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First Report on Sample data management training workshops

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Introduction and Objective

Biological samples from rare disease (RD) patients are precious resources for research. Due to their intrinsic rarity, these samples are often dispersed in multiple biobanks and are difficult to locate. The accessibility of these biological samples underpins the development of new diagnostic techniques, biomarker development, identification of potential therapeutic targets and testing therapeutic response.

Biobanks are key research infrastructures that offer professional services to the research community for sample sourcing and management. They play an important role in maintaining the quality of the biological samples from time-of-collection to distribution, as well as conserving the privacy and wishes of the patients as indicated within the consent forms. Biobanks (eg. [EuroBioBank](#)) have begun to share RD sample datasets to centralised sample catalogue to facilitate sample access and support the change towards best practice with their special position interfacing patients, clinicians and researchers.

Recent developments from EC funded projects have delivered tools to address this challenge. RD-Connect Sample Catalogue (samples.rd-connect.eu), a flagship platform listing over 66.500 RD samples and metadata from the EuroBioBank, allows users worldwide to find specific specimens for research (RD-Connect; 2012-2018). Its subsequent link with research infrastructure supported tools within the development context of EJPRD, such as the BBMRI-ERIC Negotiator, can open the way to initiate sample requests. However, despite significant tool developments to improve RD sample access, researchers and biobankers did not have sufficient training opportunities to be able to exploit these technological advances on biobanking activities. Similarly, researchers remain unfamiliar with biobank services and their potentials.

RD samples and associated data pose particular management challenges because of their high variety of data types (e.g. disease names, genetic variants, phenotypes, clinical data), as well as balancing the need to share while preserving privacy and rights of RD patients as expressed in the consent forms.

Therefore, upon the identification on such specific needs of training, WP14.7, within Work package (WP) 14 of Pillar 3 of the EJP RD, has developed a series of focused workshops to help the RD community with the experience of all actors around the biobanking activities. These training workshops are part of a capacity building programme put forth by the EJP RD Pillar 3. The goal of this training workshops is to develop the capacity on data management of biobanks, allowing them to optimise operations to support the need of RD research community. Through the workshops, we aim to promote FAIRification of resources and research reproducibility [1]. The training workshops will give

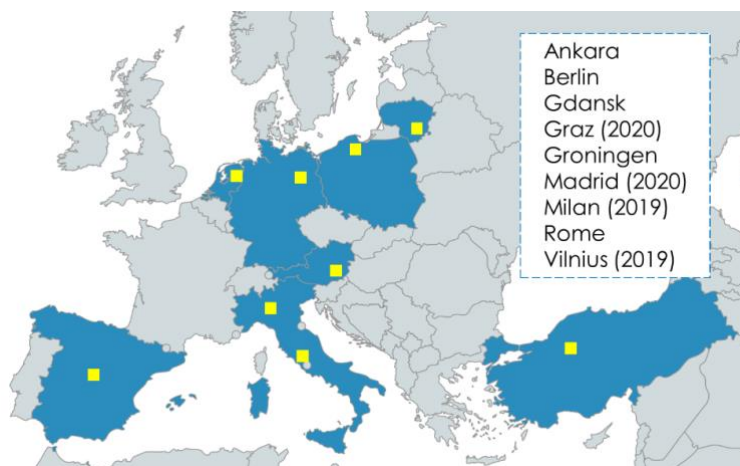
researchers linked to biobanks the opportunity to learn how to harmonise and share their rare disease biological sample data and to encourage direct interactions between RD clinicians/researchers and biobanks, where researchers can exchange on how to leverage biobanks in their RD research.

Methodology

Definition of Training programme

Over the course of EJP RD, 10 workshops will be organized to offer capacity building opportunities for biobanks and stakeholders. These workshops will rotate in 9 different European cities in diverse geographical regions (see Figure 1). The reasoning behind this design was to maximize participation of stakeholders from different regions in Europe. It is also the goal of the workshop to stimulate conversation and awareness in RD biobanking in different EU countries.

