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As a core function of the Agency, IARC's education and training programmes have made a substantial contribution to the development of human resources for cancer research worldwide and have also helped to widen the Agency's network of collaborators.

Key achievements of IARC's education and training programmes during 2022–2023 are presented here. Whereas the Learning and Capacity-Building Branch (LCB) coordinates the Agency's activities in these areas, many initiatives are led by the research Branches.

Research Training and Fellowship Programme

The programme offers researchers at different stages of their career (collectively referred to as Early Career and Visiting Scientists) opportunities to receive training at IARC by participating in collaborative research projects. These Early Career and Visiting Scientists are supported either by project funds from IARC Branches or by IARC Fellowships. A total of 296 Early Career and Visiting Scientists from 66 different countries were hosted at IARC during the biennium. This represents a 16.5% increase compared with the previous biennium (2020–2021), which is directly related to increased mobility resulting from the lifting of travel and entry restrictions imposed during the COVID-19 pandemic. Furthermore, a comparison of the 2022–2023 figures with those for the 2018–2019 biennium shows that the number of Early Career and Visiting Scientists joining IARC is back to pre-pandemic levels.

Hosting environment and career growth

The internal programme of generic skills courses, jointly managed by LCB and the Human Resources Office, offered more than 40 instructor-led training courses to Early Career and Visiting Scientists in 2022–2023 (Table 1), which were attended by more than 300 participants. Because of the preparation for the move to the new IARC building and the period of transition after the move, the courses offered were mostly held online until the second half of 2023. In addition, Early Career and Visiting Scientists accessed more than 80 online learning resources on the WHO/IARC ilearn learning platform.

LCB continued to work closely with the Early Career Scientists Association (ECSA). Among other activities, ECSA organized its annual Scientific Days, to showcase the work of IARC students and postdoctoral scientists, and held career panels and workshops for professional development, as well as social and networking activities (Figure 1).

Postdoctoral Fellowships

During the biennium, the Agency awarded nine IARC Postdoctoral Fellowships to candidates from low- and middle-income countries (LMICs) for projects in line with the IARC Medium Term Strategy 2021–2025.

Table 1. Generic instructor-led courses for Early Career Scientists, 2022 and 2023. © IARC.

Research skills development	**Writing skills**
FAIR data principles in practice	Effective scientific posters
Fundamentals of implementation, by the University of Washington	European Commission (EC) grants: insights from an expert evaluator
Introduction to Bayesian statistics	Grant writing: fundamental considerations
Introduction to multiple imputation for missing data	Publishing in scientific journals
Learn R facilitated training	PubMed: search efficiently
Science implementation vs intervention: basic considerations	Predatory publishing
R Shiny for beginners	Systematic reviews search methodology
	Writing competitive grant applications
IT skills	**Communication skills**
Meeting rooms – audiovisual equipment	Effective interpersonal communication techniques
REDCap for surveys	Information is beautiful
REDCap for data collection	Science communication
SAMI (SAmple Management at IARC) training sessions: beginner and advanced	The power of visual storytelling
Take IT Easy: 10 sessions on Microsoft Teams, OneDrive, Office 365, OneNote	
Career management and development	**Leadership and management**
Creating your personal brand (WHO)	Creating and sustaining high performance
Emotional intelligence in the workplace – masterclass series (WHO)	Giving and receiving feedback
WHO Emotional Intelligence (EQ) Café	"No excuse" webinar series related to sexual misconduct (WHO)
Networking for results (WHO)	Research leadership training course
Motivation and focus	Time management workshop (WHO)
Motivation and well-being	Values-based decision-making and communication
Working together remotely	Bystander training in the workplace (WHO)
Workshop on CV skills and competency-based interviews (WHO)	Workshop on preventing and addressing abusive conduct (WHO)

"First aid at work" sessions in French and English were offered throughout 2023.

Figure 1. Early Career Scientists Association (ECSA) Day 2022. © IARC.

In addition, as part of efforts to identify complementary sources of funding for the programme, negotiations with Children with Cancer UK led to a renewed agreement enabling the awarding of two fellowships to scientists wishing to carry out research on paediatric cancers or cancer in teenagers and young adults.

Budget decisions in May 2023 had an impact on the total number of 2-year fellowships funded on the regular budget, which decreased from seven to six. Consequently, and to maintain the opportunities for the most excellent candidates, (i) one candidate who had been awarded another competitive 1-year fellowship, which could not be postponed, was only awarded a 1-year fellowship by IARC, and (ii) the remaining funding was combined with available extrabudgetary funding at the host Branch level to award a 2-year fellowship to the first candidate on the waiting list.

