

EUROPE BIOBANK WEEK 2021

COVIDBANK: Achievements and challenges one year after COVID-19 spread

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INTRODUCTION

In 2020, the World Health Organization declared the COVID-19 pandemic. The Biobank from Hospital Clínic de Barcelona (HCB) - Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS) processes and procures samples and associated data to foster research progress (Figure 1).

From the 5140 COVID-19 patients [1] treated in our hospital, 3024 have consented sample withdrawal.



Figure 1. Biobank workflow diagram.

AIM

- To share achievements and challenges of the South European COVID-19 repository COVIDBANK, collected *ad hoc* in collaboration with clinical and home care units and the Anatomical Pathology Department (Figure 2).

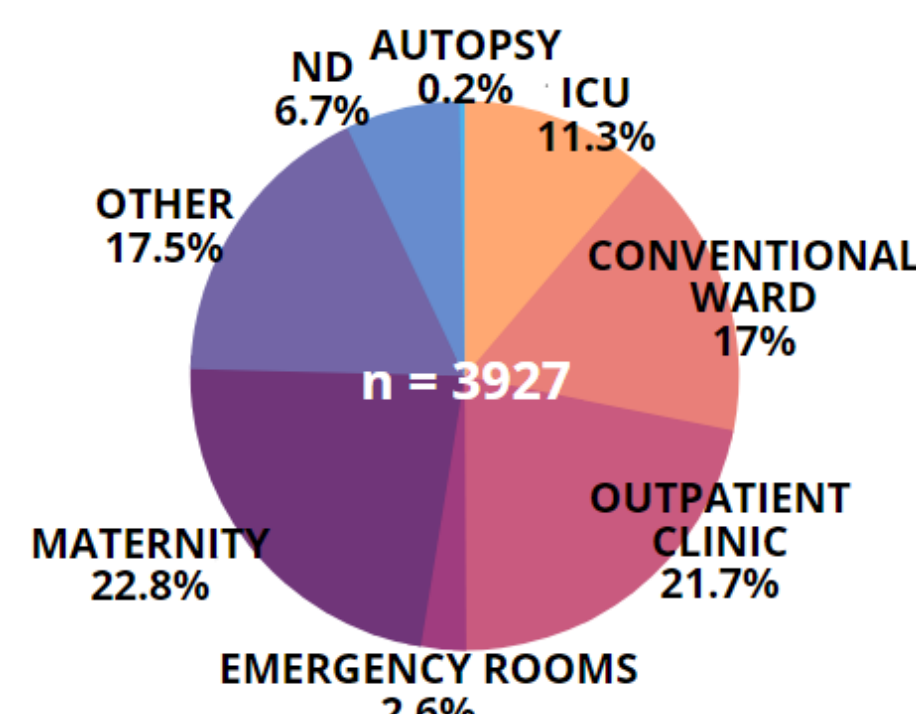


Figure 2. Donations origin room..

RESULTS

The results achieved in this year and a half are the following:

Hospital donors recruitment

Figure 4A shows how many COVID-19 patients from the hospital have samples in the COVIDBANK and the % that it represents from the total of patients hospitalized during each wave in ICU and conventional wards.

Overall, from April 14th 2020 until September 15th 2021, the 44% and the 17% of the ICU and conventional ward hospitalized patients, respectively, have consented sample withdrawal to the COVIDBANK (Figure 4B). Due to the high demand of ICU patients samples and to cover research projects inclusion criteria needs, the biobank prioritizes this type of donations. Importantly, all samples are associated with preanalytical and quality data as well as demographic and clinical information from the donor (Figure 5).

Sample processing and storage

The biobank has collected more than 44.000 samples that include serum, plasma, DNA, saliva, sperm, urine and tissue (Table 1). From the 3024 total donors, 810 have follow-up care samples. We have procured 6790 aliquots from 1502 patients, a 47,23% from the total number of patients. As it reads in Figure 6, the most asked sample type was serum (4305 serum aliquots have been procured).

Sample procurements

24 project requests have been satisfied - 10 additional requests are in progress (Figure 7).

