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Laboratory Support, Biobanking, and Services (LSB)

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Laboratory Support, Biobanking, and Services (LSB) (Figure 1) works with the IARC Administrative Services Office (ASO) and research Branches to provide core laboratory and biobanking services to support the Agency's research activities. LSB's technical and safety advice was crucial for the design, installation, and restarting of the laboratories and the IARC Biobank at the new IARC headquarters building. LSB also leads national and international research projects on biobanking and medical research infrastructure, in alignment with the IARC Medium-Term Strategy 2021–2025.

Figure 1. Laboratory Support, Biobanking, and Services (LSB) team photo. © IARC.

Laboratory services

LSB ensures that optimal laboratory services are available, including a laboratory store that provides consumables, glass-washing facilities, mycoplasma testing and quarantine for cell cultures, pipette checking, and the freezing and/or retrieval of cell lines in liquid nitrogen gas. In conjunction with the Laboratory Steering Committee (LSC), LSB oversees the common laboratory platforms and ensures that equipment is well maintained. Interaction between laboratory-based and epidemiological research is enhanced through the upgrading, updating, and acquisition of state-of-the-art scientific instruments and the provision of sample storage capacity.

Health and safety

Health and safety issues are managed in collaboration with the Occupational Health and Safety Committee (OHSC). The IARC safety manual, a key document, is now available online; it has been regularly updated and is aligned with the latest national and international guidelines. A new safety manual is being developed for the new IARC building, describing the role of personnel and services involved in safety and security at IARC, access conditions, emergency procedures, and medical services, as well as laboratory safety, including IARC general safety guidelines in the laboratories and emergency procedures in case of an accident or incident in the laboratories. Other information on personal and collective protection guidelines, management of equipment, laboratory services offered, good laboratory practice, and biological and chemical risks, including risks related to the handling of carcinogens, liquid nitrogen, and laboratory waste, will be available in a separate document.

IARC authorizations for the restricted use of genetically modified organisms (GMOs) are handled by LSB. Radionuclide experimentation has ceased entirely, and the relevant authorizations have not been renewed; the old site was successfully validated as cleared by the relevant authorities before the handover. LSB initiated the declaration of the biological collections stored at IARC and the authorization to import and/or export biological samples in accordance with CODECOH rules and constraints provided by the French Ministry of Higher Education and Research. The authorizations to import and export are valid for 5 years. Furthermore, LSB is an active participant in the working group for the dematerialization of the import and export authorization procedure, by invitation of the French government.

During the 2022–2023 biennium, LSB provided 91 safety briefings for newcomers until the move to the new IARC building, 17 training sessions for newcomers working in laboratories, and four theoretical trainings and three practical trainings of 47 people to ensure the transfer of the liquid nitrogen tanks. LSB gave several presentations and a training session on laboratory safety during the Twinning for the Armenian Research Infrastructure on Cancer Research (ARICE) project conference and training workshop in Armenia. LSB made more than six online presentations to more than 100 laboratory personnel in total, covering new guidelines linked to COVID-19 constraints, working with liquid nitrogen, working with carcinogens, working in the L3 or L2+ laboratories, and completing the Electronic Laboratory Notebook. LSB also published a report on biosafety, specifically on the immunological considerations for laboratory staff and COVID-19 biosafety (Kintossou et al., 2023).

Biobank services

The IARC Biobank maintains biological sample collections from international studies and operates a service platform for sample retrieval, inventory, aliquoting, DNA extraction and quantification, and reception or shipment of biological material worldwide.

The IARC sample management database (SAMI) stores information on more than 6 million biological specimens. During the biennium, information on more than 423 000 new samples was imported into SAMI, as a result of a huge effort made by all IARC groups before the move to the new IARC building, and more than 150 000 samples were accessed for collaborators. SAMI is continuously being upgraded; version 2.0 was launched in 2020 and was fully integrated operationally during the 2022–2023 biennium. In addition, the information from older samples is being updated and incorporated into the database.

The new sample disposal policy was implemented, and requests by scientists for the disposal of 68 defunct collections were serviced in 11 batches (totalling more than 100 000 samples). During the 2022–2023 biennium, 86 Material Transfer Agreements for incoming and outgoing samples were technically validated. LSB supervised the replacement of obsolete equipment and the purchase of new units to increase cold storage capacity to meet future needs as well as provide adequate back-up facilities. A new freezer-temperature monitoring system, which had already been validated, was installed on all cold storage equipment, and the remote, real-time temperature monitoring system was fully implemented within the new IARC building.