Figure 1: Locations of the WP14.4 Biobank Training workshops 2019-2023.



At the kickoff of the project, the task partners identified topics as relevant for the curriculum of EJP RD Biobank Training programme. The list of topics was discussed within the context of EJP RD goal, the focus of WP 14 and available resources to implement the workshops. The topics were prioritized as core curriculum or additional topics, that can be adapted to the workshops depending on country specific interests or themes on annual bases (Table 1). We believe allowing 20% of course contents to be adjusted according to local needs would provide opportunity to diversify teaching programme.

Table 1: The core curriculum of the Biobank Training workshops and additional topics

Core Biobank Training Curriculum	Additional topics
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<ul style="list-style-type: none"> Existing RD networks; EuroBioBank [2, 3] FAIR principles, MIABIS [1, 4] ELSI considerations for data sharing [5 - 8] Ontology & Orphanet Nomenclature Practical session on data harmonisation Tool Demos Catalogues and request management Country perspective in RD 	<ul style="list-style-type: none"> Data and sample sharing workflows Human pluripotent stem cell lines (iPSCs) annotation & registration How to set up a biobank Long term sustainability How to network and engage international collaboration How to write a biobank business plan
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Table 2: Workshop programme general outline

Day 1	Day 2
Introduction to EJPRD and Biobank training Problem Case & Problem Based Learning Breakout I: Case reading and problem analysis Lecture Lecture (topics from Core Curriculum) Lecture Breakout II: Problem solution Solution presentations and review	Local RD biobanking activities Lecture (Ontologies) Tool Demonstrations Practical session Feedbacks

The Biobank training workshops contain plenary lectures and interactive small-group exercises, based on the *Problem-Based Learning* (PBL) method. PBL is a highly interactive and learner-centred approach where the learning occurs by working in a small group assisted by a facilitator to develop a solution of a Problem Case. Practical sessions on data management and demonstration of related tools is also part of the programme. During a 2-day workshop, the first day covers the general ELSI and theoretical elements of the curriculum with group problem solving sessions, whereas the second day covers data and tool related practical sessions (Table 2). At the end of both days, the participants have the opportunity to present their group solutions and discoveries in plenary and discuss what they have learned with the trainers.

2019 Workshops

In 2019, the theme of the workshops was “**Organizing & maximizing rare disease biological sample data in biobanks**”. This was to take direct advantage of outcomes from previous EC funded project RD-Connect, to leverage on previous investments and provide training on existing tools and concepts. The two workshops in 2019 were held in **Milan, Italy (1-2 April 2019)** and **Vilnius,**

Lithuania (29-30 October 2019). The Milan workshop was the very first training workshop offered from the whole EJP RD capacity building programme since the start of the project. The two workshops had similar training contents and organisation.

The 2019 Problem Case described a general scenario and challenges biobanks may face while managing a rare disease biological sample collection (Box 1). In particular, it focused on how to make RD biological findable and accessible using the current knowledge base, network, standards and tools. In order to make sure the participants focus the discussion on the specific challenges and come up with solutions, the problem case contains a few assumptions on the basic setup of the biobank.

Box 1: Problem Case 2019

*The group of Dr Green has finally set up a biobank, holding precious biological samples from **rare disease** patients and relatives. They know how to run a biobank, and have set up quality standards, to ensure samples are of high quality. They have consent from patients and relatives to distribute these biological samples for research use, and have a database of these samples. However, now they realize that the biobank nor their sample collections are sufficiently visible for external researchers. Dr Green's group is unsure about how to make information available researchers outside of their institute, and if there might be privacy concerns. The biobank has a website with general information about the collection and contact information.*

Dr Brown, a biobank staff, says "I don't know exactly how to begin, there are too many things to consider before start to sharing samples."

Dr Green suggests to Dr Brown: "let's start to gather information on how we can make RD samples available for the scientific community".

DAY 1: If you were Dr Brown, how do you proceed in order to make it easier for researchers to find and request the right samples and data from the biobank taking into account privacy/legal issues, if any?