Mid-Career Visiting Scientist Award

The former Senior Visiting Scientist Award evolved into several awards for mid-career scientists from LMICs to develop collaborative research projects with IARC, contribute to enhancing their career prospects, and build the capacity of their institution through longer-term collaborations initiated or strengthened through the fellowship. Three such fellowships were awarded.

Courses Programme

The courses programme is designed to enhance the capacity of the global research community, in particular in LMICs, through lifelong learning in the areas of the Agency's expertise.

Learning events

The Agency organized 69 courses or webinars targeting researchers and health professionals from many countries, in particular LMICs (Table 2). Because of the COVID-19 pandemic and the move to the new IARC building, most courses during 2022–2023 were offered online. When on-site options were not possible, courses were redesigned to combine live sessions with facilitated self-learning. They lasted from a few days, such as the three ChildGICR Childhood Cancer Registration online courses (in Georgia, India, and Viet Nam) and the Codificación de Tumores ICD-O-3 course, to several weeks, such as the Training of Trainers on quality assurance for cancer screening for Georgia, Latvia, and Slovakia, or even months, such as the Research Leadership training. Some events also combined a face-to-face component to focus on practice and networking, such as the IARC Summer School 2023 (see the text box) or the Cancer Screening in Five Continents (CanScreen5) Train the Trainers course (Figure 2). More than 3800 scientists and health professionals benefited from these learning events during the biennium.

Self-learning and teaching resources

As a key complement to live events, IARC continued to produce self-learning resources. A video series on managing data according to FAIR principles (Findable, Accessible, Interoperable, and Reusable) was developed through the Human Exposome Assessment Platform (HEAP) project (https://www.youtube.com/playlist?list=PL-Hb2W9K8uzrRrKYRrXYOZFj7_o6RXQvt). A new self-paced learning programme, Introduction to Cancer Prevention and Early Detection, based on a combination of IARC learning material, was launched in 2022 (https://learning.iarc.fr/edp/courses/sp-intro-cancer-prevention-and-early-detection/). This introductory learning path was a

Table 2. Learning events, 2022 and 2023. © IARC.

Course title	Location	Number of participants	External collaborations
Cancer surveillance			
CanReg5 training course for Japan, the Republic of Korea, Barbados, and Trinidad and Tobago (2022)	Online	25	
ChildGICR Childhood Cancer Registration for India, Bangladesh, Bhutan, Nepal, and Sri Lanka (2022)	Online	31	St. Jude Children's Research Hospital, Memphis, USA; Cancer Institute (WIA), Chennai, India
ChildGICR Childhood Cancer Registration for Viet Nam, Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, and Thailand (2022)	Online	32	St. Jude Children's Research Hospital, Memphis, USA; Viet Nam National Cancer Institute, Hanoi, Viet Nam
ChildGICR Childhood Cancer Registration for Armenia, Azerbaijan, Georgia, the Republic of Moldova, Türkiye, and Ukraine (2023)	Online	31	St. Jude Children's Research Hospital, Memphis, USA; National Center for Disease Control and Public Health (NCDC), Tbilisi, Georgia
GICR Basic Cancer Registration Course for Ecuador, El Salvador, Guatemala, Panama, Paraguay, and Peru (2022)	Online	22	Sociedad de Lucha Contra el Cáncer (SOLCA), Quito, Ecuador; Pan American Health Organization (PAHO) Virtual Campus for Public Health
GICR CanReg5 training course for Latin America (2022)	Online	41	National Cancer Institute, Colombia
GICR Codificación de tumores de mama y de tracto genital femenino for Latin American countries (2023)	Online	78	National Cancer Institute, Colombia
GICR Codificación de tumores ICD-O-3 for Latin America: Argentina, Chile, and Uruguay (2023)	Online	24	National Cancer Institute, Argentina
Joint IARC–National Cancer Center of the Republic of Korea Summer School on Cancer Registration: Principles and Methods (2022 and 2023)	Blended; online and Republic of Korea	29 + 23	GICR, National Cancer Center of the Republic of Korea and its Graduate School of Cancer Science and Policy (GCSP)
IARC-WHO EMRO Workshop on cancer data use to inform cancer control planning in the Eastern Mediterranean Region countries (2023)	Egypt	30	WHO Regional Office for the Eastern Mediterranean
Cancer prevention and early detection			
CanScreen5 Train the Trainers – African Region – Face-to-face (2022)	United Arab Emirates	20	American Cancer Society (ACS), United Kingdom Medical Research Council (MRC), Friends of Cancer Patients (FoCP)
CanScreen5 Train the Trainers – Community of Latin American and Caribbean States (CELAC); Three groups: A and C Spanish, B English (2023)	Blended; online and Miami (USA) and Panama	18 + 35 + 30	American Cancer Society (ACS), United Kingdom Medical Research Council (MRC)
CIRC Série d'échanges « Cancer de la bouche : quels facteurs de risque ? comment le prévenir ? » (2023)	Online	40	Centre Léon Bérard, Lyon, France
Colposcopy training programme (2022)	India	15	Nargis Dutt Memorial Cancer Hospital, India
IARC Summer School: Implementing Cancer Prevention and Early Detection (2023)	Blended; online and IARC, Lyon	35	
IARC Summer School – 12 public events (2023)	Online	1597	
IFCPC-IARC Training course in Colposcopy and the Prevention of Cervical Cancer – OSCE (2022–2023)	Online	50	International Federation of Cervical Pathology and Colposcopy (IFCPC)
Pre-conference workshop of the European Public Health Conference – Cancer prevention for a sustainable future: an interactive workshop for public health specialists (2023)	Face-to-face	20	Cancer Prevention Europe including Cancer Research UK
The World Code Against Cancer – for Youth Ambassadors for the European Code Against Cancer – Digital Summer School (2022)	Online	60	Association of European Cancer Leagues (ECL)
Theoretical and hands-on training in study protocol, ethical considerations, and procedures (cervical cancer screening) for the EASTER Project (2023)	Zimbabwe	20	EASTER Project partners
Training and quality assurance on colposcopy (2022)	Zambia	16	International Federation of Cervical Pathology and Colposcopy (IFCPC)
Training of Trainers on quality assurance for cancer screening for Georgia, Latvia, and Slovakia (2023)	Online	24	
Training on clinical breast examination for the State of Libya (2023)	Tunisia	6	
Training on use of portable breast ultrasound for the detection of breast abnormalities (2022 and 2023)	Blended; online and India	10 + 45	Bhabha Atomic Research Centre (BARC) Hospital, Mumbai, India