HCB COVID-19 PATIENTS WITH SAMPLES IN THE COVIDBANK

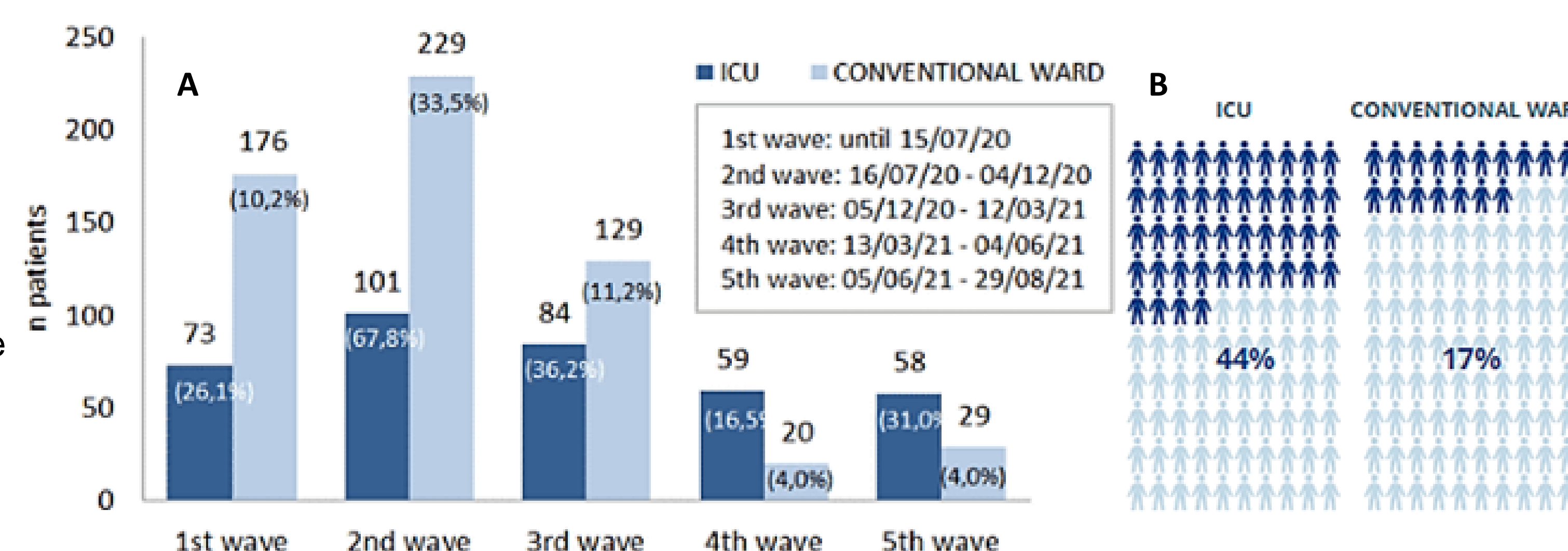


Figure 4. A - HCB COVID-19 patients (admitted in ICUs and conventional wards) with samples in the COVIDBANK. The % shows the comparison to the total number of hospitalized patients during that period in each ward. B - % of COVID-19 admitted patients with samples in the COVIDBANK since the beginning of the COVIDBANK (April 14th 2020).

SAMPLE COUNT

SAMPLES	Donors	Aliq./tissues	%
Plasma	2249	18086	70,72
Serum	2546	20151	80,06
Follow-up plasma	333	2373	10,47
Follow-up serum	379	3386	11,92
DNA	2066	2490	64,97
PBMCs	713	2646	22,42
Saliva	12	12	0,38
Sperm	15	57	0,47
Urine	4	92	0,13
Tissue (autopsy/biopsy)	45	204	1,42
Procured samples	1502	6790	47,23
DONATIONS (any type of sample)	3927		
DONORS	3024		
Donors with follow-up samples	810		

Table 1. Number of aliquots and patients that have donated each type of samples, and the percentage this represents from the total number of donors. The table also shows information about procured samples (last update: September 15th 2021).

