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**Record Keeping Episode Notebook**

Part of FAIR in (bio) practice, <https://carpentries-incubator.github.io/fair-bio-practice>

**Attendance**

Please sign in here: your name/ pronoun (if you prefer to share it) / institution / country.

1.

2.

3.

4.

5.

6.

7.

8.

**Which of these most accurately describes your record keeping experience?** (type

+1 next to the statement that best describes your situation)

- I have used hard copy lab notebooks before for research data records keeping.

- I have used electronic lab notebooks before for research data records keeping.

- I have used an online protocol database before.

- I have used Benchling before.

- I have used Protocols.io before.

- I have not had any research record keeping experience in the past.

- What in the world are you talking about? Is this Philosophy 101 or am I in the wrong classroom?

Before you begin with lesson 8, please take some time to sign up for the following two accounts (if you haven't already done so):

**Benchling (the ELN we will use for one of today's lessons):** https://benchling.com/signup?pubref=pubref\_zQlS6DPe.

**Protocols.io (the protocol repository with PID, which we will also be using for today's lessons):** https://www.protocols.io/create

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**Exercise/challenge 1:**

**Differences between analog and digital record keeping**

Compare the electronic version of tea protocol: <https://www.protocols.io/view/how-to-make-a-cup-of-tea-buhknt4w>

with the paper one from the photo:

<https://github.com/carpentries-incubator/fair-bio-practice/blob/gh-pages/fig/06-handwritten-tea-protocol.jpg>

What are advantages and disadvantages of traditional analog records vs digital records? Try to find at least a handful of advantages and disadvantages for each. With all of these, which system do you think is most advantageous?

(Split users per task, e.g. advantages group)

**Advantages of traditional analog records**  
-  
-  
  
**Disadvantages of traditional analog records**  
-  
-      
  
**Advantages of digital records**  
-  
-      
**Disadvantages of digital records**

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**Exercise 2:**

**Re-using a published lab entry**

1. Open Benchling (<https://benchling.com>) and log in.
2. First within your own workspace click the big ‘+’ (Create Project) right next to Projects in your Benchling workspace
3. Call the project ‘Breakfast’, and add an appropriate description, click ‘Create project’
4. Click here https://benchling.com/s/etr-SY8fi7L8ZIDSMCLCf92o to access the public lab entry ‘Eggs Florentine in Portobello Mushrooms’.
5. Select the clock symbol on the right-hand side underneath Share: Now you can see the history of the entry and changes that have previously been made to the document with a timestamp. If someone had tried to ‘manipulate’ data, you would be able to see this here. You also see the owner of the document.
6. Click ‘Clone from version’.
7. Select the ‘Breakfast’ folder to clone it to.

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**Exercise 3:**

**Adapting a protocol to your needs**

1. You have now accessed a digital record and want to reuse it to make your own breakfast. To show how reusable digital records are we will first navigate through the cloned file you made in your project.
2. Navigate to your Project ‘Breakfast’, you can tell you are in your Project, if your initials show in a red circle next to entries in the side bar. You should see the lab entry ‘Eggs Florentine in Portobello Mushrooms’, and the top bar above the title and toolbar should read ‘Tea’, ‘Portobello Mushrooms and Spinach’, ‘Poached Egg and Hollandaise Sauce’, ‘Add Protocol’, ‘Notes’, and ‘Metadata’.
3. Click through those tabs and you will see that in your notes you have your lab entry describing how breakfast was made with embedded graphics and a shopping list and current prices. The other three tabs describe the protocols that were used, and you can add additional protocols with the ‘add protocol’ tab. We want you to adapt the ‘Tea’ protocol to suit your ingredients and methods.
4. Once you have made appropriate changes in the Tea protocol, you should consider changing the order in which the breakfast and tea are made.
5. Once you have made all suggested change have a look at the history of the record (clock button), you can see the changes you have recently made, and you can see it still relates to the original document. It tells you what record it has been cloned from and when.
6. Click the link to the original record. As you can see digital record keeping allows provenance, crediting the original author, but also allowing you to keep track of your sources.
7. Navigate back to your lab entry in your project (your initials are a sign that you are in the right place).

