

OFFICE OF THE DIRECTOR

Director

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Ms Margot Geesink

Ms Susan Haver-Legros

Secretary

Ms Karima Abdedayem

Scientific officer

Dr Eduardo Seleiro

THE DIRECTOR IS RESPONSIBLE FOR PROVIDING LEADERSHIP THROUGH THE DEVELOPMENT OF A SCIENTIFIC STRATEGY THAT SETS OUT THE OVERALL VISION, DIRECTION AND FOCUS OF THE AGENCY'S RESEARCH PROGRAMME AND PROVIDES THE FRAMEWORK FOR ATTAINING ITS MISSION, IN ACCORDANCE WITH THE STATUTES. THE IARC MEDIUM-TERM STRATEGY AND IMPLEMENTATION PLAN FOR 2010–2014, APPROVED BY THE GOVERNING COUNCIL AT ITS 52ND SESSION IN MAY 2010, OUTLINES THE AGENCY'S DIRECTIVE.

Within the Agency, the Director's Office team assists the Director in the development of specific scientific initiatives and programmes, particularly those involving multiple research Groups. The Director's Office also supports the activities of several advisory groups and committees, most notably the Senior Leadership Team (SLT) (comprising the Director, all Section Heads, the Director of Administration and Finance and the Head of the Communications Group), which advises the Director on scientific strategy.

As well as the team mentioned above, there are four Groups within the Director's Office: the Gambia Hepatitis Intervention Study (GHIS), Communications (COM), Education and Training (ETR), and Laboratory Services and Biobank (LSB). The latter three Groups have a wide range of activities that are relevant across the Agency. Their activities are described elsewhere in this Report.

In addition, the Director's Office assists in the coordination of contacts and relations with IARC's partners, both to expand the Agency's network of scientific collaborations with other groups and institutions, and to develop the relations with governmental and non-governmental organizations and funding agencies with an interest in cancer research, prevention and control. It is also responsible for assisting the Director, Division of Administration and Finance, in relations with the Agency's governance structures and with Participating States.



COMMUNICATIONS GROUP (COM)

Group head

Dr Nicolas Gaudin

Secretary

Ms Bernadette Geoffre

Editor

Mr John Daniel
(until September 2011)

Librarian

Ms Sharon Grant

Institutional webmaster

Ms Maria de la Trinidad Valdivieso
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Technical assistants

Mr Antoine Bellon
Ms Latifa Bouanzi
Mr Roland Dray
Ms Sylvia Moutinho

As an integral part of the Director's Office, the Communications (COM) Group is responsible for the uniform presentation of all aspects of IARC's work to the scientific community, the media and the general public, as well as providing a service to the research Groups in all matters related to information.

PUBLICATIONS/EDITING SERVICE

COM assists all scientific Groups in disseminating their research results by providing editorial support and guidance for the publication of articles, papers and op-ed pieces in international scientific journals. They also offer support in the way of graphic services, both for illustrations of publications and posters, and for the layout of the finished print-ready products. The Editor takes an active role in the preparation of manuscripts for submission to scientific journals, as well as for volumes in the book production series. The Editor also forms part of the faculty of the IARC Summer School, and has developed a course on writing journal articles, annual reports, poster presentations and abstracts. In the future these classes may be offered to all IARC trainees in addition to Summer School students. This Group reactivated the Advisory Committee on Publications, a consultative committee whose aim is to assess the publication needs and priorities for the Agency.

DISSEMINATION OF IARC PUBLICATIONS

The recent agreement between IARC and our exclusive dissemination partner, WHO Press, has been instrumental in enabling the publications programme to fund sustained efforts, particularly in the area of the WHO Classification of Tumours ('Blue Books' series), which remains the Agency's bestseller and continues to be among the top selling titles for WHO Press (Figure 1). The Advisory Committee on Publications, whose mission reflects the new strategic vision of the Agency, manages and pilots publication projects in the longer term.

NEW IARC PUBLICATIONS

The Agency published a number of publications under the IARC logo in the period under review:

In print:

- Tumours of the Digestive System, WHO Classification of Tumours, 4th edition
- Effectiveness of Tax and Price Policies for Tobacco Control, IARC Handbooks of Cancer Prevention Volume 14
- Cancer Survival in Africa, Asia, the Caribbean and Central America, IARC Scientific Publications Volume 162
- Molecular Epidemiology and Biomarkers, IARC Scientific Publications Volume 163
- Some Non-heterocyclic Polycyclic Aromatic Hydrocarbons and Some Related Exposures: IARC Monographs Volume 92
- Carbon Black, Titanium Dioxide, and Talc: IARC Monographs Volume 93
- Ingested Nitrate and Nitrite and Cyanobacterial Peptide Toxins: IARC Monographs Volume 94
- Household Use of Solid Fuels and High-temperature Frying: IARC Monographs Volume 95
- Alcohol Consumption and Ethyl Carbamate: IARC Monographs Volume 96
- Painting, Firefighting, and Shiftwork: IARC Monographs Volume 98
- Some Aromatic Amines, Organic Dyes, and Related Exposures: IARC Monographs Volume 99

In electronic format:

