

Director's Report

Dr Elisabete Weiderpass

Scientific Council, 60th Session, Lyon 7-9 February 2024
Lyon, France

International Agency
for Research on Cancer



World Health
Organization

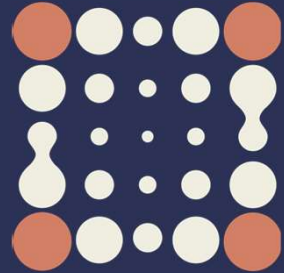


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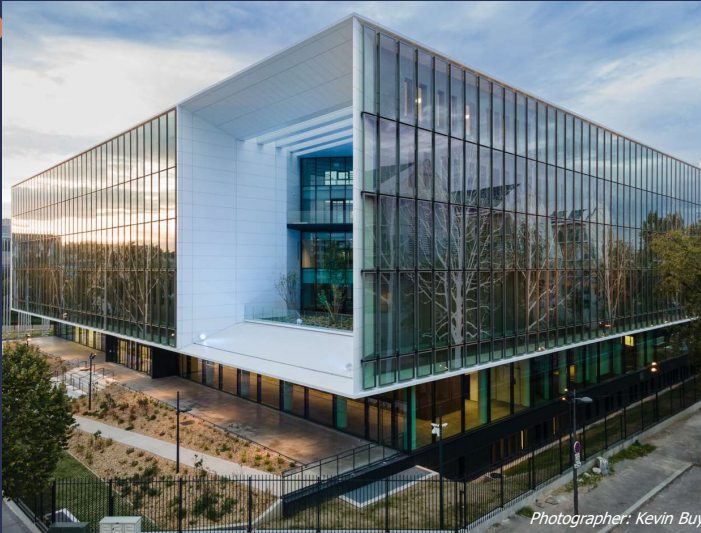
**Introduction: a few
updates**

Director's Report



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Success of the transfer to Gerland Biodistrict



Photographer: Kevin Buy



The fund-raising campaign raised
over **€1,6 million** for the
Nouveau Centre

11 500 m² and **500**
workstations

A celebration of outstanding work in
advancing cancer control at UICC's World
Cancer Leaders' Summit

Civil Society category: Dr Freddie Bray

17 October 2023, Long Beach, CA, USA

Introduction - Director's Report

7-9 February 2024



Dr Freddie Bray, Head of the Cancer Surveillance (CSU) Branch at IARC, received the Outstanding Contribution to Cancer Control Award in the Civil Society category at the Union for International Cancer Control (UICC) World Cancer Leaders' Summit 2023, held in Long Beach, California.

Launch of the Latin America & the Caribbean Code Against Cancer, 1st edition



Introduction - Director's Report

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The 1st edition of the Latin America and the Caribbean Code Against Cancer (LAC Code) was internationally launched on 17 October, 2023.

This is the first regional adaptation of the European Code Against Cancer under the umbrella of the World Code Against Cancer Framework

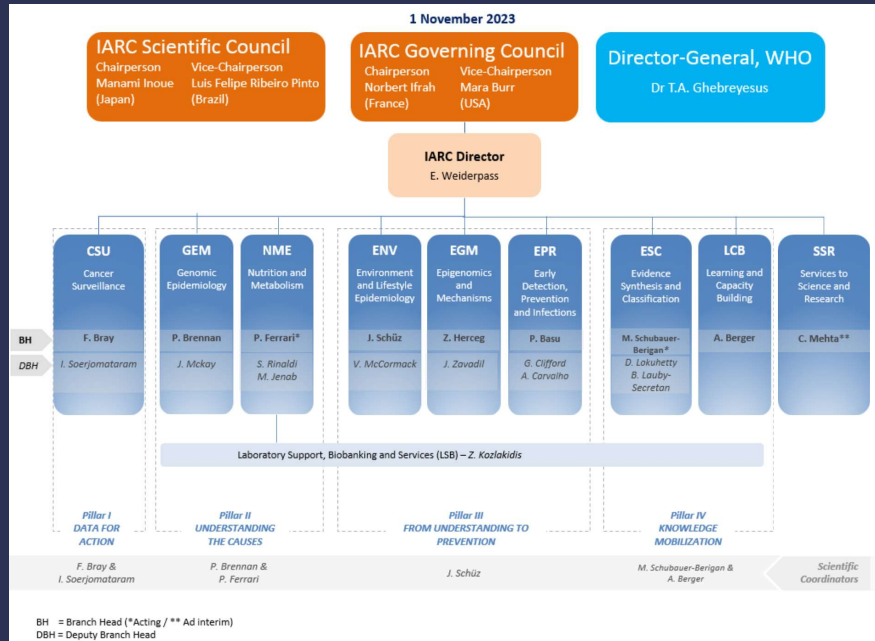
During almost three years, more than 60 experts from Latin America and the Caribbean, key partners, the Pan-American Health Organization (PAHO) and IARC have worked in a collaborative manner, with the common mission of promoting cancer prevention.

