RD Connect

RD-CONNECT AND THE GENOME-PHENOME ANALYSIS PLATFORM (GPAP)

4th Conference on European Reference Networks
Parallel Session 3, Brussels November 21st

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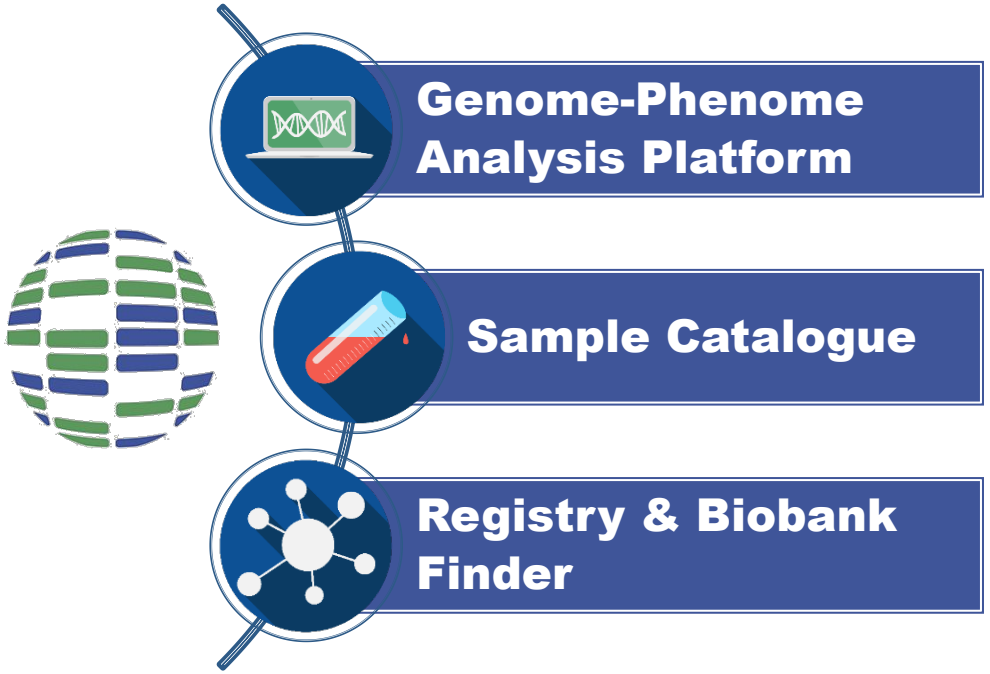
cnag
centre nacional d'anàlisi genòmica
centro nacional de análisis genómico

CRG
Centre for Genomic Regulation

I have no actual or potential conflict of interest in relation to this program/presentation

RD Connect an integrated platform for RD research

rd-connect.eu



4,160 GENOME-PHENOME DATASETS

24,857 BIOSAMPLES COVERING 112 RD

382 PATIENT REGISTRIES AND BIOBANKS COVERING 1500 RD

Data linkage across resources

Standardized phenotypic data collection

Ethical, legal & social issues

Bioinformatics and Omics data analysis

Patient engagement

The BBMRI-LPC Whole Exome Sequencing Call as an example

>800 exomes from 17 RD transnational projects
in collaboration with EuroBioBank and RD-Connect

Objectives

- ✓ to promote the usage of biobanks for rare diseases
  - samples deposited in the EuroBiobank network