PROCURED SAMPLES

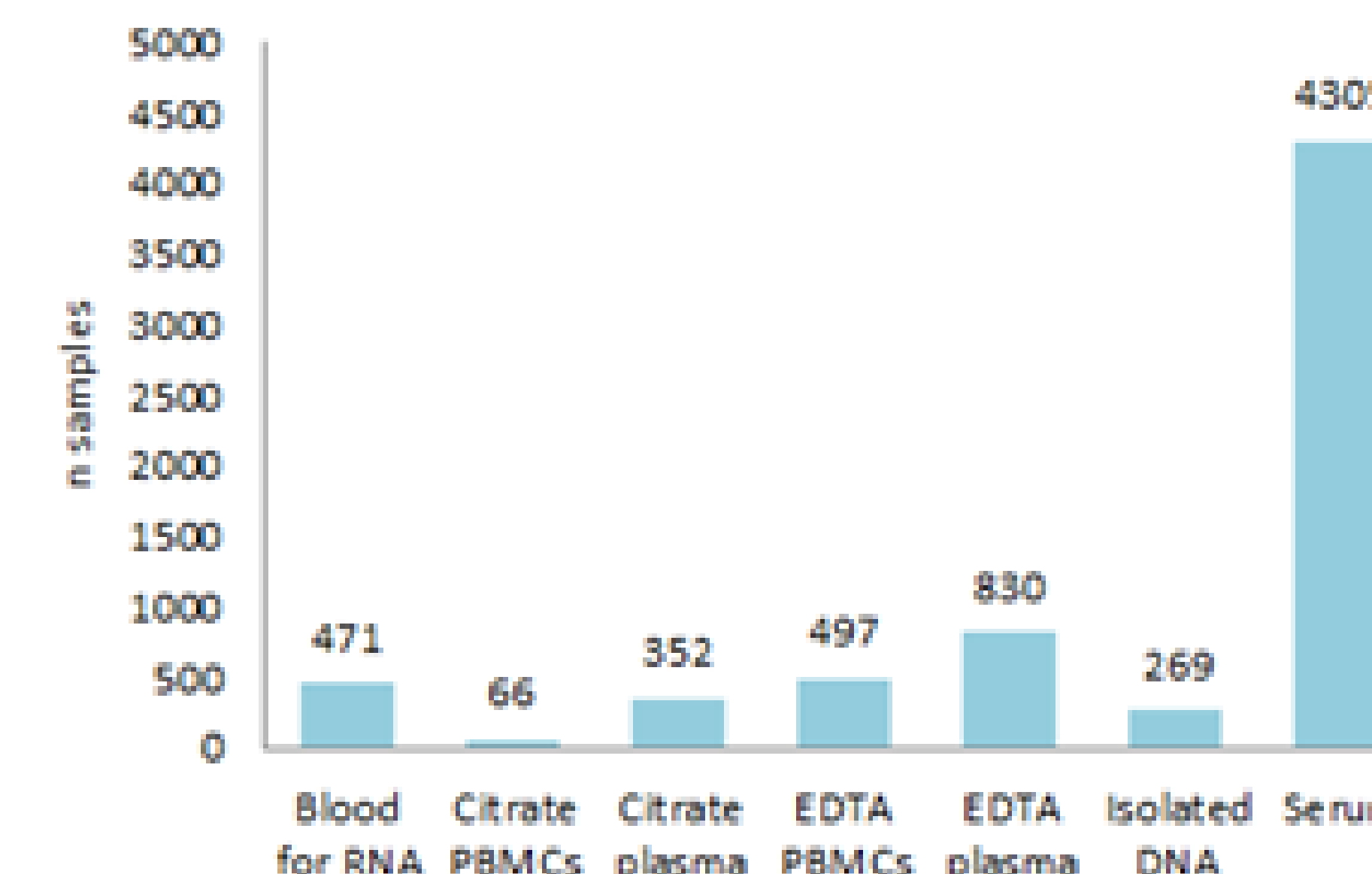


Figure 6. Number of procured samples of each sample type since April 14th, 2020 until 15th September, 2021, from the total number of procured samples (n = 6790).