Table 2. Learning events, 2022 and 2023 (continued). © IARC.

Course title	Location	Number of participants	External collaborations
World Cancer Report Updates webinar series: Polygenic scores for cancer prevention (2022)	Online	391	European Society for Medical Oncology (ESMO)
World Cancer Report Updates webinar series: The present and future of lung cancer screening (2022)	Online	166	European Society for Medical Oncology (ESMO)
World Cancer Report Updates webinar series: Liquid biopsy-based biomarkers for cancer detection and monitoring (2023)	Online	243	European Society for Medical Oncology (ESMO)
Cancer research infrastructure and methods			
Environmental and occupational cancer	Online	15	School of Public Health of Yale University, USA
Epidemiology of breast cancer – 5th International Course on Breast Cancer, by Institut Curie (2022)	France	25	Institut Curie, France
Epigenomics and Mechanisms of Human Carcinogens for the EMGS, webinar and online workshops (2023)	Online	60	Environmental Mutagenesis and Genomics Society (EMGS); Education, Student, and New Investigator Affairs (ESNIA)
Evidence Gap Maps training programme (online series), WHO Classification of Tumours Evidence Gap Map (EVI MAP) Project (2022–2023)	Online	25	University of Newcastle, United Kingdom
IARC Summer School: Introduction to Cancer Epidemiology (2023)	Blended; online and IARC, Lyon	35	
Precision Oncology Summer School – Liquid biopsy biomarkers: rationale, technological developments, and clinical applications (2022)	France	35	European Scientific Institute (ESI), Archamps, France
Precision Oncology Summer School – Optimizing personalized cancer diagnosis and treatment (2023)	France	35	European Scientific Institute (ESI), Archamps, France
Training for pathology laboratory technicians (2022)	India	16	Cachar Cancer Hospital, India
Training on biobanking best practices (2023)	Online	30 + 25	Mansoura University, Egypt; University of Alessandria, Italy
Training on biobanking best practices and pre-analytical factors for the Annual Egyptian Biobanking Conference (2023)	Online	32	BCNet
Training on biobanking best practices and pre-analytical factors (2022 and 2023)	Czechia, Armenia, and IARC, Lyon	8 + 20 + 5	ARICE study
Training on biobanking best practices and pre-analytical factors (2023)	China	12	Chinese Center for Disease Control and Prevention, China
Training on biobanking best practices and pre-analytical factors for the ASEAN Biobank Feasibility Study (2023)	The Philippines	12	BCNet
Training on biobanking best practices and pre-analytical factors (2022 and 2023)	Guatemala and United Republic of Tanzania	8 + 8	IIPAN/NICHE Study; BCNet
Training on biobanking in relation to pathology and clinical practices at the AORTIC conference (2023)	Senegal	5	BCNet
Training on laboratory safety for the University of Shanghai (2023)	Online	45	Shanghai Jiao Tong University, School of Public Health, China
Training on laboratory safety for the ASEAN Biobank Feasibility Study/The Philippines (2023)	Online	12	BCNet
Training on laboratory safety and toxicology (2023)	Online	25	National Quality Control Laboratory of Drug and Food, Indonesia
Training on untargeted metabolomics for non-laboratory scientists (2022)	Online	40	Mount Sinai School of Medicine, USA; Columbia University, USA; and Imperial College London, United Kingdom
Training on urine sample collection in HPV study protocol (2022)	Zimbabwe	35	University of Zimbabwe Clinical Trials Research Centre
Training on urine sample collection in HPV study protocol (2023)	Lao People's Democratic Republic	15	Mother and Child Health Center, Ministry of Health, Lao People's Democratic Republic
Research leadership			
Research Leadership Training Programme (twice in 2022)	Online	21 + 29	Mobilize Strategy Consulting