- IARC Biennial Report 2008–2009
- Rapport Biennial 2008–2009 (French version of above title)
- Methods for Evaluating Tobacco Control Policies: IARC Handbooks of Cancer Prevention Volume 12

- Evaluating the Effectiveness of Smoke-free Policies: IARC Handbooks of Cancer Prevention Volume 13
- Cancer Survival in Africa, Asia, the Caribbean and Central America, IARC Scientific Publications Volume 162
- World Cancer Report 2008, Non-Serial IARC publication
- Some Non-heterocyclic Polycyclic Aromatic Hydrocarbons and Some Related Exposures: IARC Monographs Volume 92
- Carbon Black, Titanium Dioxide, and Talc: IARC Monographs Volume 93
- Ingested Nitrate and Nitrite and Cyanobacterial Peptide Toxins: IARC Monographs Volume 94
- Household Use of Solid Fuels and High-temperature Frying: IARC Monographs Volume 95
- Alcohol Consumption and Ethyl Carbamate: IARC Monographs Volume 96
- Painting, Firefighting, and Shiftwork: IARC Monographs Volume 98
- Some Aromatic Amines, Organic Dyes, and Related Exposures: IARC Monographs Volume 99
- Identification of Research Needs to Resolve the Carcinogenicity of High-priority IARC Carcinogens: IARC Technical Publication No. 42.
- Pharmaceuticals: IARC Monographs Volume 100A
- Biological Agents: IARC Monographs Volume 100B

In addition, the preparation of an IARC Technical Publication on Management of Mycotoxins in Food and Feeds for



Figure 1. COM maintains IARC's presence at international meetings, e.g. the World Health Assembly

Improving Public Health is now close to publication and production in print. Further, several online electronic resources were made available from the centralized online publications databank, including access to GLOBOCAN 2008, launched in June 2010, as well as digital atlases for training, prepared by the Screening Group, and tools for cancer registries.

For ease of reference, the relevant web page for IARC publications in PDF format (freely accessible) is: <http://www.iarc.fr/en/publications/pdfs-online/>. The full list of IARC publications and direct link to the IARC online book order platform and/or to the free PDF document is: <http://www.iarc.fr/en/publications/list/>.

To make online ordering of publications simple, a computer with direct access to IARC's publications catalogue and to the WHO Press online ordering facility has been installed in the IARC entrance hall for use by visitors.

WEB SERVICES

The Agency's bilingual internet site is maintained by COM. As a primary means of dissemination of research results, the IARC website ensures greater visibility of investigative outcomes from various internal cancer databases and research programmes' websites. As a result of the analysis of human resource needs in this area conducted in 2010, the Web team has gained one post and is now composed of one Professional Institutional Webmaster, assisted by one General Service Webmaster Assistant.

The Web team also makes certain that the presentation of all IARC research material available through the web and IARC subsites is standardized to promote an effective corporate image. To this end, special effort has been made to bring into line various IARC subsites with IARC's corporate image: <http://www-p53.iarc.fr/>, <http://monographs.iarc.fr/>, <http://epic.iarc.fr/>, <http://ilcco.iarc.fr/>, <http://ilcs.iarc.fr/>, <http://inhance.iarc.fr/>, <http://welas.iarc.fr/>, <http://ethics.iarc.fr/> and <http://governance.iarc.fr/>, and to coordinate action with web focal points regarding the harmonization of websites: <http://www-dep.iarc.fr/> and <http://screening.iarc.fr/>.

The team also helps to analyse the web needs of the IARC Groups and to conceptualize and guide the process of development, and the updating and upgrading of various Groups' websites. During this biennium, the Web service launched a number of new websites:

Public websites:

<http://synergy.iarc.fr/>,
<http://agricoh.iarc.fr/>,
<http://iicc.iarc.fr/> and
<http://accis.iarc.fr/>

Meetings' websites:

<http://www.iarc.fr/p53isoforms/>,
<http://www.iarc.fr/oncogenicviruses2010/>
and
<http://www.iarc.fr/oncogenicviruses2012/>

Internal websites

<http://library.iarc.fr/>,
<http://igo.iarc.fr/> (Grants Office),
<http://intranet.iarc.fr/SAC/index.php>
(Staff Association) and
<http://ohsc.iarc.fr/> (Occupational Health and Safety Committee).

The Web service ensures greater visibility of the key IARC activities through the IARC home page (<http://www.iarc.fr/>).

The COM group collects results from the various research Groups and disseminates them through the 'IARC News' facility. It also provides visibility and functionality for GLOBOCAN 2008 from the IARC home page.

As part of the continuous process of improving the IARC website, new features have been developed like Google Custom Search and RSS feeds. In addition, new sections have been added to the website: Office of the Director, IARC Publications–Cancer Screening Manuals and Guidelines, and IARC Publications–IARC CancerBases and Related Electronic Resources.

In 2011, the Web services team carried out the evaluation of several web analytical tool options to monitor and evaluate the traffic and usage of IARC websites. URCHIN 7 was selected and is now being customized across all IARC websites.

COM also maintains the IARC intranet, which provides staff with many administrative resources and information for internal use (e.g. library, occupational health and safety committee, etc.).