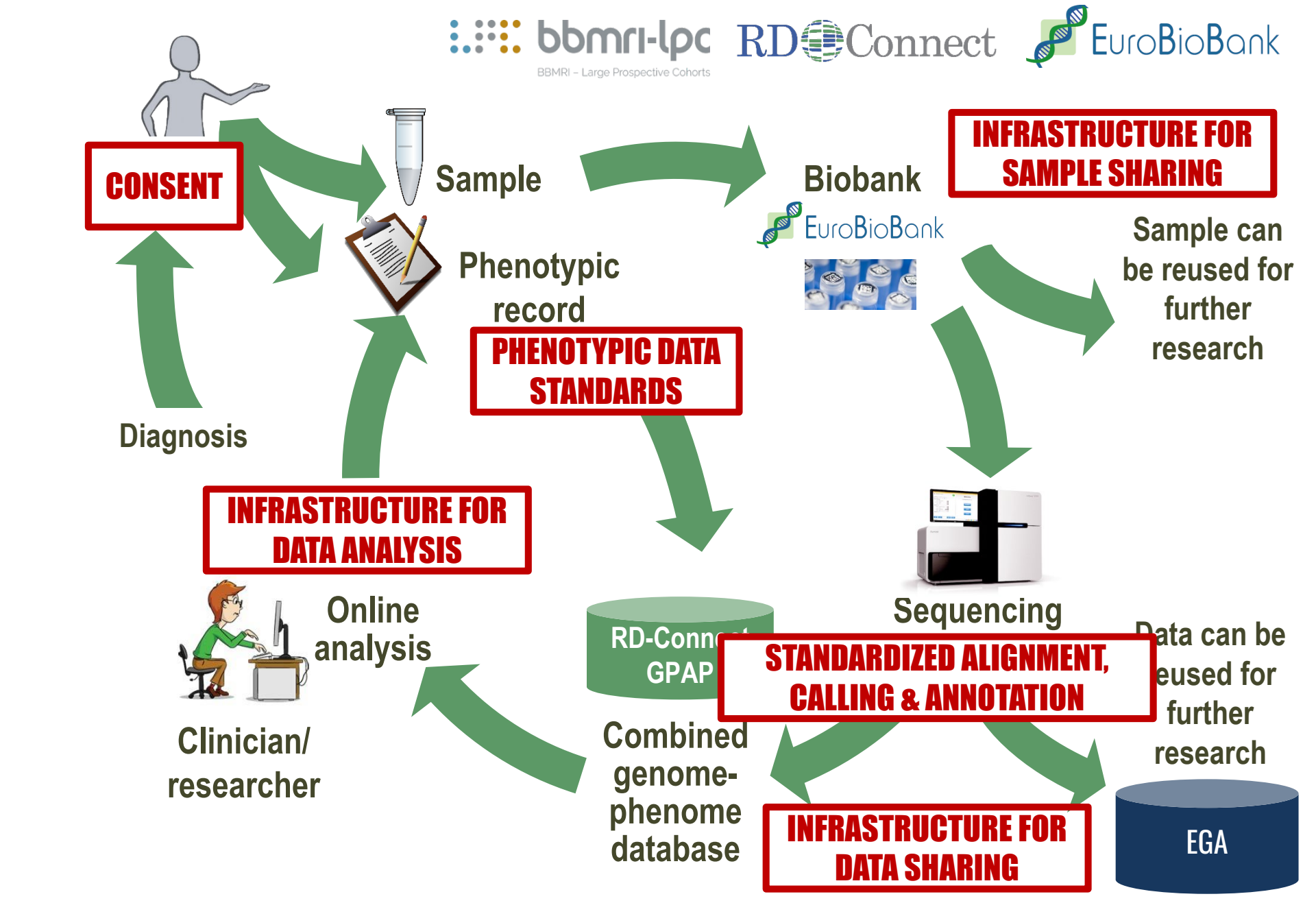
- ✓ to promote the utilization of cutting-edge next-generation sequencing technology for the identification of novel causative variants and genes
  - free-of-charge sequencing of 900 exomes

- ✓ to molecularly diagnose rare disease patients
  - analysis through the RD-Connect platform

