EXCELERATE Deliverable D8.5

Project Title:	ELIXIR-EXCELERATE: Fast-track ELIXIR implementation and drive early user exploitation across the life sciences	
Project Acronym:	ELIXIR-EXCELERATE	
Grant agreement no.:	676559	
	H2020-INFRADEV-2014-2015/H2020-INFRADEV-1-2015-1	
Deliverable title:	Report on the ELIXIR workshops organized with the Rare Diseases communities	
WP No.	8	
Lead Beneficiary:	UL	
WP Title	Use Case C: ELIXIR infrastructure for Rare Disease research	
Contractual delivery date:	31 May 2019	
Actual delivery date:	29 May 2019	
WP leader:	Ivo Gut and Marco Roos	8 - CRG; 6 - LUMC (LTP)
Partner(s) contributing to this deliverable:	UNIMAN, NBIC, LUMC, CRG, CIPF, BSC, NTNU, CNRS, CNR, UL, DTU, FPS	

Authors and Contributors:

Brane Leskosek, Leslie Matalonga, Sergi Beltran, Marco Roos

Reviewers:

None

1. Table of contents

2. Executive Summary

In this third report on training workshops we first describe the workshops from M26 until M45 and planned future workshops for the rare diseases (RD) domain within the context of the ELIXIR-EXCELERATE project. Within the reported and planned training events for the RD domain within ELIXIR community, the suggested focuses from the results of the ELIXIR Training - Rare Diseases Training capacity and needs survey 2017, were used. The gathered information was used (1) to update or identify key training contacts/subjects in the RD community, (2) to updated specific training needs in the RD community and (3) to spread specific knowledge needed in the RD community. An important mission of EXCELERATE WP8 'ELIXIR infrastructure for Rare Diseases research', defined at the kick-off meeting on November 24, 2015 in Leiden, is to help the rare diseases community in different nodes to raise its infrastructure activities to the level of best practices in ELIXIR infrastructure, i.e. where rare diseases data, metadata, tools, and catalogues are shared, interoperable, and sustainable at the source, are conformant with a common set of principles and standards across participating countries/nodes and in agreement with the ELIXIR platforms. To achieve optimal knowledge exchange between the domains, workshops in this WP are typically co-organised with members from the rare diseases community and co-sponsored by relevant projects such as RD-Connect[1] and connected to important starting projects and initiatives on rare diseases as is the European Joint Programme on Rare Diseases (EJP-RD) or 1M genomes by 2022 declaration.

During this third reporting period a total of 9 different international events involving the participation of at least eight ELIXIR nodes (ES, HU, NL, FR, IT, BE, DE and SI) and reaching more than 2000 experts and researchers in the RD field across Europe were organised. These events, coordinated by or in collaboration with the ELIXIR rare disease use case and the ELIXIR training platform, have also an impact in the the dissemination of all the possibilities ELIXIR infrastructure offers to the RD community through the different ELIXIR platforms.

Events were either organised specifically with the Rare Diseases (RD) community, or a separate stream/session for the RD community was co-organised around other events. Training workshops and courses were delivered in partnership with WP11 'EXCELERATE Training Programme'.

The delivery of workshops was complemented by the ELIXIR implementation study/RD-Connect proof-of-concept to test interoperability backbone components for enabling queries across rare diseases biobanks and registries.

The training capacity and needs for RD community, that were identified in the "ELIXIR Training: Rare Diseases Training capacity and needs 2017" survey was used for the delivery of RD training events.

[1] http://rd-connect.eu/

3. Impact

WP8 members have participated in the organisation of training activities with and for the RD community reaching a wide range of more than 2000 international participants and impacting in the research of rare diseases.

4. Project objectives

With this deliverable, the project has reached or the deliverable has contributed to the following objectives:

No.	Objective	Yes	No
1	Demonstrate, in partnership with the Rare Disease community, how aligned ELIXIR resources enable research, avoid fragmentation and support the development of sustainability models for resources created by the community research projects.	X	

5. Delivery and schedule

The delivery is delayed: Yes • No☑

6. Adjustments made

Not applicable

7. Background information

Background information on this WP as originally indicated in the description of action (DoA) is included here for reference.