The LAC Code consists of 17 recommendations on primary and secondary prevention of cancer for the general public of Latin America and the Caribbean, complemented with 17 recommendations for policymakers on the same topics.

It provides the most up to date, authoritative, and clear evidence-based recommendations for the public and policy-makers and it prioritizes the most effective, feasible and implementable interventions for cancer prevention in the region

This summary infographic shows short version of the 17 recommendations and their relevance throughout the life course

Organigram as of 1 November 2023



The slide shows IARC organigram as of 1 November 2023.

The four pillars reflect IARC's fundamental activities:

Pillar 1: data for action

Pillar 2: understanding the causes

Pillar 3: from understanding to prevention

Pillar 4: knowledge mobilization

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**1. Biennial Report
2022–2023: scientific
highlights**

Directors' Report



Key facts and figures on IARC

58 years of research for cancer prevention

339 employees

48 nationalities

132 Early Career and Visiting Scientists [2023 figures]

27 Participating States

248 active research projects

123 signed contracts

287 collaboration research agreements (CRA)

406 articles in 194 journals

319 peer-reviewed papers

h-index: 12

9 Memoranda of Understanding (MoU); **4** MoU renewed

Launch of an NCC China regional Learning Centre

3 new IARC GICR Centres of Expertise in Sub-Saharan Africa

Joint strategic workplan IARC-WHO 2023–2025

IARC research to support the 3 WHO Global Cancer Initiatives

€45.37 million budget from Participating States for 2022-2023 and **€24.38 million** from extrabudgetary contracts (2022) with **9** main funders

IARC's Scientific IT Platform with **156** active projects and 1 PB of data
Data Protection Framework
Business Management System
The Research Leadership Training Programme with **78** participants including 51 from IARC

Key facts and figures on IARC for the biennium 2022–2023 are reported here (document [SC/60/2](#)), as show in the webpage associated to the Biennial Report 2022–2023.

Biennial Report 2022–2023: Scientific highlights

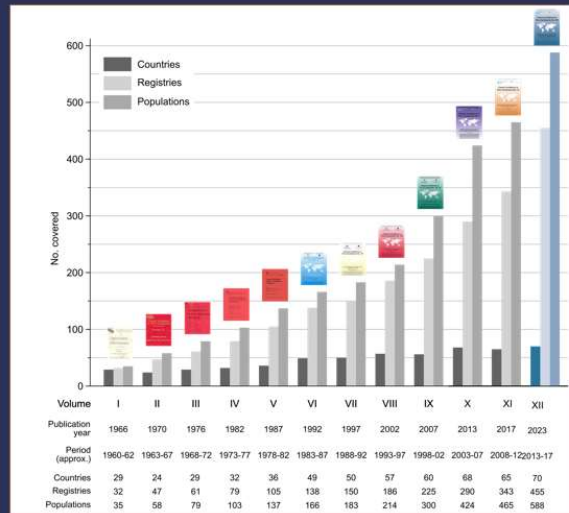
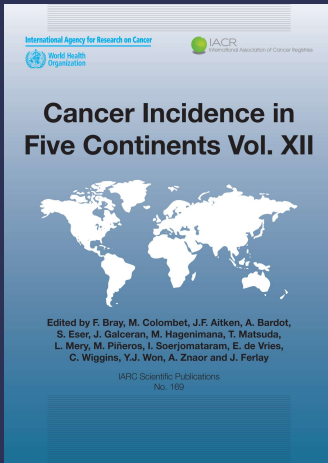
Pillar 1:
Data for action

The following slides present some scientific highlights from the IARC Biennial Report 2022–2023 for Pillar 1, which includes the Cancer Surveillance (CSU) Branch.