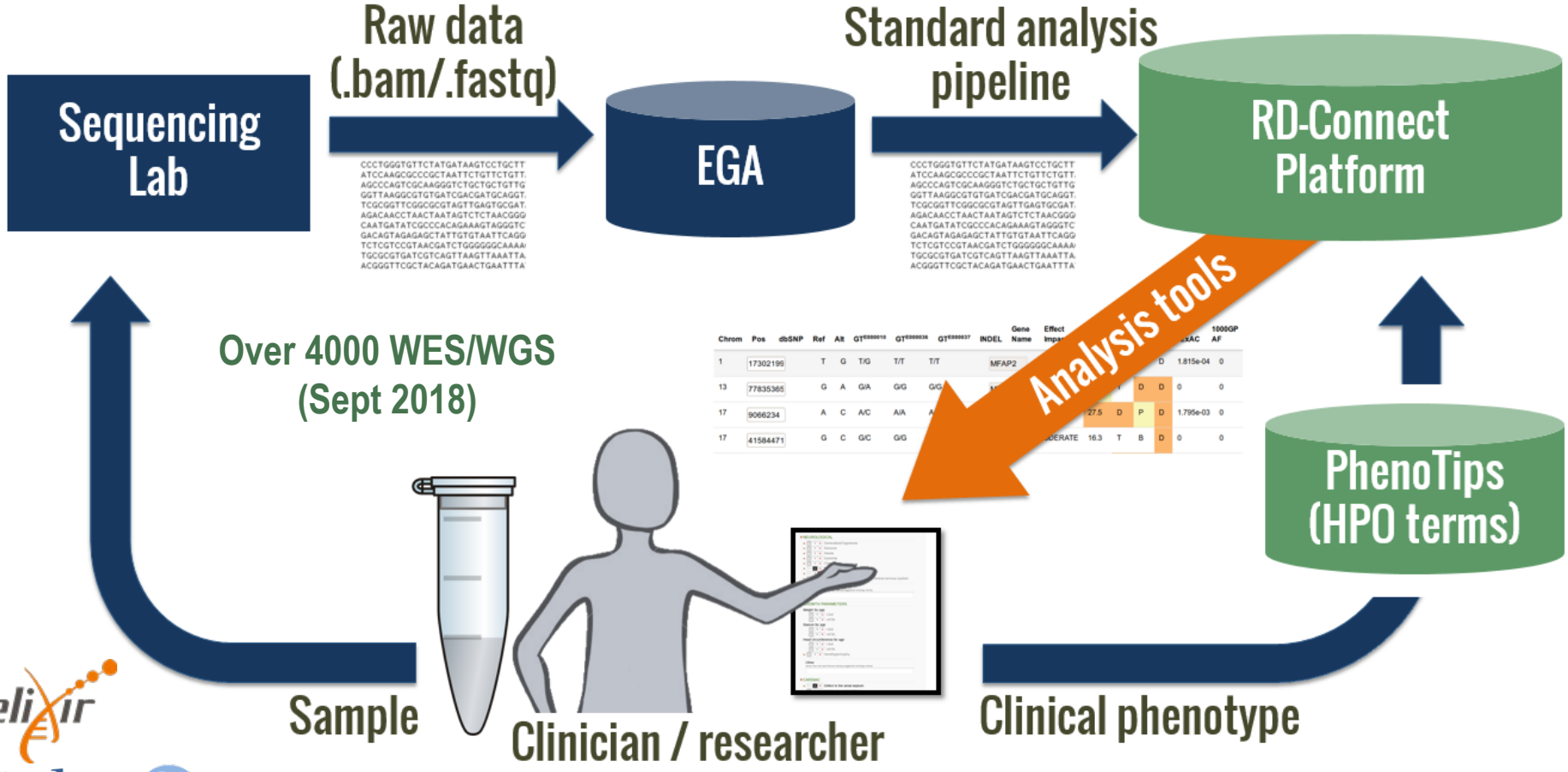
- ✓ to promote data sharing for rare disease research to enable future discovery
  - data sharing through the EGA and RD-Connect and phenotyping with HPO

bbmri-lpc cnag CRG welcome trust sanger institute EuroBioBank

A paradigm for best practice in data sharing in genomic studies?