Work package number	8	Start date or starting event:	month 1

Work package title	**Use Case C: ELIXIR infrastructure for Rare Disease research**
Lead	Ivo Gut (ES) and Marco Roos (NL)

Participant number and person months per participant

4 - UNIMAN 6.00; 6 - NBIC 0.00 LUMC 6.00; 8 - CRG 38.40; 9 - CIPF 2.66; 12 - BSC 10.00; 22 - NTNU 12.00; 26 - CNRS 12.00; 30 - CNR 6.39; 32 - UL 15.00; 38 - DTU 12.00; 47 - FPS 4.54

The International Rare Diseases Research Consortium (http://www.irdirc.org) established the ambitious goal of developing 200 new therapies by 2020. ELIXIR as a whole and in particular this Work Package is aligned with this effort. The overall objective of this Work Package (WP) is to address the needs of the rare diseases community through the instantiation of the ELIXIR resources described in WP1-5. These resources do not constitute a replacement of the current research projects organized around the rare diseases area. Indeed the aim is to empower them and to help in the sustainability of the resources created by these projects in the long term. This WP is organised around the actors that play a major role on the development of these new therapies. These actors are the main users of the ELIXIR infrastructure: data generators and curators (usually personnel working in hospitals, genomics-based companies, and members of large research consortia), researchers (bioinformaticians, geneticists, and clinical doctors), diagnosis companies, CROs (usually SMEs), and the pharmaceutical industry among others.

Objectives

WP8 aims to empower actors involved in the development of new rare diseases therapies through the execution of the following specific objectives:

1. Build the ELIXIR registry of data resources and analysis tools critical for the development of the rare disease research. (Task 8.1)
   - Continuous monitoring of resources and tools in Rare-diseases.
   - Implementation of a system for the generation of datasets adequate for the assessment of methods in the area of rare- diseases.
   - Implementation of the ELIXIR rare-disease portfolio in the ELIXIR registry.
2. Implementation of a technical framework for the comparison and standardization of services useful for the rare-disease communities. (Task 8.2)
3. Collaboration with the rare-disease communities for the organization of training courses, workshops and jamborees. (Task 8.3)

Work Package Leads: Ivo Gut (ES) and Marco Roos (NL)

Description of work and role of partners

Task 8.1: The ELIXIR portfolio of data resources developed in collaboration with the rare diseases communities (69.4PM)

Subtask 8.1.1 Monitoring of resources and tools. (25.4PM)

There is a wide range of data resources and analysis methods used in the rare-disease area. Many of those resources are provided by ELIXIR Nodes, for example the European Genome-Phenome archive (EGA) currently stores data from major research initiatives in rare diseases like the RD-connect project. In this subtask we will review the current data resources and evaluate their usability and potential impact on the rare disease community. An important aspect of the evaluation will be the security of the data that is a key aspect in rare disease domain given the low frequency of the

associated genomic variants in the population.

One critical aspect of the development of the registry is to engage the different communities in the submission and rating of the tools. In this task we will work together with representatives of the major projects in the field of rare- diseases to create a customized portfolio of ELIXIR tools and services devoted to assist them in the development of these new therapies. As an example we will ask for proposals of tools that serve to interpret the effect of genomics variants on a group of patients that belong to the same family. We strongly believe that this link between the end- users and the tools developers will help ELIXIR to understand better the problems that are actually facing the main actors in the rare diseases research and hence to better solutions. The final outcome of this task will be the ELIXIR data resources and analysis tools useful to the rare disease communities.

Partners: NO, ES, SI, IT, NL

Subtask 8.1.2: Creation of reference datasets adequate for the specific assessment of methods and standards in the area of rare-diseases. (30PM)

While the creation of these tools should stay as a priority for researchers, large scale projects, SMEs and the industry increasingly need access to benchmarked methods on which to build their analysis strategies.

The evaluation of the methods requires the adequate selection of the datasets and benchmarking strategies. The systems for the selection of the datasets for the benchmarking have to be fast and effective to enable the continuous evaluation of the methods, as described in WP2. We will collaborate with the ELIXIR benchmarking strategy (WP2) to build the appropriate strategies for the selection of the datasets (subtask 8.1.1 above) and with the rare- disease communities to implement the adequate quality reporting standards. Moreover we will integrate these pipelines in the ELIXIR benchmarking framework (WP2) to continuously monitor the selected methods with the newly generated datasets.