DAY 2: (Practical session) If you were Dr Green, how can you use the data you already have to share information about the samples and data with researchers?

Webinars and preparatory materials

Preparatory webinar for training participants prior to the workshop were not required. Instead, a teleconference was necessary prior to the workshop to prepare the PBL facilitators. The facilitators must be well prepared in PBL methodology as their role in assisting the group discussions is vital to the success of the workshop. With the help of WP14 leader Claudio Carta, we have developed a specific guide to prepare and help the facilitators to navigate the PBL discussion. The Facilitators Guide contains a detailed programme of the workshops, the problem case, the identified learning objectives, suggested

questions to stimulate the group discussions, definition of terms and a list of relevant references from the lectures.

The mock biological sample dataset for the Day 2 practical session contained guides from the RD-Connect project as well as a mock biological sample collection dataset.

Selection of speakers

It was foreseen that the majority of the speakers/trainers would be EJPRD partners and/or WP14.4 partners, as it may increase interactions and interoperability between WP and Tasks. To provide the workshops with the flexibility to adapt the programme and to invite local speakers, the hosting organisers do have the resources to invite 2-3 speakers additional to the current task partners. The facilitators for group discussions may be invited from the local community to stimulate engagement and their contributions to the workshops are in-kind.

2019 - In the Milan workshop, the facilitators were local experts and WP14 partners, instead in the second workshop in Vilnius all the facilitators were from the local organisation.

Dissemination

The workshops are mainly disseminated by partners and through the EJP RD communication manager via the project website, newsletters and social media channels.

2019 - The dissemination of the first workshop in Milan was challenging as the announcement for the workshop and registration had coincided with the kick-off phase of the project. During this phase many aspects of management were still being established, including: new personnel, creation of the website, procedures for creation of surveys using LimeSurvey (EJP RD endorsed platform) and preparing administrative offices for travel fellowship budget usage. Despite the challenge, the announcement went out successfully on 21 February 2019, less than 2 months after project kick-off. For the second workshop, in Vilnius, all those resources were already available and used.

Selection of participants

In principle, the biobank training workshop follows the Pillar 3 agreed criteria for participant selection. Participation of applicants from all stakeholders (clinicians, biobank management, basic researchers, patient organisations, ethicists, policy makers, etc.) was encouraged to facilitate communication between diverse viewpoints in rare disease. In particular, the small groups for the PBL learning exercises were composed of these different stakeholders to ensure different aspects of biobanking were brought together. In case of over

subscription, applicants already working in a biobank and/or working in the rare disease field would be prioritized.

2019 - For the first workshop the participant registration were accepted on a first come first served basis. The approach was taken due to both time constraints and the launch phase when the Pillar level selection criteria was still under discussion. For the second workshop the standard process was applied, although all applicants for the workshop were accepted at the end of the registration period.

Travel fellowships

For each of the training workshop, 2-4 travel fellowships would be offered. The number of available fellowships reflect approximately 10% of the total participants in a workshop. Participants who wished to apply for travel fellowships were asked to submit a biosketch, a description of their current work, how attendance of the workshop would help them in their work/biobank, and whether their work location is in a EU-13 country. The applications were evaluated by the international Organizing Committee composed of the local organisers and task leader. The selection and assessment of the fellowship takes into account their geographical location, work relevance in rare diseases and biobanks, whether they represent patient organisations as well as whether they are young scientists.

2019 - Each of the workshop in 2019 offered 2 travel fellowships. Both workshops received four applications for the fellowships.

Satisfaction questionnaire submitted to participants.

Participants were asked to complete a feedback questionnaire at the end of the workshop.

Results and Discussion

Participant origins and profiles

In 2019, the biobank training workshop trained a total of 46 participants (Milan 22, Vilnius 24). We have observed on average 15% no-show or dropout rate with justified or non-justified reasons. Both workshops had participants from different European countries, including EU-13 countries. Milan Workshop had participants from 9 different countries; EU-13: Lithuania, Estonia, Poland. Vilnius Workshop had participants from 7 different countries; EU-13: Poland, Turkey.