Cancer Incidence in Five Continents Volume XII

CI5-XII submissions from 104 countries:

- 670 registry submissions
- 812 population submissions



Volume XII compiles incidence data from **455 cancer registries**, covering **588 populations** in **70 countries**

IARC, in collaboration with the International Association of Cancer Registries (IACR), launched the latest volume (Volume XII) of Cancer Incidence in Five Continents (CI5) series online. The CI5 series is an exposition of comparable cancer incidence data from all parts of the globe based on the high-quality data made available by population-based cancer registries.

For CI5 Volume XII, 670 population-based cancer registries, covering 812 populations in 104 countries, responded to the call for data, submitting cancer incidence datasets covering the period of diagnosis 2013–2017. After a careful evaluation of the comparability, completeness, and accuracy of each submission by the 16 members of the CI5 Volume XII Editorial Board – which included representation from Africa, the Asia–Pacific region, Europe, and the Americas – Volume XII compiles cancer incidence data from **455 cancer registries**, covering **588 populations** in **70 countries**.

The long-standing collaboration between IARC and IACR serves as a unique source of cancer incidence data from high-quality population-based cancer registries around the world and illustrates the extraordinary international variation in cancer incidence rates – whether compared across registry populations or within a registry population over time, providing compelling evidence of the environmental, lifestyle, and infectious origin of many forms of cancer and, by extension, the potential for cancer prevention.

International Association of Cancer Registries (IACR)



CSU Branch provides the Secretariat to the International Association of Cancer Registries (IACR), the professional society of population-based cancer registries worldwide.

The IACR resumed its in-person participation at its annual scientific conference in November this year in Granada, Spain. The conference was organized jointly with the European Network of Cancer Registries (ENCR) and hosted by the Andalusian School of Public Health and the Cancer Registry of Granada.

The meeting was attended by more than 350 participants and included themes covering special populations research, registry innovation, COVID-19 (coronavirus disease) impact, staging and comorbidity, and clinical applications. There were four keynote lectures, including the 2023 Johannes Clemmesen Lecture, presented by Dr Prashant Mathur of the Indian Council of Medical Research.

In addition to several consortium and working-group coordination meetings, there were four pre-conference registration workshops on collecting treatment data, survival metrics, cancer recurrences, and artificial intelligence. Jacques Ferlay, who retired from IARC in 2022 after 33 years of service, was among the awardees of the IACR Honorary Fellowship this year.

GICR e-learning series: 16 cancer registration modules

The series comprises 16 modules that aim to provide you with a knowledge base about cancer registry data in addition to guided skill instruction on specific implementation steps for registry operation, management, data analysis, and information dissemination.

- 00 Pre-Course Preparation Module (Prerequisite)**: Learn tumor differences, cancer pathology, data source, and PBC's specific essentials before diving into this e-learning series.
- 01 Introduction to Cancer Surveillance**: Discover public health surveillance, cancer registration, and IARC's global role in monitoring cancer trends and data.
- 02 Measuring Cancer Incidence, Mortality and Prevalence**: Understand cancer incidence, mortality, prevalence, rates, and population risk estimation techniques for accurate cancer data analysis.
- 03 Cancer Registries**: Explore the history, types, and key functions of cancer registries, along with the steps needed to establish and operate one.
- 04 Variables for Cancer Registries**: Learn about the essential variables collected by cancer registries, coding techniques, and where to find standardized codes.
- 05 Classification and Coding**: Dive into international coding systems, including the International Classification of Diseases for Oncology (ICD-O).
- 06 Case Finding and Sources**: Discover various information sources, cancer abstraction, and essential details required for cancer case registration.
- 07 Staging of Cancer**: Master cancer staging methods. Essential that and staging guidelines for specific cancers, including esophageal, breast, cervical, etc.
- 08 CarReg: Installation and Management**: Learn how to install, manage, remove, enter data, and update the CarReg5 cancer registry database software.
- 09 CarReg: Data Entry**: Explore the structure of CarReg5, data entry processes, record linkage, and creating a population dataset.
- 10 Treatment and Follow-Up**: Understand cancer treatment recording, curative vs. palliative therapy, advanced vs. neoadjuvant therapy, and patient follow-up.
- 11 Principles of Data Quality**: Learn the significance of data quality control, types of quality control, quality indicators, and its impact on results.
- 12 Analysis and Presentation of Data**: Master data management using CarReg5, presenting data through tables, charts, and creating effective cancer registry reports.
- 13 Confidentiality**: Explore ethical principles, human rights guidelines, data protection laws, and PBC's role in data confidentiality and protection.
- 14 Uses of Registry Data for Cancer Control**: Discover the extensive uses of PBC's data in assessing cancer burden, quality of treatment, early detection, care planning, and dissemination.
- 15 Pediatric Cancer Registration**: Gain insights into childhood cancer types, classification, special considerations by registries, and staging in pediatric cancer.