Partners: ES, DK, IT, FR, SI, UK

Subtask 8.1.3 Implementation of the ELIXIR rare-disease portfolio in the ELIXIR registry. (14PM)

The ELIXIR registry will be a reference for the research community (WP1), as it will reflect the quality and the real-time status of the services included on it. This registry will act as a one-stop shop for services provided by ELIXIR. The goal is to allow users from the different countries, communities and projects to discover which are the tools available at a given time, with the associated information about the community based rating (see WP2), instructions for correct use and associated examples We will encourage tools developers to adopt the EDAM standard to describe their tools and to share several metrics about the performance and usage of these of the tools (see description in WP1)

Those services promoted as relevant by the end-users will be listed in a special section in the ELIXIR registry.

Partners: DK, ES, FR.

Task 8.2: Standardisation of rare disease services in collaboration with the RD communities. (36PM)

The ecosystem of RD services will inevitably be a combination of distributed and centralized resources, because of the sheer number of rare diseases and rare disease organisations, as well as legal and ethical constraints between countries and communities. At the same time, because of the low frequency in the population, combining data across patient registries, biobanks, and -omics databases is the single most important way of getting new insights towards new treatments.

One of the most recurrent issues when attempting to perform research across resources is the lack of standards or the poor adoption of existing standards by RD stakeholders. Rare disease standards concern different types of data including genomic and phenotypic characteristics, causative genetic variation status, quality criteria, analysis protocols, supporting evidence and follow-up indicators. These problems will be analysed in workshops including experts in semantic web, linked data technologies and rare-disease experts (see previous experiences and proposal in “Bring Your Own Data (BYOD) bootcamps”, in WP5). The initial experience with this methodology (see 61) is that a critical bottleneck is the identification of the most appropriate terms and identifiers to annotate data for cross- resource questions. Based on this experience we aim to address two major 'white spots' in the available infrastructure for Rare-diseases: (i) the current infrastructure of the rare disease platform: RD-Connect, does not contain backbone services for functional interlinking, (ii) a majority of RD sources are not equipped to provide data, metadata, and data updates using appropriate standard procedures. To address these needs we will work together with WP5, the rare-disease communities and the RD-Connect project to (i) deploy and test the services and guidelines for standardization 'at the source', (ii) provide standardized interfaces that Rare-disease communities can work with from a central location, (iii) build capacity in the RD community by enabling them to work with these services themselves.

Partners: FR, ES, DK, NL.

Task 8.3: Training workshops targeting different user communities. (32PM)

In this task training workshops and courses will be delivered, in partnership with WP11 “EXCELERATE Training Programme”. The training will be approached from two sides. First, in collaboration with the Train the Researcher task in WP11 we will train rare diseases’ researchers in the use of relevant tools, standards and infrastructure produced

by ELIXIR. Second, we will run “feedback workshops” in which those who are developing the methods will be exposed directly to problems faced by the rare disease community. These userthons will help to shape the ELIXIR portfolio.

The direct collaboration with WP11 Train the Researcher will ensure that researchers are trained to a high standard in state-of-the-art analysis techniques for rare disease data and that innovative training approaches developed in this task are applied elsewhere in ELIXIR.

Partners: UK, SI, NL.

8. Appendix 1: Workshops for and with the rare disease community

EXCELERATE members contribute to the workshops by advising in rare disease workshops, mediating them and organising the contribution of data experts, such as in the case of Bring Your Own Data events - BYODs (contribution of Marco Roos et. al. for ELIXIR-NL). Based on the experience from the workshops, they take initiatives towards collaboratively developing protocols and tooling (e.g. the cross-project rare disease data linkage plan co-led by EXCELERATE WP8 co-lead Marco Roos), define new training goals (led by Brane Leskošek for WP8/11), and further developing the Rare Disease Connect platform (led by WP8 co-leads Ivo Gut and Sergi Beltran). The objectives of the contributions are: (i) to stimulate and foster rare disease data resources to become FAIR at the source (Findable, Accessible, Interoperable, Reusable for humans and computers), (ii) to stimulate the rare disease community to share (meta)data via the RD-Connect platform and European infrastructures such as EGA. In the Table 1 is presented the summary of the workshops and events organised within the RD domain in the observed period (Table 1).