PUBLIC AND MEDIA RELATIONS

The Public Relations Service acts as liaison between the Agency and the media by writing and distributing press releases and organizing press conferences (Figure 2). By means of a database of media contacts around the world, the Service dispatches press releases to and maintains regular contact with over 4000 press agencies, individual journalists and decision-makers. The impact of this effort is



Figure 2. Global Press conference at IARC's Headquarters: the evaluation of radiofrequency electromagnetic fields, including mobile phones, drew intense media attention.



Figure 3. COM organizes the training of IARC staff for media interaction with the support of the WHO Headquarters' media team.

evident from the global news coverage surrounding several press releases over the biennium (Figure 2). The profile of the media impact is being observed by news monitoring services led by COM and correlates closely to media launches.

This Service also coordinates press releases on new investigations within the Monographs programme (Figure 3) by way of publication of a summary in the *Lancet Oncology Policy Watch* section, which offers the Agency a regular tribune for independent and transparent results (Figure 3).

LIBRARY

The mission of the IARC Library is to support the Agency's information and research needs by providing a wide range of electronic resources, a traditional print collection and responsive, user-centred services.

The Library is committed to providing access to information through acquisition, organization and management of collections. The cost of online information is high and demand for it is rapidly expanding. The Library works closely with local libraries in Lyon and with WHO Libraries & Information Networks for Knowledge to provide additional options for information access for IARC users. In addition, the Library's highly efficient Document Delivery Service ensures a rapid turnaround time between requests

and delivery of documents. The IARC Library is pleased to provide access to its collections and services to institutions or individuals.

The Library also offers orientation and training to staff, fellows, students and visiting scientists, either individually or in groups. These sessions focus on the effective use of information resources, information management and copyright education. Information consultations, literature searches and participation in the IARC Summer School are additional core activities.

The Library's intranet website reflects our focus on providing access to accurate and reliable information for our primary audience: IARC staff, fellows, students and visiting scientists.

The Library monitors the peer-reviewed publications of the Agency that result from our research. This activity contributes to the visibility of IARC through the dissemination of the information relating to these publications via the institutional website. Through its technical expertise, the Library actively participates in the publications programme of the Agency.

TRANSLATION

The Translation Service provides translations from English to French of all official documents of the Governing Council of IARC, as well as articles,

technical documents, correspondence, memoranda and other texts for the scientific and administrative Groups. It also organizes successful language courses in both working languages for the Agency's staff, as well as administering the United Nations language proficiency examinations.

EDUCATION AND TRAINING GROUP (ETR)

Group head

Miss M. Heanue (until April 2011)

Acting head

Dr E. Seleiro (from 15 July 2010)

Responsible officer, fellowship programme

Dr Z. Herceg

Senior visiting scientist

Dr R. Saracci

Assistant, fellowship programme

Mrs E. El Akroud

Assistant, courses programme

Mrs S. Anthony

Education and training in cancer research has been one of the statutory functions of the Agency since its inception in 1966. Through its well-established and highly successful international Fellowship and Courses Programmes, IARC has made a substantial contribution to training generations of cancer researchers worldwide and has been instrumental in the development of cancer research in low- and middle-income countries (LMICs).

The importance of education and training activities within the Agency's mission, was emphasized by the establishment in 2010 of the Education and Training Group (ETR) as a distinct structure within the Office of the Director, with a professional staff to provide leadership and innovation. In addition, an internal Advisory Committee on Education and Training was also established, composed of scientists from across the Agency, which helps to identify, evaluate and coordinate training initiatives.

The educational and training programmes of the Agency are designed to complement and support its research activities. ETR works closely with the scientific Groups to develop and implement training initiatives specifically aimed at countries/regions where lack of resources and expertise prevents the expansion of cancer research. In this context, a new and growing area of activity is to support the development of distance learning resources (see below).

ETR is currently divided into two programmes: training courses and fellowships.

COURSES

The activities of the Courses Programme comprise both the IARC Summer School and the organization of specialized courses run by the scientific Groups of the Agency.

SUMMER SCHOOL

The IARC Summer School, held in Lyon during June and July each year, provides basic training in cancer epidemiology primarily aimed at scientists from LMICs. The format consists of a one week module on 'Cancer Registration: Principles

Other courses held in Lyon 2010–2011			
Course Title	IARC Group	Number of participants	External Collaborators
Course on statistical practice in epidemiology with R	ETR/ICE	28	-

Courses held outside IARC in 2010–2011			
Course Title	Location	Number of participants	External Collaborators
MECC cancer registration workshop	Antalya, Turkey	20	MECC
CanReg training course, Casablanca Cancer Registry	Casablanca, Morocco	10	Casablanca Cancer Registry
International course on introduction to cancer registration and its application to cancer epidemiology	Guayaquil, Ecuador	28	PAHO
International course on introduction to cancer registration and its application to cancer epidemiology	Trinidad and Tobago	12	PAHO
Workshop on cancer registration	Stellenbosch, South Africa	54	Stellenbosch University, Cape Town
CanReg 5	Yokohama, Japan	17	IACR
Cervical cancer prevention	Trivandrum, India	200	Regional Cancer Centre, Trivandrum
Cancer registration and descriptive epidemiology: principles and methods course	Mumbai, India	40	UICC/ICRETT
VIA, colposcopy and treatment of cervical neoplasia (visual inspection) course	Barshi, India	18	Tata Memorial Rural Cancer Project, Nargis Dutt Memorial Cancer Hospital, Office of United Nations Population Fund, Ministry of Health and Family Welfare, People's Republic of Bangladesh
Cancer epidemiology courses	EC – Luxembourg and Brussels	16 and 10	European Commission DG SANCO