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**Exercise 4:**

**Sharing your record**

1. Click the info icon on the right-hand side underneath the clock symbol you used previously and select ‘Export entry’
2. Your export is now running, you will receive an email when the export is complete
3. Click the link in the email to download your protocol as a .zip
4. Unzip the file and in your own time, print the protocol if you want to use the recipe in the kitchen, or share it with friends.
5. You can share .pdf versions or click Share and generate a Share link of your lab entry. This makes your record interoperable as many users across many platforms across the world can access your entry if you make it public and share it on for example social media. If there is no IT access present, you always have the option to print the .pdf copy.

Our Benchling tutorial:  
<https://www.wiki.ed.ac.uk/display/RDMS/Benchling+%28quick%29+tutorial>

Further resources and tutorials from Benchling:

* Main help page, with access to several tutorials: <https://help.benchling.com/en/>
* More molecular biology features: <https://help.benchling.com/en/collections/69523-molecular-biology>
* Benchling training kit for academics: <https://help.benchling.com/en/collections/1608962-benchling-training-kit-for-academics>

Materials on ELN:  
<https://www.wiki.ed.ac.uk/pages/viewpage.action?pageId=463750271>

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**Exercise 5:**

**Adapt a public protocol and retain its provenance**

*Fork the protocol, preserving the original for crediting*

1. Open the link to the above protocol, as you can see, we have assigned it its own DOI

2. First click on Metrics: Because we are FAIR, this shows you how many views over time this protocol has had, how many exports, how many individual steps it involves and how many times it has been forked.

3. Now click on the downwards arrow next to the title

4. Select 'Copy/Fork' and click 'make a fork'

5. Select the Folder you want the protocol to be forked to and click 'continue'

6. Your fork of "How to make a cup of tea" is ready now, click 'edit new fork'

7. On the right-hand tool bar, the clock icon, shows you the history of the protocol (as before in Benchling). Currently you should see no history as you have not made changes.

*Edit the forked protocol*

1. Go to 'Materials' in the top tool-bar: add or edit materials according to your preferences, e.g., change full-fat milk to oat-milk, or add honey, lemon etc

2. Go to 'Steps' in the top tool-bar: edit the protocol according to your preferences

3. You can edit the 'Description' and 'Guidelines & Warnings' if you would like to

4. As soon as you change anything, the timestamp and where in the protocol this change was made appears in the history.

5. Click 'View', you will now see the reader view of your protocol. It clearly states underneath the title 'Forked from How to make a cup of tea' and the original protocol is linked. This allows clear identification of your source.

6. Click 'Edit'

*Optional: Export the forked protocol*

1. Click 'More' in the top tool-bar, select 'Export' > 'PDF' > 'To your computer' and click export (leave selections blank)

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**Exercise 6:**

**Do you use an ELNs? Which one? What features do you like?**

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**Quiz:**

Which of the following statement are true (T) / false (F)?

* Good record keeping ensures transparency and reproducibility.
* There are no advantages to using analog record keeping when compared to digital record keeping.
* Digital records help people view a protocol simultaneously.
* Digitally kept records can be quickly and easily edited.
* On balance, digital record keeping is more advantageous than analog record keeping.
* Digital records are easier to search (for and within) than analog records.

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**Feedback. Help us improve!**

1.      How do you feel about the presented topics after this session (type +1 next to the statement that best describes your feeling):

•       I am more confused:

•       I have a better understanding of them now:

•       My knowledge has not changed much:

2.      Thinking of your knowledge of the lesson topic and its presentation,

which one of the statements best characterize your experience (type +1

next to the statement)

•       I am a novice, and I found the course useful/informative:

•       I am a novice, but I think the course should be improved:

•       I have experience in the presented area, but I found the course

useful/informative:

•       I have experience in the presented area, and I think the course could

be improved:

3.      How was the pace of the lesson:

•       Too fast:

•       About right:

•       Too slow:

4.      If the lesson had to be 5 minutes shorter, what would you remove:

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5. If the lesson could be 5 minutes longer, what would you add or spend

more time on:

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