Interestingly, the composition of the two workshops were quite different. Large percentage of the participants in Milan were biobank staff (Director, Manager,

Data Manager, Technician or IT Administrator), whereas in Vilnius the participants were often research scientists and clinicians (Table 3). The “other” profile types indicated by the participants included policy makers and students. The difference in the profile of the participants made significant impact on the direction of the group discussions.

Reports from the facilitators suggested that in the Vilnius workshop, participants spent substantial time discussing why a biobank would share biological sample and data and to whom, even though the assumption in the Problem Case indicated it was the goal of the biobank to do so. Instead, such questions on the assumption were not noted in the workshop in Milan. This observation may be attributed to the difference in the accepted norm of biobank staff to share biological samples as a part of its operation versus researchers/clinicians often sharing biological samples through projects. It would be important to tailor future workshops with the profiles of the participants in mind and introduce concepts of biobanking in a more concrete way. Alternatively, future workshops can be designed specifically for beginner biobank or more advanced biobanks.

Table 3: The profile of the participants in the training workshops

Milan		Vilnius	
Type of participant	%	Type of participant	%
Biobank staff (Director, Manager, Data Manager, Technician, IT administrator)	45.8	Research scientist	41.4
Clinician	12.5	Clinician	24.1
Research scientist	12.5	Biobank staff (Director, Manager, Data Manager, Technician, IT administrator)	10.3
Patient representative/advocate	12.5	Pathologist/medical specialist	6.9
Other	16.7	Patient representative/advocate	3.4
		Other	13.8

Table 4: The number of participants in each of the biobank training workshop in 2019.

	Total participants	Number of feedbacks	% response
Milan	22	16	73%
Vilnius	24	11	46%

Analysis of the satisfaction questionnaire

Overall feedbacks

The details of the participant numbers and number of feedback questionnaires received from each of the workshops is shown in Table 4. Overall, the feedback

from the participants were very positive, rating the workshops as very good or excellent (Milan 93%, Vilnius 80%), and met their expectations. More than 90% said they are likely or very likely to recommend the workshop to their colleagues. Quotes from the feedback questionnaire:

“Now I know how to manage all this biobank things (e.g. where should I look for information, networking and so on), it'll really save my time in the future!”

“My key message from the WS is that sharing of samples is crucial part of successful biobanking either in rare disease field or other disease fields. This thinking will help me better consult stakeholders in the field as well as raises some new ideas for scientific publications.”

Training methodology and course content

On the training approach, the Problem Based Learning methodology was much appreciated by both the trainers and the participants. The participants indicated this method as effective (94% Milan and 91% Vilnius). Many especially liked the informal atmosphere it created and the stimulating interactions between participants, trainers. Some quotes from the feedback questionnaire:

“Active interaction with the speakers and with other learners”

“Working on group with real problems”

“Working in groups is an excellent opportunity for intra and inter-national comparison”

For both the theoretical and practical days, the participants felt the level of the contents were just about right (Figure 3). The level of the practical sessions on the second day was perceived to be slightly more difficult. We recognized and expected the practical sessions with hands-on data harmonization to be more challenging for the participants. This result was in line with the expected outcomes.

Figure 2. (A) Overall rate on the workshop. (B) Whether the workshop met expectations. (C) Whether participant is likely to recommend the course to their colleagues