Course Title	IARC Group	Number of participants
Workshop on effective scientific posters	COM	14
Workshop on publishing in English-language journals	COM	25
Introduction to biostatistics	BST	25
Project management workshop	IGO	14
Workshop on STATA	SCR	24



and Methods,' followed by a two week module on 'Introduction to Cancer Epidemiology.' The programme focuses on epidemiology and biostatistics, with modules on descriptive, analytical and molecular epidemiology, and is designed to provide integrated training to participants who can attend both modules depending on expertise and the availability of funding.

Over the biennium, the IARC Summer School attracted over 414 applications from 64 countries. A total of 60 and 70 participants attended the Summer School in 2010 and 2011, respectively, with approximately 78% originating from LMICs (Algeria, Argentina, Belarus, Bosnia and Herzegovina, Botswana, Bhutan, Brazil, Cameroon, China, Colombia, Congo, Egypt, Ethiopia, Georgia, Ghana, India, Indonesia, Islamic Republic of Iran, Jamaica, Jordan, Kenya, Madagascar, Malawi, Malaysia, Mali, Mexico, Mongolia, Morocco, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Philippines, Rwanda, Sierra Leone, Sri Lanka, South Africa, Sudan, Syrian Arab Republic, Turkey, Uganda, Viet Nam, Yemen and Zambia).

Additional financial support for the Summer School was generously provided by the US National Institutes of Health, National Cancer Institute (NIH/NCI), the Fondation Léa et Napoléon Bullukian and the Nordic Cancer Union.

OTHER COURSES

Several additional courses were organized during 2010–2011 in collaboration with Agency Groups (particularly in the areas of cancer registration and screening with CIN and SCR) and in some instances co-organized with external partners and held at diverse locations throughout the world (see Table 10 below).

GENERIC TRAINING

With the establishment of ETR came the initiative to run in-house generic training courses and workshops, open to all at IARC and conducted in collaboration with IARC Groups. Several of these courses are now being incorporated into the generic training provided through the IARC Postdoctoral Fellowship Charter (see below).

OTHER ACTIVITIES

Another noteworthy collaboration in the area of training is the signing of a memorandum of understanding between IARC and the London School of Hygiene and Tropical Medicine to coordinate the timing of their respective flagship courses in Cancer Registration and Cancer Survival. The aim of this collaboration is to facilitate the exchange of course faculty and provide an opportunity for some participants to attend training in these two complementary areas.

FELLOWSHIPS

The Fellowship Programme coordinates the training of young postdoctoral scientists at the Agency and supports senior scientists to work in cancer research either at the Agency or in an institute in a LMIC.

A major development in this area was the introduction of the 'IARC Postdoctoral Fellowship Charter.' The Charter was developed to reinforce the provision for in-house generic training for all postdoctoral fellows at IARC, as requested by IARC fellows and postdoctoral scientists, and to provide a more structured approach to performance evaluation and career development, by outlining the commitments expected of the postdoctoral fellow, the supervisor and the Agency during the period of training.

As a part of the Charter, a generic training programme has been developed with activities offered in biostatistics, grant writing, scientific publishing, laboratory safety, project management, effective scientific poster preparation, library resources, bibliographic tools, and the IARC Sample Management and Information System, among others.



IARC RESEARCH TRAINING FELLOWSHIPS

The IARC Research Training Fellowships provide an opportunity for postdoctoral scientists who wish to pursue a career in cancer research to train at the Agency. Fellowships are awarded in areas related to the Agency's own programme, with a focus on LMICs and an emphasis on interdisciplinary projects.

Fellows are selected from applicants from any country, with priority given to candidates from, or with a research project relevant to, LMICs. Furthermore, candidates need to provide reasonable assurance that they intend to return to their home country and continue working in cancer research on completion of their Fellowship at IARC. On completion of their training, over 80% of Fellows return to their home country and remain active in cancer research, often supported by a modest research Return Grant.

In 2010–2011, there was a 30% increase in applicants for the IARC Research Training Fellowships compared to recent years. A total of 14 Fellowships were awarded to postdoctoral scientists

(from more than 60 applicants) from 12 countries (Australia, People's Republic of China, Colombia, Germany, Indonesia, Republic of Korea, Mexico, the Netherlands, Portugal, Sudan, USA and Zimbabwe).

The IARC Fellowship Programme is partly funded by a generous contribution from the EC-FP7 Marie Curie Actions-People-COFUND programme.