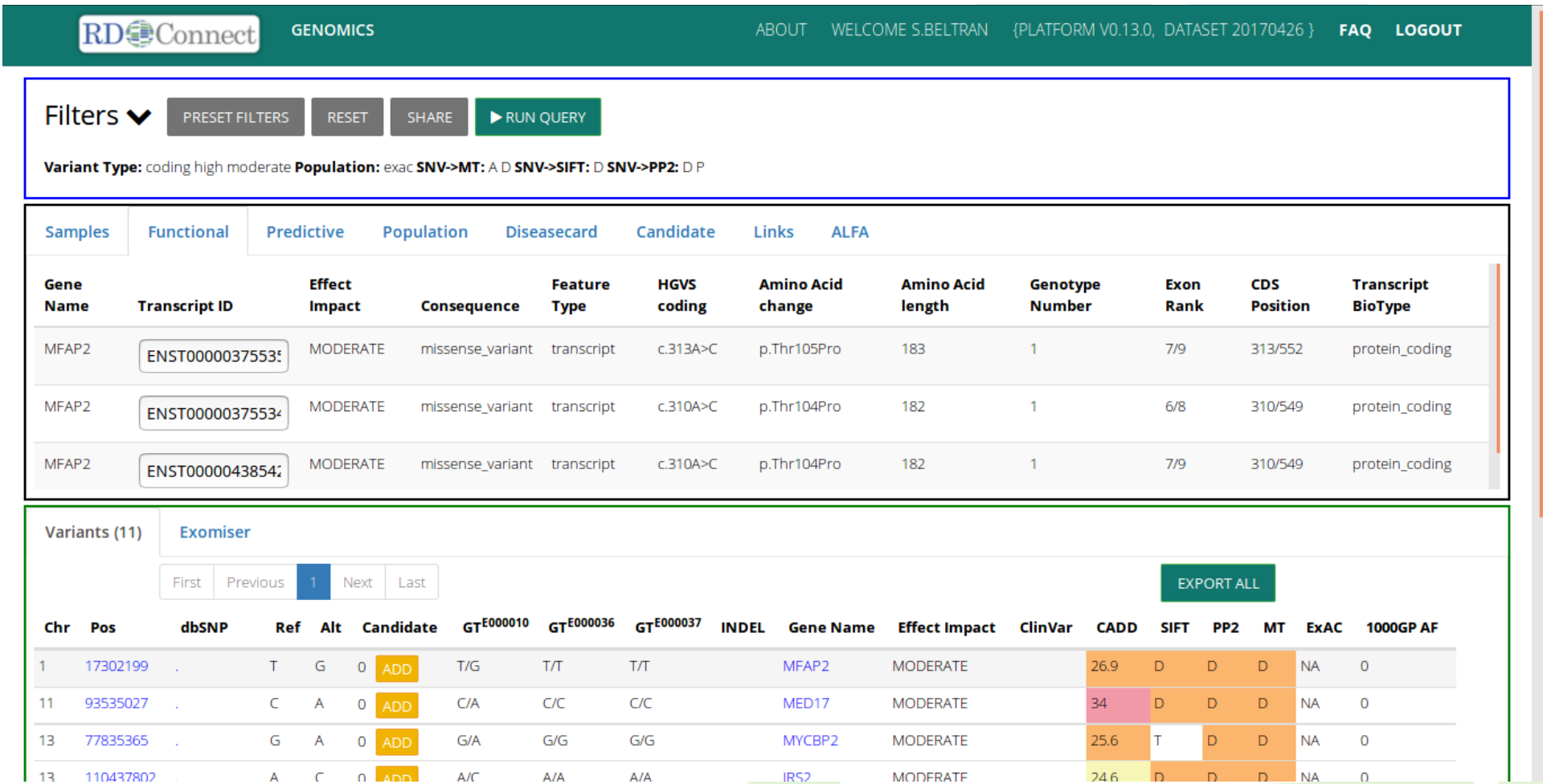
RD-Connect Genome-Phenome Analysis Platform (GPAP)



Ethics Committee Approval, GDPR Compliance, Code of Conduct, Data Access Committee, Security audited, User Activity logged