COVIDBANK PROCUREMENTS

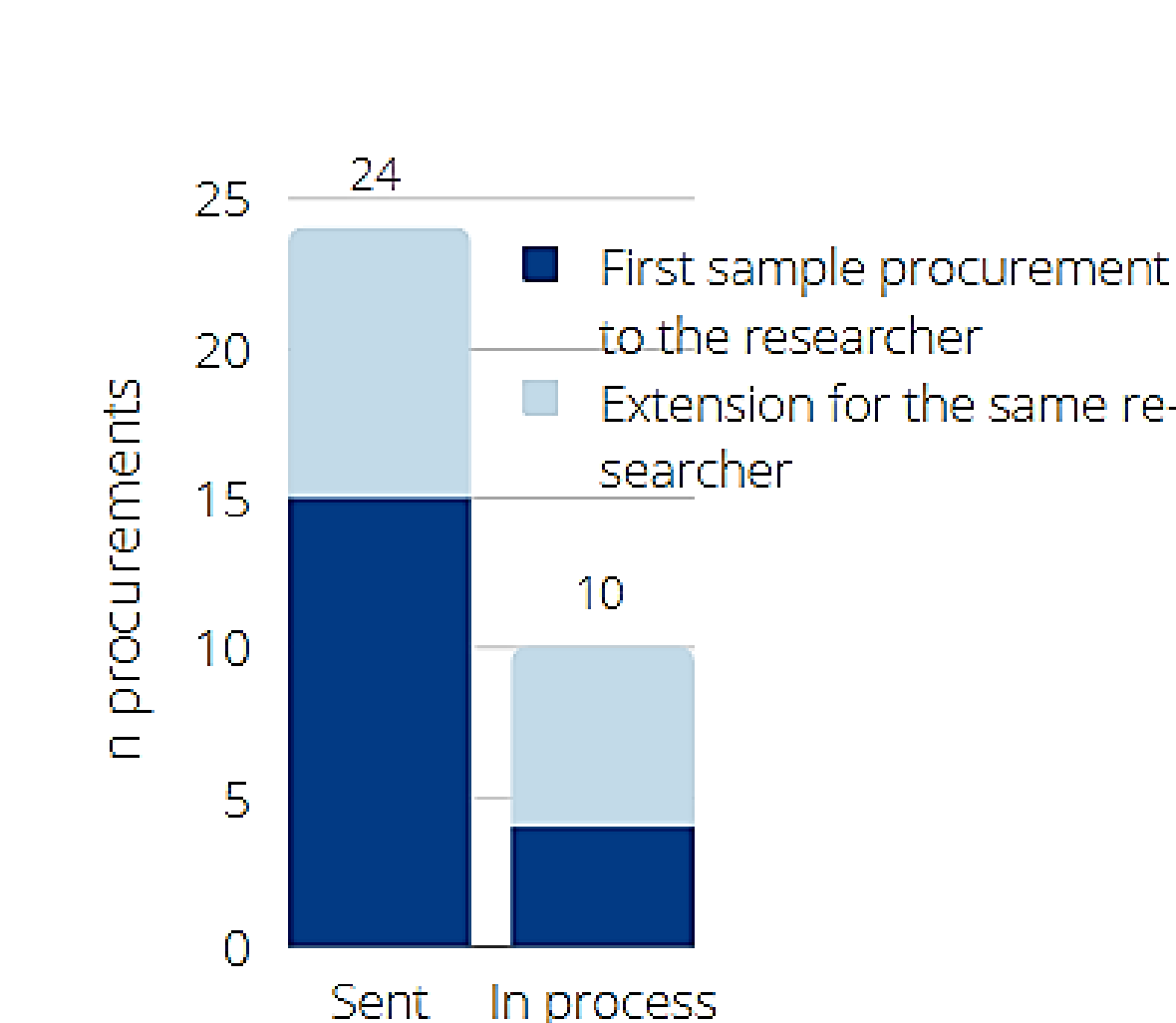


Figure 7. Sample procurements sent and in process that have been given to a research group for the first time (dark blue) and that are extensions for the same researcher (light blue).

METHOD

Our Biobank centralizes the procedures and guarantees traceability and quality thanks to the use of standardized protocols and the optimization of infrastructure and resources (Figure 3) [2, 3].