BILATERAL FELLOWSHIPS

During 2010–2011, the Agency successfully completed bilateral agreements with the Cancer Council Australia and with the Irish Cancer Society to establish the IARC-Australia and the IARC-Ireland Postdoctoral Fellowships. The first IARC-Australia fellowship was awarded in 2011 to Dr Suzanne Moore from the Queensland Institute of Medical Research in Brisbane, and the first call for applications is being launched for the IARC-Ireland fellowship. The expansion of these bilateral agreements to other organizations in Participating States, as well as institutes offering extra funding, will continue to be actively pursued to

expand both the postdoctoral and senior visiting scientist programmes.

SENIOR VISITING SCIENTIST AWARDS

The interest in these awards has steadily increased over the past years, reflecting perhaps a growing interest in developing high-level collaborations with Agency scientists. For the Agency, the possibility of hosting eminent researchers, even for relatively short periods, provides a significant boost to its research activities and collaborations and a superb opportunity for the development of its junior scientists.

The Senior Visiting Scientist Award for 2010 was granted to Dr Jia Chen from the Department of Preventive Medicine, Mount Sinai School of Medicine, New York, USA who spent 12 months developing collaborations with the MOC/EGE Groups.

In 2011 the Agency awarded four Senior Visiting Scientist Awards to: Professor Anssi Auvinen from Tampere School of Public Health, Tampere, Finland to spend six months developing collaborations with the ENV Section; to Professor

Joakim Dillner from the Department of Medical Epidemiology and Biostatistics, Karolinska Institute, Stockholm, Sweden to spend 10 months with the ICE Group; to Professor Anna Giuliano from the Department of Cancer Epidemiology, Cancer Epidemiology Program, H. Lee Moffitt Cancer Centre and Research Institute, Tampa, FL, USA to spend six months with the ICE Group; and to Professor Nanny Wermuth from the Department of Mathematics, Division of Mathematical Statistics, Chalmers University of Technology and University of Gothenburg, Gothenburg, Sweden, to spend 11 months with the BST Group.

for Cancer Control network (VUCCnet). In particular, IARC has been invited to contribute academically to the development and review of e-learning modules for the VUCCnet. As a first step, the focus will be on developing a cervical cancer prevention training module.

EXPERTISE TRANSFER FELLOWSHIP

These awards aim to promote the training of researchers in LMICs by enabling an established investigator to spend up to 12 months in a host institute in an LMIC to train and develop collaborations in an area related to the Agency's research programme.

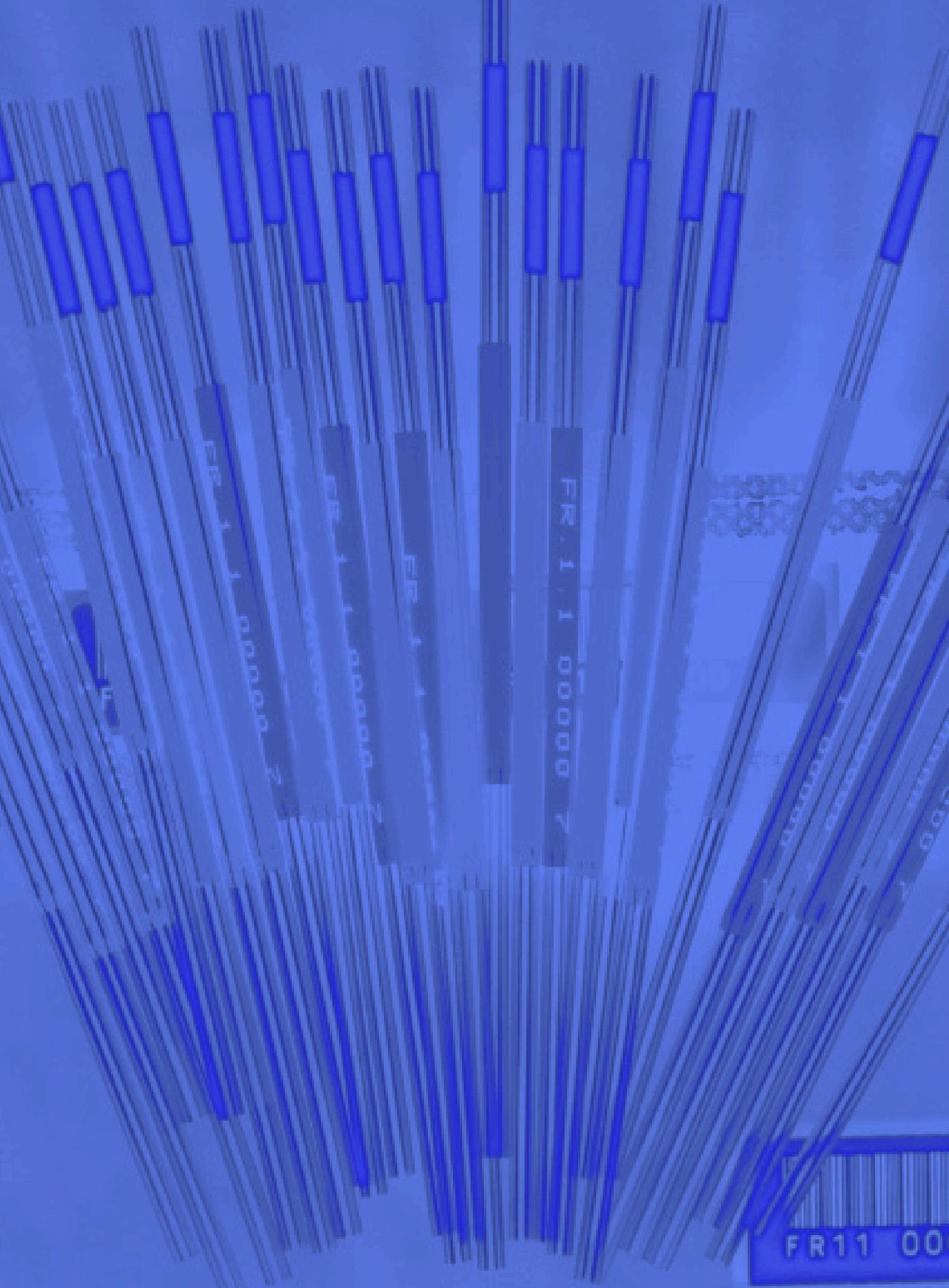
No award was made in 2010. In 2011 the Expertise Transfer Fellowship was awarded to Dr Jean-Michel Lutz from the National Institute for Cancer Epidemiology and Registration (NICER), Zurich, Switzerland to spend 12 months at the National Cancer Registry in Montevideo, Uruguay.