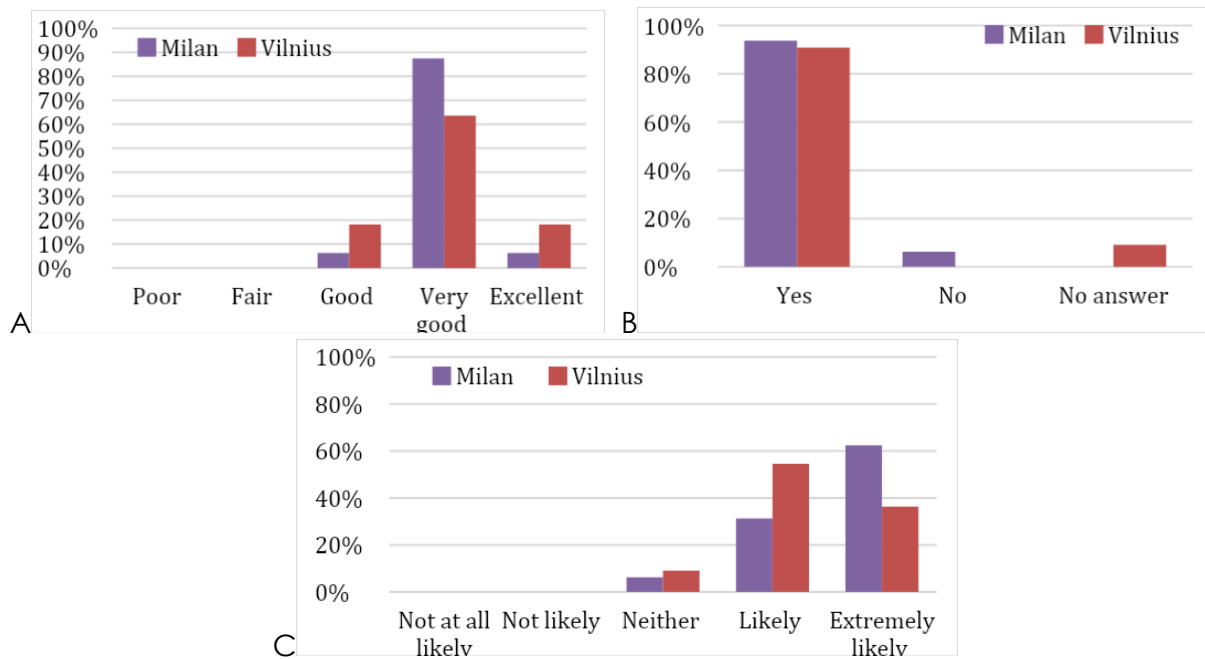
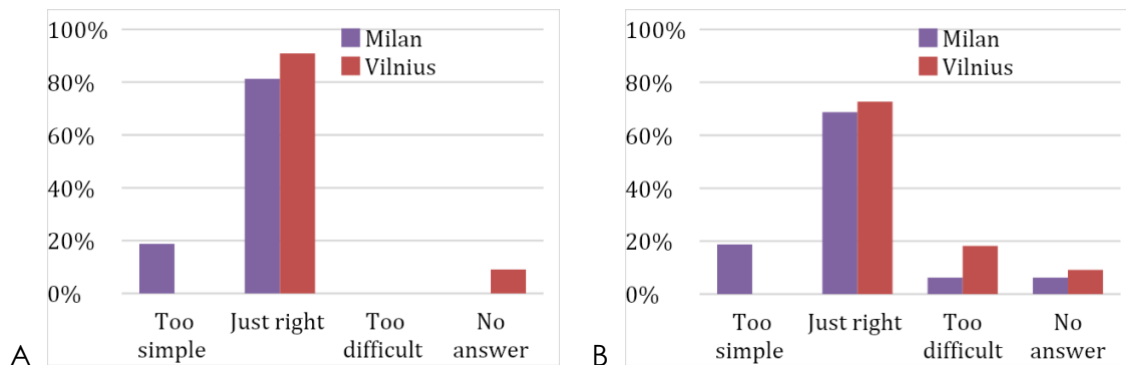


Figure 3: The level of training content for theoretical DAY 1 (A) and practical DAY 2 (B) sessions.



Training materials available

All the training material including presentation slides, reference papers, mock datasets and the solutions presented by the participant were shared directly with the participants at the end of the workshop as a zip folder.