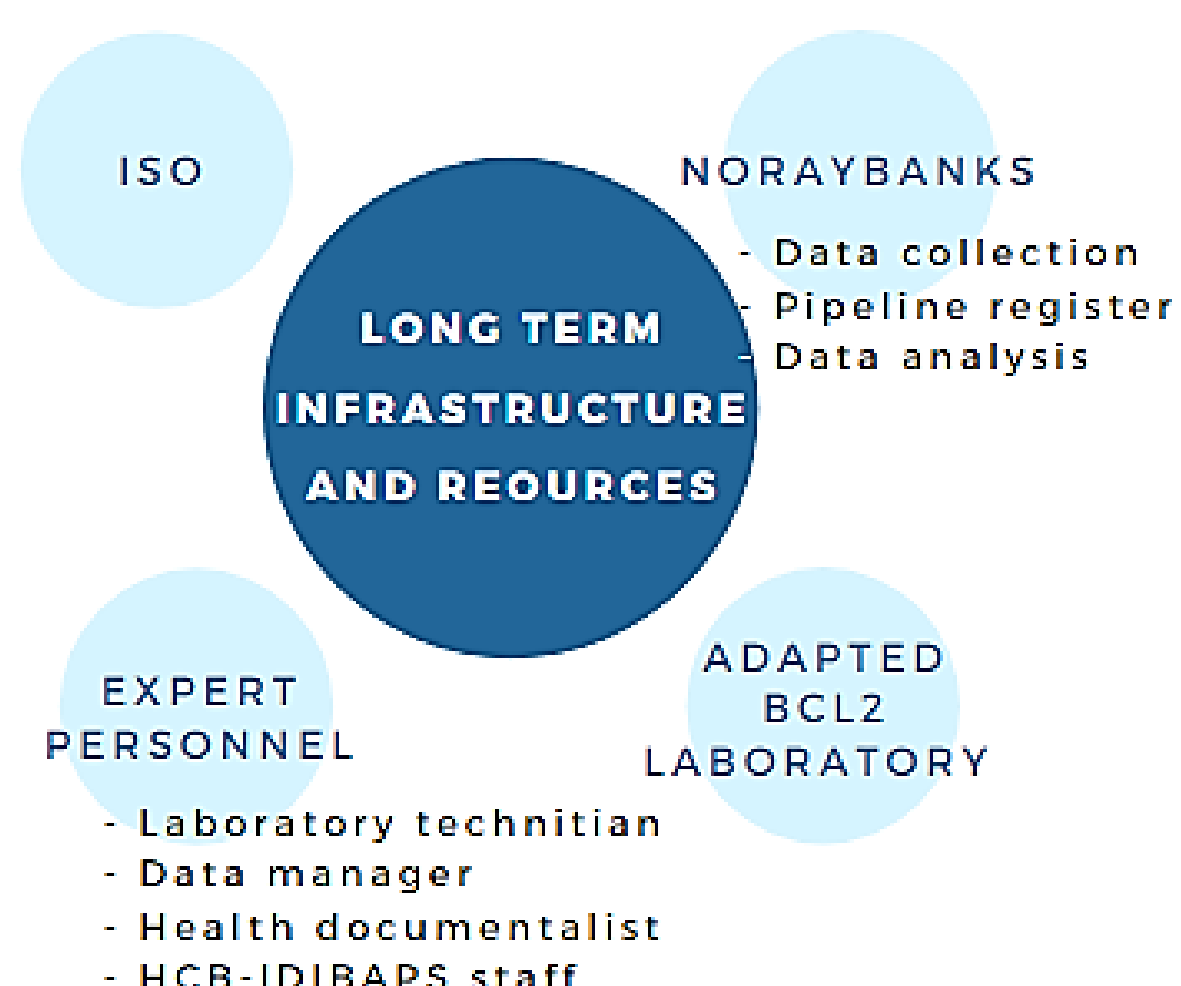


Figure 3. Long term infrastructures and resources diagram..

CONCLUSIONS

The COVIDBANK **centralized** the procedures and guaranteed that the **traceability, quality** standards and **regulatory** requirements were met during the pandemic in a **fast-changing environment**.

Indeed, the **paradigm was switched** to overcome all challenges [4, 5], in terms of:

- **Human resources & infrastructure** requirements
- Hospital **sample circuits**
- **Biosafety** measures [6]
- **Data management & bioethical** aspects
- **Funding & collaboration** opportunities [7]

COVID-19 waves have implied a continuous effort to **keep and upgrade** new **sample types and data** collection and processing, as well as **follow-up** analyses.

The **return of results** include the implication in more than 5 published articles. The samples and data have been essential to:

- Unravel the **ethiopathology** and **impact** of COVID-19 disease in biological systems;
- Identify **risk factors** in cohorts.
- Provide evidence for **personalized medicine**, **treatment** strategies and **vaccines** development.

REFERENCES

- [1] HCB weekly COVID-19 reports are analyzed periodically to actively re-define COVIDBANK strategies. Some external references:
- [2] Spanish Biobanks Network.
- [3] BBMRI.QM Web Conference. <https://www.bbMRI-eric.eu>
- [4] Ngo A, Masel D, Cahill C, Blumberg N, Refaai MA. Blood Banking and Transfusion Medicine Challenges During the COVID-19 Pandemic. Clin Lab Med. 2020 Dec;40(4):587-601.
- [5] Bandera A et al. COVID-19 Network (multiple center departments). COVID-19 Network: the response of an Italian Reference Institute to research challenges about a new pandemic. Clin Microbiol Infect. 2020 Nov;26(11):1576-1578.
- [6] BBMRI biosafety recommendations.
- [7] Daniel Simeon-Dubach and Marianne K. Henderson. Opportunities and Risks for Research Biobanks in the COVID-19 Era and Beyond. Biopreservation and Biobanking. Dec 2020; 503 - 510.

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