OTHER POSTDOCTORAL SCIENTISTS AT IARC

In addition to the IARC postdoctoral fellows, the Agency hosts a much greater number of postdoctoral scientists supported by project funds from the Groups. In the biennium 2010–2011, IARC welcomed approximately 47 postdocs from 23 countries. The introduction of the Charter, mentioned above, provides a more structured training for young scientists coming to the Agency irrespective of their funding source.

FUTURE DIRECTIONS

In addition to these initiatives, ETR is actively seeking to develop a distance learning programme by initiating partnerships with IAEA-PACT, the Institut Catalan d'Oncologia in Spain, WHO and UICC on the Virtual University



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LABORATORY SERVICES AND BIOBANK GROUP (LSB)

Group head

Dr Maimuna Mendy

Secretary

Dominique Bouchard

Laboratory services

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Elodie Colney

Thomas Cler

Gertrude Tchoua

Jose Garcia

Sophie Guillot

Christophe Lallemand

The Laboratory Services and Biobank Group (LSB) was established in 2010 to address the growing complexity of and rapidly increasing demand for laboratory services and the biobank at IARC. The Group, which is under the Office of the Director, became fully functional when the Head took up the position in October 2010. The creation of LSB provides an opportunity for all laboratory Groups to shape the future of the Agency's laboratories, by strengthening shared facilities and identifying priorities for acquisition of state-of-the-art technology. The Group's formation also ensures the smooth running of a centralized biobank to facilitate the sharing of biological resources and to create new opportunities for research collaboration. LSB is supported by the Laboratory Steering Committee (LSC) and the Biobank Steering Committee (BSC).

BIOBANK

The IARC Biobank, which is mainly population-based, holds large sample collections from prevalence and risk factor studies and from multiple smaller collections. In total, the Biobank comprises over four million biological specimens. The smaller collections often correspond to pilot studies conducted in low-income countries. Although the majority of the studies are active, some of the collections are archives of important past studies and are not the subject of current research. Samples are stored in liquid nitrogen, in freezers or at ambient temperature (in the case of paraffin blocks and blood filter paper). The Biobank also maintains a sample collection from the European Prospective Investigation into Nutrition and Cancer (EPIC) study, which forms the largest collection in the Biobank. Although EPIC has its own governance under the general guidance of its Steering Committee, the size and level of activity of the EPIC study has a strong impact on the Biobank's services.

CENTRALIZED BIOREPOSITORY

An important objective of LSB is to create and maintain a centralized structure by employing a standardized sample management tool. In 2008–2009, following the acquisition of a Laboratory Information Management System supported by an Oracle database, IARC developed its own electronic system for biospecimen/biobank

management (SAMI). SAMI, a joint initiative between the Biobank group, GCS and ITS, has undergone improvements and upgrading in the past year. Following its validation under the implementation program, specific data fields for additional epidemiology and sample data have been included along with improved facilities for monitoring sample movement. Similarly, standard operating procedures for sample deposition, data collection and data importation have been developed for users.

The Biobank's resources offer opportunities for collaboration with the international research community. The availability of biological material of diverse geographical origin from different cancer sites from studies conducted through varying epidemiology study designs, provides a valuable resource for biomarker and genetic studies, cancer etiology and risk factor studies.

BIOBANK SERVICES

The aim of the Group is to provide a reliable pre-analytical sample processing service for research projects at IARC and outside the Agency. Over the past 10 years, the emergence of 'omics' technologies has made it necessary to develop laboratory workflow for pre-analytical processing (extraction of nucleic acid and DNA quantification, aliquoting) and sample distribution of a large series of specimens. In this biennium, the IARC Biobank worked on over 20 projects; the majority (70%) for EPIC-based studies. Among the other projects were studies on breast, prostate, lung, kidney and thyroid cancer and on cardiovascular diseases (EPIC-heart). The Biobank also provides pre-analytical services to IARC-based projects conducted by GCS, GEP, MOC, BMA, NEP, ENV and EGE.