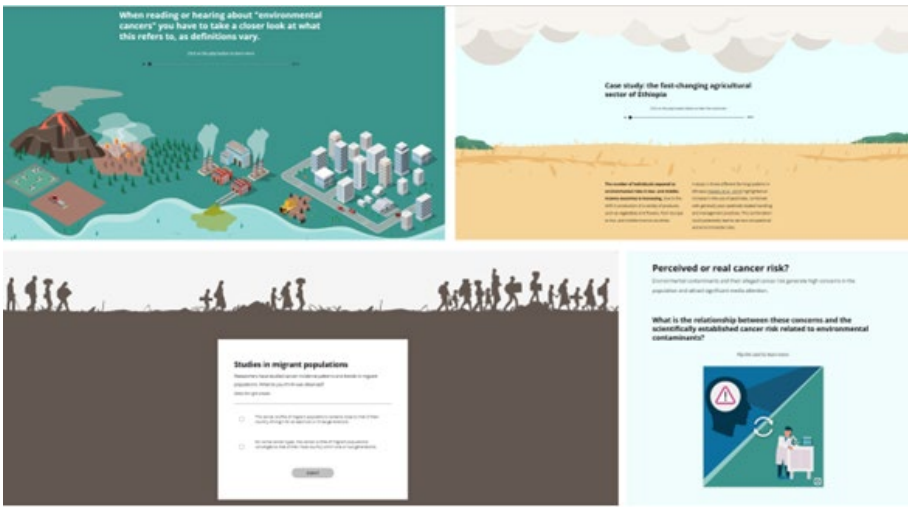
Figure 2. Cancer Screening in Five Continents (CanScreen5) Train the Trainers face-to-face sessions in Sharjah, United Arab Emirates. © IARC.

prerequisite to apply for the corresponding module of the IARC Summer School 2023 (see the text box). Another self-paced learning module, Introduction to Research on Pollution and Cancer, was released in 2023 as part of the collaboration with the European Society for Medical Oncology (ESMO) (https://learning.iarc.fr/wcr/courses/module-1-pollution/) (Figure 3). Also as part of the *World Cancer Report* Updates learning platform, IARC launched a Teaching Toolkit on Cancer Research for Cancer Prevention, designed to support anyone involved in transmitting knowledge and skills on cancer research for cancer prevention. In line with IARC's commitment to open science, the first module of the toolkit, Rationale and Scope of Cancer Research for Cancer Prevention, was published under a Creative Commons licence, Attribution-NonCommercial-ShareAlike 3.0 IGO (CC BY-NC-SA 3.0 IGO), which allows reuse, adaptation or translation, and publication under the same licence.