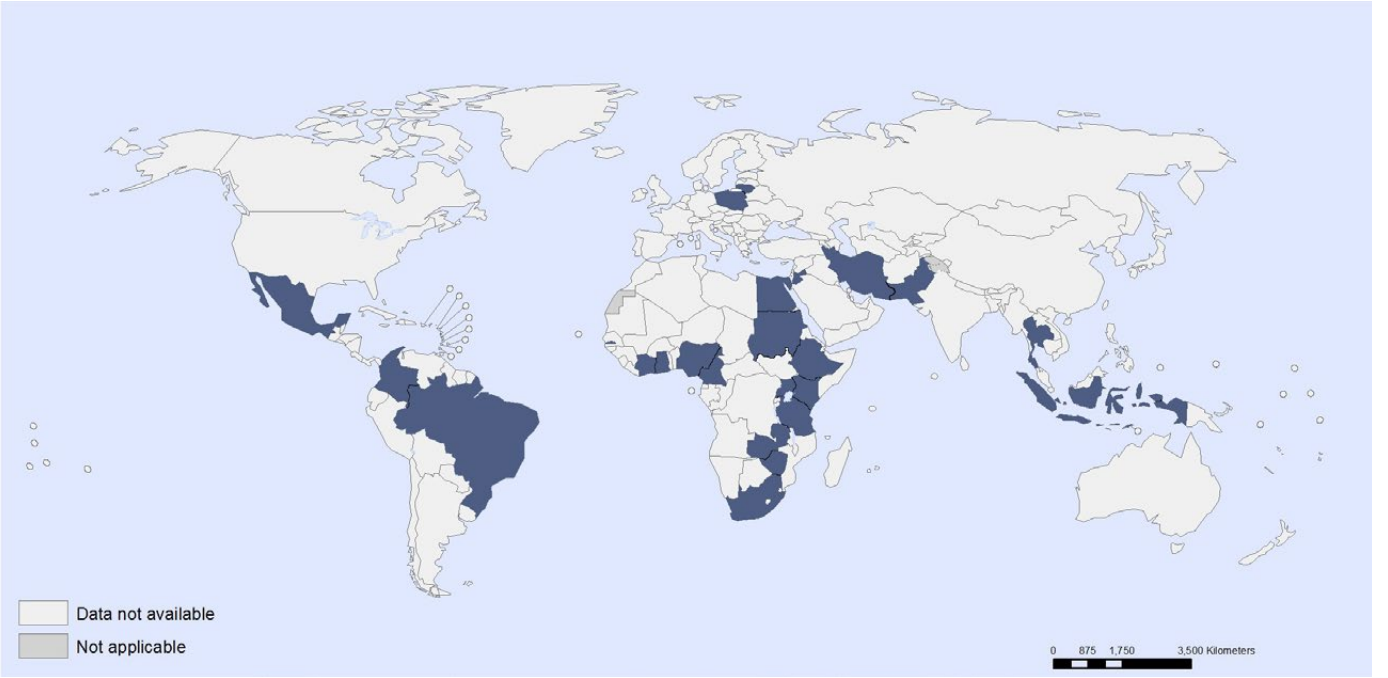
The Biobank continues to provide pre-analytical services, charging collaborators only the consumables costs incurred. During the 2022–2023 biennium, 20 projects were serviced, all of which related to requests from international institutions. This resulted in more than 33 000 sample retrievals from liquid nitrogen, 3043 DNA extractions, 5106 DNA aliquots, 23 300 plasma and serum aliquots, and 123 receptions and 111 shipments of samples from or to 48 countries worldwide. The Biobank inventoried more than 123 000 individual samples and provided support across the continuum, from reception to data upload into SAMI.

The Biobank continues to participate in international proficiency testing schemes, and after the move to the new IARC building, the new facilities have applied for the IBiSA accreditation programme (to be initiated in 2024).