Dissemination of results

The activities of WP14.4 and the biobank training program was presented during the European Biobank Week conference 8-11 October 2019, Luebeck, Germany. EJP RD and WP14.4 were mentioned in the oral presentation on biobanking state-of-art during the Rare Disease Session (speaker: Chihui Mary

Wang), and subsequently fully presented via a poster during the poster session (Annex 1).

Conclusion and Next actions

Within the first year of the EJP RD, we have successfully organized two biobank training workshops to stimulate thinking and awareness in sharing RD biological samples and data, to teach the best practices in data management and the importance of networking for the rare disease field. We were able to leverage from existing tools and expertise of EJPRD partners to put together the brand new comprehensive training programme. The feedback of the workshops were very positive, indicating the appropriateness of the curriculum, content and organization. We have gathered useful experiences and interesting observations from the workshops that will help the planning and organization future workshops.

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Annex I: Poster on WP14.4 Biobank Training Task presented during the European Biobank Week conference 8-11 October 2019, Luebeck, Germany

Promotion of rare disease biobank services, sample findability and accessibility through dedicated training workshops

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Rare Disease Challenge

A disease is defined as rare in Europe when it affects less than 5 people per 10,000. There are estimated 6000-8000 identified rare diseases. Access to rare disease (RD) biological samples is a challenge due to the intrinsic rarity and sparsity of patients.

Recent developments in the *RD-Connect Sample Catalogue*, a flagship platform listing over 66.500 RD samples, allow users worldwide to find specific specimens for research. Its subsequent link with BBMRI-ERIC Negotiator opens the way to initiate sample requests.

However, despite significant tool developments to improve access, biobanks did not have sufficient training opportunities to be able to exploit these technological advances. Similarly, researchers remain unfamiliar with biobank services and its potentials.

Capacity Building

Objectives

- Develop the biobank capacity on RD data management, harmonise and share RD biological sample data.
- Optimise biobank operations to support the need of RD research community.
- Encourage interactions between RD clinicians/researchers and biobanks, where researchers can learn on how to leverage biobanks in their research.
- Encourage involvement and conversation on RD biobanking in European countries.

Target

- Biobank managers and staff, researchers, clinicians, students, patient representatives.
- Travel fellowships to encourage participation from EU-13 countries.

2 workshops every year between 2019 – 2023; 10 workshops in total.

- Ankara
- Berlin
- Gdansk
- Graz (2020)
- Groningen
- Madrid (2020)
- Milan (2019)
- Rome
- Vilnius (2019)



Curriculum & Problem Based Learning

Problem-Based Learning method: participants stimulated to discover and learn whilst working on a RD biobank problem case in groups.

- Existing RD network: EuroBioBank
- FAIR principles, MIABIS
- Ethical considerations
- Ontology & Orphanet Nomenclature
- Country perspective
- Practical session on data harmonisation
- Tool Demos



Workshop outcomes

2019 theme: **"Organizing & maximizing rare disease biological samples data in biobanks"** in Milan 1-2 April and Vilnius 29-30 October. Feedback: 88% would strongly recommend it to their colleagues and 93% rated it as excellent or very good.

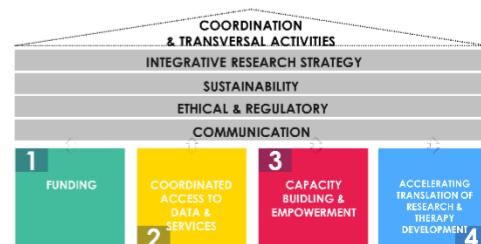
A rich, dedicated training program to promote biobank accessibility can moreover stimulate interactions between biobanks and its stakeholders.

What is EJP RD?

European Joint Programme on Rare Diseases is a 5-year project with the objective to "improve integration, efficacy, production and social impact of research on rare diseases through the development, demonstration and promotion of sharing of research and clinical data, materials, processes, knowledge and know-how, and an efficient model of financial support for research on rare diseases"

35 participating countries, 88 beneficiaries

www.ejprarediseases.org



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