forma Fitness Sport Club Registration

   Field choices from other fields
   
   (drag a choice below to box on right)
   
   - \(bf\text{\_}complete = \text{(define criteria)}\)
   - \(bf\text{\_}gender = \text{Male (1)}\)
   - \(bf\text{\_}gender = \text{Female (2)}\)
   - \(bf\text{\_}age < 18 (1)\)
   - \(bf\text{\_}age = 19 \text{ to } 25 (2)\)
   - \(bf\text{\_}age = 26 \text{ to } 35 (3)\)
   - \(bf\text{\_}age = 36 \text{ to } 45 (4)\)
   - \(bf\text{\_}age = 46 \text{ to } 55 (5)\)

   Show the field ONLY if...
   
   - ALL below are true
   - ANY below are true

   Drag
   
   and
   Drop

4. **Select Save**

   Click on the Branching logic button again to view how REDCap has stored your choice

   **Advanced Branching Logic Syntax**

   \[
   \text{Show the field ONLY if...}
   \]

   \[\text{[bf\_gender]} \text{=} \text{"2"}\]

   REDCap enters the variable name in [ ] and your selection in the Advanced Branching Logic box. Once you are familiar with this, you can type the logic directly in this box.

5. **Repeat the process for the following questions requiring branching logic in the Forma Fitness Sport Club Registration example.**
Advanced branching logic

Repeating questions a set number of times

Use the ‘Forma Fitness Sport Club Registration’ form. In this form, we find questions that are repeated a number of times. The number of times these questions are needed is dependent on the answer to a previous question: e.g. **How many supplements do you take per day?** If the answer is ‘0’, no related questions should be displayed, if the answer is ‘1’, just one related question should be displayed, if ‘2’, two questions and so on.

**Exercise 4**

Select the **Forma Fitness Sport Club Registration** form and add logic to display only the required number of repeating questions.

---

**Meeting several conditions** - Branching logic can also be used to display questions/labels depending on the answer to multiple questions.
Data Entry

To add/edit records, select the **Add/Edit Records** menu under the **Data Collection** group.

To add a record, if Enable ‘auto-number’ has been selected in the project setup, select **Add new record** button; if ‘Enable auto-number’ has not been selected, enter ID in the box and press enter.

To edit an existing record, use the dropdown under **Choose and Existing Client ID**.

*If a project has a large number of records, you can use the Data Search facility. You can select a field to search by and start typing in the Search Query box. Records that match the criteria will be displayed.*

For **non-longitudinal** projects, when choosing **Add/Edit records**, the first instrument will be displayed ready for input or editing. For **longitudinal** projects, the **Event Grid** will be displayed so that user can select instrument and event to complete.

**Event Grid**

The grid below displays the form-by-form progress of data entered into the project for one particular Participant ID for all defined events. You may click on the colored buttons to access that form for that event. If you wish, you may modify the events below by navigating to the **Define My Events** page.

**Participant ID 1**

<table>
<thead>
<tr>
<th>Data Collection Instrument</th>
<th>01 - Baseline (1)</th>
<th>02 - Visit 2 (2)</th>
<th>03 - Visit 3 (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Exercise 5**

1. Select **Add/Edit Record** and **Add new record**. The **Office Use Only** form will be displayed. Enter information for this form and then click **Save and go to Next Form** and complete the **Fitness Sport Club Registration** form.

2. Add a few participants. We will use this data to test the Data Export.

**Notice:** Only test data should be added whilst the project is in development status. Once the project instruments have been finalised, the project should be moved to production in preparation for real patient data to be entered. When promoting a project to production, all previously entered data is deleted. See the **Promote a project to production** section, for steps to follow prior to going live.

**Data Export**

REDCap allows you to easily export your project data to Microsoft Excel, SAS, Stata, R, or SPSS for analysis. Exporting your data out of REDCap is simple. To get a quick data dump of all records for your project, choose the **Data Exports, Reports and Stats** one-click option.

In the resulting screen, either select the **Export Data** button for a quick download of all current data or select the **Make custom selections** to specify the form(s) for which data is to be downloaded.
Use Reports to download only specific fields across the dataset

Once you have made your selections, click **Export Data**. The **Exporting Data** dialog will be displayed. Select the required format and follow the on-screen instructions.

When downloading data to SPSS/STATA, make sure the ‘Export survey identifier field and survey timestamps field(s)’ is **NOT** selected. This only applies to projects where surveys have been enabled.
Report Builder

You may use this page to build and save custom reports, which will query the project in real time and display the resulting data in a table format. Once created, you may view your reports at any time as well as modify or delete them. Your saved reports will be displayed on the left-hand menu as links, which can be clicked to display the report.

1. Select **Data Exports, Reports and Stats** on the left hand side menus

![REDCap Training Course](image)

2. Click the **Create New** Report button. In the resulting screen, add the report name and select all required fields and filters. Save the report

   *The report will be listed under Reports. Click on the link to View the report*

**Exercise 6**

Create a new report to extract the participant IDs and email addresses for all male active clients (currently attending a gym or leisure centre).
Reports can be ordered by selected fields (up to 3 fields).