Learning portal

Launched in 2019, the IARC Learning portal (https://learning.iarc.who.int/) enables access to several thematic learning platforms (Biobanking, Cancer Prevention and Early Detection, and *World Cancer Report* Updates). It also provides access to IARC WebTV, including the IARC Summer School video channel, as well as to the websites of other IARC-led projects with learning materials on cancer

Figure 3. Self-paced e-learning module, Introduction to Research on Pollution and Cancer. © IARC.



surveillance and on the exposome (the HEAP project). The IARC Learning portal continues to attract an increasing audience. Since November 2019, about 4500 professionals (2806 during 2022–2023) have created an account on the portal to freely access learning resources. About half of the users of the IARC Learning portal are from LMICs.

In 2022, IARC and the WHO Academy set up a collaboration within the development of the WHO Academy's Learning Experience Platform (LXP). Within the framework of this collaboration, LCB has provided training design expertise to support the development of the LXP, including through advice on key LXP functionalities and testing of demo versions. The WHO Academy team has created a dedicated Learning Space on the LXP, which will be managed by IARC autonomously. IARC self-paced and facilitated courses will progressively be migrated to the LXP, which will eventually replace the current IARC Learning infrastructure.

Key partnerships

Relationships between IARC and key stakeholders continued to be strengthened during the 2022–2023 biennium.

The Agency and the National Cancer Center of China (NCC China) signed a Memorandum of Understanding in May 2023 to set up a first regional learning centre, the IARC-NCC China Learning Centre (Figure 4); a first course (Introduction to Cancer Epidemiology) is planned for early 2024. Discussions are under way with the National Cancer Institute of Brazil (INCA) and the University of São Paulo to follow the same approach for Brazil and neighbouring and/or Portuguese-speaking LMICs.

As described above, IARC has been involved in the development of the WHO Academy at several levels. As well as contributing to governance and infrastructure aspects, two IARC learning programmes have been developed as part of the development of the first courses of the WHO Academy: the Comprehensive Learning Programme on Screening, Diagnosis, and Management of Cervical Precancer, and the Managing Infrastructure for Medical Research Learning Programme.

In addition, LCB pursued its partnership with ESMO on the *World Cancer Report* Updates learning platform, and with the International Federation of Cervical Pathology and Colposcopy (IFCPC) on the hosting of joint courses. Through European Union funding, LCB continued its collaboration with the Karolinska Institutet (Sweden) and other European institutions in the HEAP consortium, and started a new collaboration, together with EPR and CSU, with about 50 institutions within Europe to develop capacity of Comprehensive Cancer Infrastructures for Europe (CCI4EU).

Figure 4. Signature of the Memorandum of Understanding with the National Cancer Center of China in May 2023. © IARC.

IARC Summer School in Cancer Epidemiology 2023

The IARC Summer School in Cancer Epidemiology aims to improve the methodological and practical skills of cancer researchers and health professionals. In 2023, both modules – Introduction to Cancer Epidemiology, and Implementing Cancer Prevention and Early Detection – were held in a blended format, including 2–4 weeks of online self-paced activities (recorded lectures and assignments, punctuated by a few live sessions) followed by 1 week on site in Lyon, focused on practical and networking activities. A brand-new Public Events Series was part of the programme; 12 live public events were successfully organized throughout the period (https://www.youtube.com/@iarclearning5527/streams) and attracted 260–1100 viewers per event.

A total of 70 cancer researchers and health professionals from 41 countries (most of which were LMICs) participated in the two modules, representing a wide variety of disciplines and nationalities, which is what makes the IARC Summer School so unique. All the resources used to deliver the IARC Summer School 2023 are available on the IARC Learning portal (https://learning.iarc.who.int).

Pre-course and post-course surveys were administered to measure the impact of the course on participants' self-perceived level of confidence with regard to knowledge and skills covered in the modules. The results showed a substantial progression, which was also clearly expressed by the participants in their oral and written feedback and quotations.

The participants' testimonials perfectly illustrate the spirit of the IARC Summer School: the shared learning through the provision of multiple opportunities for interaction, the sharing of experiences, and the fostering of collaboration and networking for cancer prevention across countries.

"Being both a nurse and a PhD student, attending this Summer School will enable me to effectively execute my research project and suggest further studies that will aid in mitigating the risk of cancer among our population."
—Majid Omari, Morocco

"The IARC Summer School programme is one of the most wonderful role models in the world in service capacity-building. It involves a world without boundaries to combat the deadly disease cancer."
—Girma Mulisa Misgana, Ethiopia

Impact of participating in the IARC Summer School on participants' self-ratings about their confidence in the knowledge and skills covered in the two modules. Comparison of pre-course and post-course survey results. The numbers of responses "Poor", "Fair", "Good", and "Very good" across all learning objectives per module are expressed as percentages. © IARC.