Maintaining a financially sustainable biobank is an important focus of the Group. The IARC Biobank operates on a cost-recovery basis, with a major contribution from the central IARC Regular Budget for infrastructure and staff salaries. Most of the consumables and specific staff costs associated with defined biobanking operations are charged, at least to some extent, to the users through various administrative mechanisms (joint grant applications, collaborative research

agreements, invoicing). However, the principles and mechanisms of cost-recovery require constant adaptation to reflect the growing diversity and workload of biobanking activities. The challenge is to make the facilities accessible and affordable to the different categories of users and projects.

INTERNATIONAL BIOBANKING

Of great importance to IARC is its involvement in developing recommendations, standards and publications aimed at establishing international biobanking practices. The Group continues its participation in and provides leadership for these activities. IARC is a founding member of the Forum of International Biobanking Organization (FIBO) and a participant of Biobanking and Biomolecular Resources Research Infrastructure (BBMRI), the International Society for Biological and Environmental Repositories (ISBER) and the European, Middle Eastern and African Society for Biopreservation and Biobanking (ESBB). IARC is also involved in the EurocanPlatform, a European Union "7th Framework" project aimed at developing infrastructure for European cancer translational research and promoting collaborative multicentre projects.

LABORATORY SERVICES

The laboratory services arm of LSB provides generic laboratory support services, including the technical management of health and safety, supervision and coordination of equipment maintenance and purchasing, maintenance of supplies of basic laboratory items, and the provision of glassware services.

HEALTH AND SAFETY

In the biennium, training programs for new staff members were conducted on specific laboratory procedures to promote health and safety and good laboratory practices. Courses on working safe in category 2 (L 2) facilities, cell culture techniques, safe handling of liquid nitrogen and pipetting skills were conducted for laboratory staff.

To enhance the safe work environment at IARC, the molecular biology laboratories replaced ethidium bromide with the less

mutagenic Gel Red dye for DNA staining, and nitrile gloves with allergenic latex gloves. In response to the introduction of the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), laboratory staff were introduced in late 2011 to the new chemical classification. Much of the activities on health and safety issues are conducted in collaboration with the IARC Staff Physician and the Occupational Health and Safety Committee.

LABORATORY EQUIPMENT

LSB is responsible for maintaining current laboratory equipment and procuring new items. To this end, IARC's equipment catalogue was updated and requests for new equipment and maintenance service contracts were reviewed and prioritized. Preventive maintenance contracts were obtained for minor, but critical, equipment items to ensure their continued smooth operation.

In 2011, a next generation sequencing instrument (5500XL ABI) for large-scale targeted sequencing and exome sequencing for genetics and epidemiology studies was purchased. Other major equipment procured in the biennium to support the shared and specialized laboratory research platform, includes a fluorescent microscope, flow cytometer for immunochemistry, and gas chromatograph (see Figures).

LSB has also procured DNA aliquoting robotic apparatus and a multi-well plate reader; a solid phase extraction robot, a real-time PCR detection system and DNA-quantification system; and a high-performance sonicator.

A laboratory store has been opened to provide commonly used items such as disposable plasticware for molecular and cell biology. This service is cost-effective, allows easy access to consumables and provides homogeneity across IARC laboratories.



FINANCIAL SUPPORT

LSB's core activities are funded by IARC. Additional support to maintain the services and facilities provided to collaborators are made available through externally funded projects. Other collaborators include the EPIC steering Committee and EPIC working group members.

The LSB is grateful to the following for their collaboration:

Benedicte Elena-Herrmann, CRMN, Gilbert Lenoir, LNCC, France; Beate Pesch, BGFA, Federico Canzian, Laure Dossus, Rudolf Kaaks, DKFZ, Heiner Boeing, Tobias Pischon, Potsdam, Germany; Domenico Palli, ISPO, Italy; Marie Braem, Bas Bueno-de-Mesquita, Petra Peeters, UMC, Utrecht, Roel Vermeulen, IRAS, Utrecht, Martine Ros, RIVM, the Netherlands; Xavier Castellsague Pique, Carlos Alberto Gonzalez, Nuria Sala Serra, ICO, Spain; Naomi Allen, Timothy Key, Ruth Travis, Oxford, Adam Butterworth, John Danesh, Nick Wareham, Cambridge, James Flanagan, Elio Riboli, Dora Romaguera-Bosch, Afshan Siddiq, Paolo Vineis, Imperial College, United Kingdom.



THE GAMBIA HEPATITIS INTERVENTION STUDY (GHIS)

Group head

Dr Ramatoulie Njie

National professional officer

Mr Ebrima Bah

The Gambia Hepatitis Intervention Study (GHIS) is a collaborative project undertaken by IARC, the Government of the Republic of the Gambia, and the Medical Research Council, United Kingdom. GHIS was initiated in 1986 to evaluate the effectiveness of hepatitis B virus (HBV) vaccination in childhood for the prevention of infection, chronic liver disease and hepatocellular carcinoma (HCC) in adulthood in a high-risk population. Led by the Director's Office, GHIS is a long-term, high-profile project of the Agency and support in the running of the project is provided by Professor Andrew Hall from the London School of Hygiene and Tropical Medicine, London, UK.