BCNet

LSB participates in several research programmes, in line with IARC's mission of cancer research for cancer prevention. To address the underrepresentation of biological resources in low- and middle-income countries (LMICs) in research, the LMICs Biobank and Cohort Building Network (BCNet; https://bcnet.iarc.who.int/) was established

Figure 2. Map of BCNet member countries, July 2023. © IARC.



by IARC in 2013. Currently, 46 institutions in 24 countries are members of BCNet (Figure 2). During the 2022–2023 biennium, BCNet delivered seven presentations to external collaborators (in Egypt, Germany, Guatemala, Indonesia, Malaysia, the Philippines, and the United Republic of Tanzania) and published several seminal articles (Ezzat et al., 2022; Kozlakidis et al., 2022a; Ngwa et al., 2022; Simeon-Dubach and Kozlakidis, 2022). Collaborations continue, with a particular focus on South-East Asia (Association of Southeast Asian Nations [ASEAN] Member States) and countries in sub-Saharan Africa.

BCNet direct funding is provided by the Center for Global Health, National Cancer Institute, National Institutes of Health, USA. LSB gratefully acknowledges all the members of BCNet and their active discussions and exchanges, which have enriched our scientific world as well as our contextual understanding of global research.

Collaborations

With regard to infrastructure research, LSB represents IARC at the International Organization for Standardization (ISO; https://www.iso.org/), at the Biobanking and BioMolecular resources Research Infrastructure–European Research Infrastructure Consortium (BBMRI-ERIC; https://www.bbmri-eric.eu/) (Figure 3), and at the European Open Science Cloud (EOSC). LSB participated in infrastructure research from the perspective of operational readiness and responsiveness (Aisyah et al., 2022a, 2022b; Al Knawy et al., 2022, 2023; Casati et al., 2022; Shirakashi et al., 2022). LSB also contributed to the development of further recommendations and guidelines (Kozlakidis, 2023a, 2023b; Kozlakidis et al, 2022b; Matharoo-Ball et al., 2022; Medina et al., 2022), with a particular emphasis on data sharing and artificial intelligence (Aisyah et al., 2023; Kozlakidis and Struelens, 2022; Schmid et al., 2023).

Figure 3. The Biobanking and BioMolecular resources Research Infrastructure–European Research Infrastructure Consortium (BBMRI-ERIC), together with IARC, launched canSERV, a European Union-funded project under the Horizon Europe programme that provides cutting-edge, interdisciplinary, and customized oncology services across the entire cancer continuum. © canSERV.eu.

Furthermore, LSB is leading the WHO Academy course on "Managing Research Infrastructures", expected to be completed in early 2024. As part of the EOSC "Upskilling Countries" Task Force, LSB has contributed to the recommendations on digital health research (to be published in early 2024). Dr Kozlakidis has also edited a book titled *Digitisation of Healthcare in Low- and Middle-Income Countries*, which contains contributions by several LSB staff members, to be published in early 2024 by Springer Nature.

During the 2022–2023 biennium, LSB investigated the impact of the COVID-19 pandemic on infrastructures and patients with cancer (Bogaert et al., 2022, 2023). This research will continue as part of the regional project "Impact of COVID-19 on Cancer" (IMCOCA), a *Projet Structurant* funded by Cancéropôle Lyon Auvergne Rhône-Alpes (CLARA; https://www.canceropole-clara.com/), awarded jointly to Centre Léon Bérard (CLB; https://www.centreleonberard.fr/en) and LSB (Figure 4). Further work on the impact of COVID-19 has been published in a series of eight publications in a

collaboration with Loma Linda University and Patton State Hospital, USA (Sfera et al., 2022a, 2022b, 2023a, 2023b).

LSB participates in projects funded by the European Commission: the Human Exposome Assessment Platform (HEAP) project (grant no. 874662) (https://heap-exposome.eu/), the ARICE project (grant no. 952417) (https://www.arice.am/), the Providing Cutting-Edge Cancer Research Services Across Europe (canSERV) project (grant no. 101058620) (https://www.canserv.eu/), and the European Union COST Action INTercEption of oRal CancEr develoPmenT (INTERCEPT; https://www.cost.eu/actions/CA21140/) (grant no. CA21140). Further ad hoc funding is provided by BBMRI-ERIC for the European Paediatric Translational Research Infrastructure (EPTRI; https://eptri.eu/) and the Center of Excellence in Biobanking and Biomedical Research at the University of Cyprus (https://biobank.cy/).

Figure 4. The "Impact of COVID-19 on Cancer" (IMCOCA) *Projet Structurant* is funded by Cancéropôle Lyon Auvergne Rhône-Alpes (CLARA) and was awarded jointly to Centre Léon Bérard (CLB) and LSB. Courtesy of CLARA.