Table 1: List of workshops and events

Nr.	Place	Date	Event	Participants Country	Num.	Topic
1	Paris, FR	14 Nov 2017	ELIXIR Innovation and SME Forum: Data Driven Innovation in Rare Diseases and Personalised[2]	ES	100	ELIXIR Rare Disease Use Case
2	online	17 Jan 2018	ELIXIR webinar[3]	ES, EBI	15-50	visualization of RD genomics data
3	online	25 Jan 2018	NIH Webinar: Global Perspectives on Standards and Common Data Elements	NL	200	Don't share, be FAIR!

[2] https://elixir-europe.org/events/elixir-innovation-and-sme-forum-data-driven-innovation-rare-diseases-and-personalised

[3] https://tess.elixir-europe.org/events/elixir-webinar-visualisation-of-rare-disease-genomics-data

			Used in Patients Data and Biospecimens Collection[4]			
4	online	21 Feb 2018	ELIXIR webinar[5]	NL		ELIXIR Webinar on the MoldatainRD Implementation Study
5	Athens, GR	16 Apr 2018	RD-connect annual meeting[6]	ES	80	ELIXIR Rare Disease Use Case
6	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM[7]	ES, NL	20	ELIXIR EXCELERATE WP8: Rare disease Use Case
7	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM	ES	30	Remote real-time visualization of human rare disease genomics data (RD-Connect) stored at the EGA
8	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM	IT	50	FAIRification protocols and services for rare disease data resources
9	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM	IT	50	Implementation study for the integration of ELIXIR-IIB in ELIXIR Rare Diseases activities
10	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM	ES	300	ELIXIR Rare Disease Use Case
11	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM	NL	30	Implementation study on molecular data for rare diseases
12	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM	IT, NL	100	FAIRification protocols and services for rare disease data resources
13	Berlin, DE	4 - 6 Jun 2018	ELIXIR AHM	ES, NL	100	Rett syndrome variant integration and analysis, use cases from the Elixir molecular data for rare diseases implementation study
14	Milan, IT	16 - 19 Jun 2018	ESHG[8]	ES	200	Phenotype:genotype data collection and analysis for rare disease research: a hands-on workshop with the RD-Connect platform
15	Rome, IT	10 - 14 Sep 2018	6th International Summer School Rare Disease & Orphan Drug Registries[9]	IT, NL	100	BYOD to Link Rare Disease Registries
16	Utrecht, NL	1 Oct 2018	ELIXIR Technical and Training Coordinators[10]	all ELIXIR members	50	Rare Disease Use Case
17	Basel, CH	19 Oct 2018	3DBioInfo[11]	ES	100	Rare Disease Community
18	online	16 Jan 2019	ELIXIR webinar[12]	ES	10-30	RD-Connect
19	Paris, FR	13 Mar 2019	Eurordis Winter School[13]	ES	30	Data sharing: Why and How?
20	Lisbon, PT	19 Jun 2019	ELIXIR AHM[14]	HU, ES, NL, SI and other ELIXIR members	/	ELIXIR Rare Disease Community

[4] https://rd-connect.eu/event/nih-webinar-global-perspectives-on-standards-and-common-data-elements-used-in-patients-data-and-biospecimens-collection/
[5] https://tess.elixir-europe.org/events/elixir-webinar-on-moldatainrd-implementation-study
[6] https://rd-connect.eu/2018-annual-meeting/
[7] https://elixir-europe.org/events/elixir-all-hands-2018
[8] https://2018.eshg.org/index.php/programme2018/saturday/
[9] https://vascern.eu/events/6th-international-summer-school-rare-disease-orphan-drug-registries/
[10] https://tess.elixir-europe.org/events/joint-technical-coordinators-training-coordinators-meeting
[11] https://swissmodel.expasy.org/25years/elixir
[12] https://elixir-europe.org/events/elixir-webinar-rd-connect
[13] https://openacademy.eurordis.org/winterschool/
[14] https://elixir-italy.org/en/news/elixir-excelerate-all-hands-meeting-lisbon-2019/

21	TBD	summer 2019	ELIXIR RD training based on training needs from the RD survey	WP8 members	/ ELIXIR Rare Disease Community