RD-Connect GPAP interface

https://platform.rd-connect.eu



RD Connect

RD-Connect GPAP functionalities

https://platform.rd-connect.eu

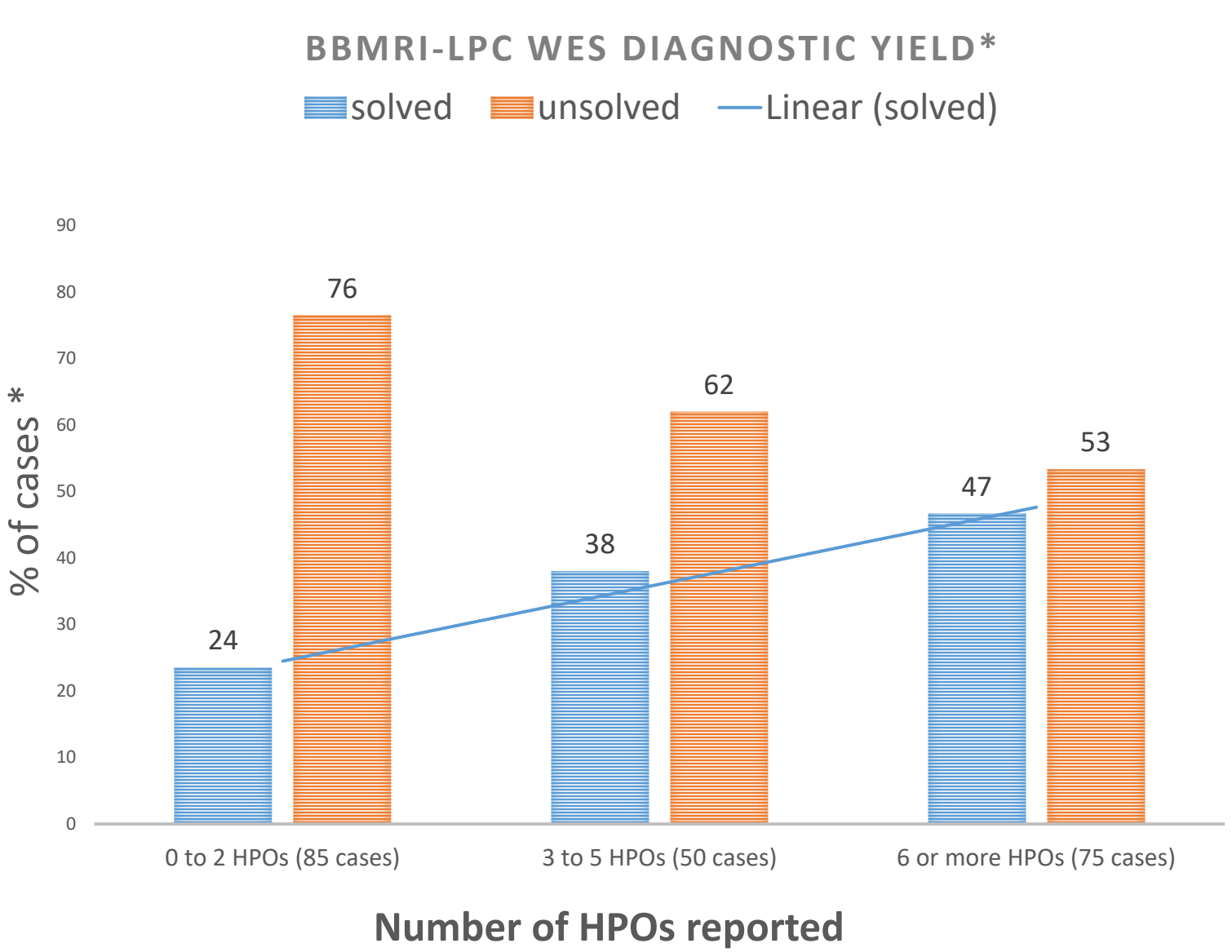
- ✓ **Standard filters and annotations** (variant impact on protein, frequency in control populations, frequency within database, *in silico* predictors, gene, genomic position, etc.)
- ✓ **Filter by genes of interest** (predefined/custom lists, associated to OMIM disease, HPO symptoms or Reactome)
- ✓ Filter by variants annotated in **ClinVar database**
- ✓ Filter to regions with observed long **Runs of homozygosity** (RoH)
- ✓ Direct link to **multiple external resources** (Ensembl, UCSC, gnomAD, HGMD, Human Splicing Finder, DiseaseCards, ALFA, etc.)
- ✓ **Phenotype driven strategy for variant prioritization** (Exomiser)
- ✓ **TAG and share candidate variants** using ACMG guidelines
- ✓ **Collaborative environment:** share data and queries
- ✓ **Anonymized data discovery** through Beacon and Matchmaker exchange

BBMRI-LPC RD WES Call: Preliminary analysis results (Oct 2018)

PROJECT	CLINICAL REFERRAL	TOTAL SAMPLES	TOTAL FAMILIES	CANDIDATES PROPOSED (%)	CONFIRMED SOLVED CASES (%)
1	Ophthalmogenetic Diseases	41	10	**40**	**40**
2	Congenital Myasthenic Syndrome	87	47	**68**	**30**
3	Mitochondrial Disorders	50	41	**61**	**43**
4	Intelectual disability	60	26	**54**	**46**
5	Epileptic Encephalopathies	50	32	**59**	**27**
6	Neuropathic pain	15	1	**0**	awaiting feedback
7	Neuromuscular diseases	81	52	**46**	awaiting feedback
8	Ataxia	50	28	**57**	**19**
9	Pyruvate Kinase Deficiency	31	15	**100**	awaiting feedback
10	Sudden Cardiac Death	83	33	ongoing analysis	-
11	Familial hyperinsulism	57	Not released	-	-
12	Neuropathies*	45	45	**85**	awaiting feedback
13	Metabolic acidurias	31	15	**67**	**40**
14	Albinism	47	27	ongoing analysis	-
15	Gastric neuroendocrine tumors	7	5	**80**	awaiting feedback
16	Rett Syndrome	46	21	**67**	awaiting feedback
17	Gastrointestinal disorders	30	Not released	-	-