For complex projects switch to Use Advanced logic.
APPENDIX I – Advanced REDCap features

Setting a Project as Longitudinal

1. Select the Project Setup tab and click on Enable ‘Use longitudinal data collection with repeating forms’ under Main project settings

2. Select Define my events under Define your events and designate instruments for them

   The Define My Events tab is displayed

   ![Project Setup, Define My Events, Designate Instruments for My Events]

This application allows you to define ‘events’ for your project that allow for the utilization of data collection forms multiple times for any given project record (often used when collecting longitudinal data). An event may be a temporal event in the course of your project, such as a participant visit or a task to be performed. After events have been defined, you will need to designate the data collection instruments that you wish to utilize for any or all events, thus allowing you to use a form for multiple events for the same project record. You may group your events into ‘arms’, in which you may have one or more arms/groups for your project. Each arm can have as many events as you wish. You may use the table below to create new events and/or arms, or modify existing ones. (One arm and one event will be initially defined as the default for all projects)

**STEP #1:**
To add new events below, provide an Event Name for that event, and then click the Add new event. Once events have been added, you can easily change their order by dragging and dropping the event using the up-down arrow icon on the far left for a given row in the table.

**STEP #2:**
Once you have defined your events on this page, you may navigate to the Designate Instruments for My Events page, where you may select which data collection instruments that you wish to utilize for each event you defined:

   ![Arm 1: Arm 1, +Add New Arm]

   Arm name: Arm 1

   ![Event Table]

<table>
<thead>
<tr>
<th>Event #</th>
<th>Event Name</th>
<th>Unique event name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>e1</td>
<td>e1_arm_1</td>
</tr>
<tr>
<td>2</td>
<td>e2</td>
<td>e2_arm_1</td>
</tr>
<tr>
<td>3</td>
<td>e3</td>
<td>e3_arm_1</td>
</tr>
</tbody>
</table>

   Add new event

   Descriptive name for this event

3. To add an event, enter data under Event Name and press Enter

4. Select the Designate Instruments for My Event tab and choose Begin Editing

   e.g. Select the events for each of your instruments as per image below and click Save
When adding participant’s information, REDCap will allow multiple completion of questionnaires assigned to more than one event.
Data dictionary

Project fields can be created or amended using either the Online Designer or the Data Dictionary. The Data Dictionary is a specifically formatted CSV (comma delimited) file within which you may construct your project fields and afterward upload the file to REDCap to commit the changes to your project.

To view the data dictionary, select ‘Edit Instruments’ and choose the ‘Data Dictionary’ tab. In the resulting screen click the Download the current Data Dictionary. An Excel compatible file will be downloaded. Open it to view formatting.

The Data Dictionary is the preferred method for adding repetitive questions or changing branching logic (e.g. Supplement Name).

The first question could be set up in the Online designer. Then, download the data dictionary, insert as many rows as required, copy the question and paste as many times as required. You will need to amend variable names, labels and logic.

Save the file and upload to REDCap by clicking the ‘Choose file’ button.
Once the instruments have been finalised and tested, the project is ready to move to Production status.

1. Access the Project Setup tab and set status to I’m done! under all sections in the Project Setup.

2. Select Move the Project to Production

The Request Admin to Move to Production Status dialog box will be displayed. Follow the instructions to check for identifiers and select Yes, Request Admin to move to production status. An email will be sent to the REDCap team so they can approve the project and promote it to production.
Using Surveys

Using surveys is a simple and fast way to collect responses from participants. You can enable one or multiple instruments within your projects as surveys. You can then send survey links via email to your participants.

1. Select the Project Setup menu and click Enable the Use surveys in this project.

2. Under ‘Enable optional modules..’ select Designate an email field to use....’ And select the email field in the Office use only form.

3. Access the Online designer and enable all required instruments as survey. For our example, enable the Forma Fitness Sport Club Registration as survey.

The Survey settings page will be displayed. Amend the Survey Instructions and Survey Acknowledgement text as required (e.g. add signature and contact details).

Save the changes.
4. In the **Online Designer**, select **Automated Invitations** and choose Modify invitation for event 1

<table>
<thead>
<tr>
<th>Instrument name</th>
<th>Fields</th>
<th>PDF</th>
<th>Enabled at survey</th>
<th>Instrument actions</th>
<th>Survey-related options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office use only</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Forma Fitness Sport Club Registration</strong></td>
<td>34</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Complete fields as per example below and select Save

**Emails can be sent Immediately or as per predefined schedule. A log of sent invitations can be reviewed using the Survey Invitation Log tab.**

6. To see this functionality in action, choose Add/Edit Records. Create a new record and add your email address under **Email** in the **Office Use Only** form.

*When you save this form, an email will be sent to you with the link to complete the **Forma Fitness Sport Club Registration** form.*

*The Survey functionality can also be used to send a public/generic URL if anonymous responses are required.*