The project involves three phases. During Phase I (1986–1990), HBV vaccine was phased into the Gambian Expanded Programme on Immunization (EPI) using a 'stepped-wedge' design over a four year period (Gambia Hepatitis Study Group, 1987). The unit of randomization was the EPI team, stratified according to four ecological zones. In total, 124 577 children were recruited, about half received all EPI vaccines and half all vaccines plus HBV. In Phase II (1991–1997), the efficacy of the vaccine against infection and chronic carriage was established. Initiated in 1998, Phase III involves the long-term follow-up of the children in the trial through cancer registration, using HCC as the primary endpoint.

For the purpose of long-term identification of subjects, three methods were established: (1) at recruitment, personal details of children were recorded, such as name, parents' names, birth date, sex, etc.; (2) at the age of four months or older, palm- and footprints of each child were taken; and (3) the usual site of the Bacille Calmette Guérin vaccination and the resulting scar were altered for children in the study.

At the beginning of GHIS, a population-based National Cancer Registry (NCR) was established. Cases are identified through public health facilities and private clinics. Confirmation of clinical diagnosis is supported by the histopathology unit of the National Health Laboratory Services (NHLS). For HCC diagnosis, clinical criteria, ultrasound and α -fetoprotein

are used in combination. Both the NCR and the NHLS have received long-term support from IARC, the former representing one of the only population-based cancer registries in sub-Saharan Africa.

CURRENT STATUS

In Phases I & II, vaccine efficacy was shown to be 84% against infection and 94% against chronic carriage at nine years of age (Fortuin *et al.*, 1993; Viviani *et al.*, 1999).

Phase III, which is currently underway, consists of:

(i) Strengthening the detection and ascertainment of cases of primary liver cancer and of chronic liver disease in the population of the Gambia. This has been approached by appointment of a consultant hepatologist (Dr Ramou Njie) to enhance liver cancer diagnosis and management in the public and private health sectors, with allied improvements in imaging (ultrasonography, fibroscan and computed tomography), laboratory and histopathology services. Liver clinics are being set up around the country, with referral centres at the Royal Victoria Hospital in Banjul, MRC unit in Fajara and New Serekunda Hospital in Kanifing. There are plans underway to conduct monthly outreach clinics in other health facilities around the country, using portable equipment and highly sensitive point-of-care tests, with support from the referral centres.

(ii) Continued registration of cancer cases and of cases of chronic liver disease through the population-based NCR.

(iii) Establishing record linkage between HCC cases in the NCR and the GHIS databases of vaccinated and unvaccinated children, so that the net effect of HBV vaccination in preventing liver cancer, the final outcome of the GHIS, can be evaluated. The latest estimates (Viviani *et al.*, 2008) indicate that the number of cases needed to detect a significant difference between vaccinated and unvaccinated groups will be reached when GHIS subjects are around 30 years old. Overall, between 30 and 35 years of total follow-up will

be necessary to obtain unequivocal results. Therefore, the final outcome of GHIS is expected between 2017 and 2020. In parallel with the development of the three phases above, the GHIS framework has fostered studies on viral, environmental and genetic risk factors for HCC, biomarkers of HBV infection, aflatoxin exposure, long-term efficacy of HBV vaccination and monitoring of breakthrough infections. More recently, the Prevention Of Liver Fibrosis and Cancer in Africa (PROLIFICA) programme, a five year European Union-funded multicentre study which includes the Gambia, is expected to generate important information on whether suppression of HBV with an oral nucleotide analogue reduces the risk of liver cancer in West African populations, as well as the feasibility of population screening and treatment of those chronically infected with HBV. Additionally, PROLIFICA will conduct a large HCC case-control study to identify genetic, proteomic and metabolomic biomarkers for liver cancer. The GHIS and PROLIFICA programmes are co-located in the IARC-funded centre at the MRC unit in the Gambia.

PUBLIC HEALTH VALUE OF GHIS

GHIS is the only randomized trial of HBV vaccination in Africa, and one of only two worldwide examining chronic liver disease and HCC as outcomes. The study has demanded a long-term commitment from its partners over a 30–40 year period to achieve these goals.

Through improving the understanding of the risk factors for HCC and the clinical presentation of the disease in West Africa, this study will provide a framework to develop recommendations and guidelines for effective reduction of the burden of liver cancer in high-incidence areas of Africa. These include the development of interventions aimed at improving early diagnosis, controlling viral replication in chronically infected subjects, managing chronic liver disease and, whenever feasible, proposing appropriate treatment to liver cancer patients.

The strategy adopted for GHIS provides a model for the evaluation of the introduction of new vaccines or other

prevention strategies in sub-Saharan African countries and other low-income regions worldwide. The value and feasibility of population-based cancer registration as an integral part of routine medical and hospital practice to assess the long-term effect of interventions, is evident. In addition, the training of staff to implement the intervention, in this case in the Gambian EPI, the NCR and in the NHLS, has added capacity to the delivery of public health services.

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