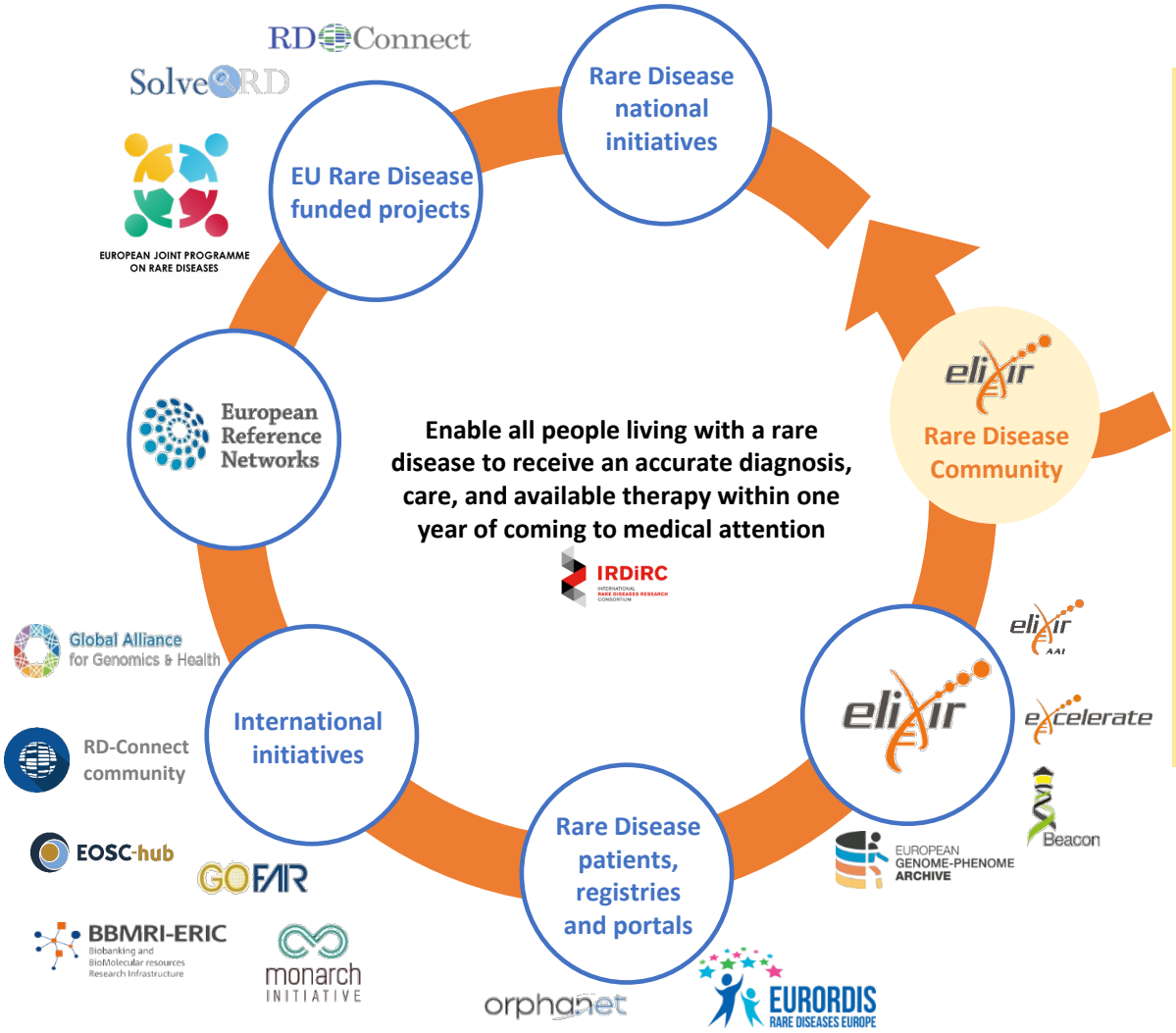
Total	811	383	**40-100%**	**19-46%**

*27 samples released only - 7 families



*N=210; Only cases with strong candidates have been taken into account

ELIXIR Rare Disease community



- **Global Infrastructure for Rare Disease research:**
  - Registry of Rare Disease data resources and analysis tools (https://rare-diseases.bio.tools)
  - Interconnection of secure data repositories and resources
  - Data sharing and data discovery
  - Benchmarking resources and activities
- **Interoperability of Rare Disease resources**:
  - Quality in terms of FAIR principles
  - Standards and ontologies
  - FAIR data services
- **Training:**
  - BYOD workshops
  - Rare Disease researchers focused trainings

Thank you!

https://rd-connect.eu

https://platform.rd-connect.eu/

SEVENTH FRAMEWORK PROGRAMME

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

SolveRD

Instituto de Salud Carlos III

NeuroOmics

Generalitat de Catalunya
Departament d'Economia i Coneixement

EUROMICS

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