The WHO Academy
Revolutionizing lifelong learning in health.

- Include exercises, references and summaries by module
- Initially available in English, French and Spanish building towards an international certification programme
- Certificates of completion available within learning streams – Registrar, Analyst, or Director

The Global Initiative for Cancer Registry Development, or GICR for short, is led by IARC and aims to build capacity in cancer surveillance worldwide. The GICR partnership operates with the fundamental vision that reliable cancer data can be translated into information that ultimately saves lives.

Training is a key activity of the GICR. The GICR Cancer Registration e-Learning Series will be launched in 2024 to help improve how educational material is shared and to make it accessible to more people.

The Series is a set of 16 comprehensive training modules that provides foundational knowledge and skills development in the principles and practices of cancer registration. The Series provides guidance on all aspects of cancer registry practices, from an introduction to cancer surveillance through to registry operations, from data analysis at the registry through to its dissemination for cancer control impact.

Already available in several languages, the Series is designed to be used as a valued resource tool for learning and a reference for those wishing to understand cancer registration in depth. The Series is aimed for anyone who is considering starting or has started a cancer registry career, from those who are newly hired to staff members wishing to refresh their knowledge. It is for registrars, analysts, data managers, and Directors alike.

Each module is aligned with the international standards of cancer registration that are recommended by the International Association of Cancer Registries, (the IARC), and the training materials developed by the GICR. The completion of each module or the overall Series allows for formal certification by the GICR and IACR.

Women, Power and Cancer: A Lancet Commission

Women, power, and cancer: a Lancet Commission

Ophira Ginsburg*, Verna Vanderpuye*, Ann Marie Beddoe†, Nirmala Bhoo-Pathy†, Freddie Bray†, Carlo Caduff†, Narjust Florez†, Ibtihal Fadhill†, Nazki Hammedi†, Shinji Hiedari†, Ishu Kataura†, Somesh Kumar†, Erica Liebermann†, Jennifer Moodley†, Miriam Mutabi†, Deborah Mukherji†, Rachel Nugent†, Winnie KW So†, Enrique Soto-Perez-de-Celis†, Karla Unger-Saldana†, Gavin Altman†, Jennifer Bhurani†, Maria T Bourlon†, Michelle A B Eala†, Peter S Hovmand†, Yek-Ching Kong†, Sonia Menon†, Carolyn D Taylor†, Isabelle Soerjomataram*

Executive summary

Women interact with cancer in complex ways, as healthy individuals participating in cancer prevention and screening activities, as individuals living with and beyond a cancer diagnosis, as caregivers for family members and friends, as patient advocates, as health workers and health-care professionals, and as cancer researchers and policy makers.

The topic of women and cancer spans broad terrain, beyond women's cancers and the biomedical aspects of a cancer diagnosis, as caregivers for family members and friends, as patient advocates, as health workers and health-care professionals, and as cancer researchers and policy makers.

The topic of women and cancer spans broad terrain, beyond women's cancers and the biomedical aspects of any type of cancer that women in all their diversities might experience. It is inclusive of the ways in which sex and gender influence exposures to cancer risk factors, interactions with the cancer health system, and specific

challenges faced by health-care professionals, advocates, and caregivers. In all these domains, women experience gender bias, and are subject to overlapping forms of discrimination, such as due to age, race, ethnicity, socio-economic status, sexual orientation, and gender identity, that render them structurally marginalised. These myriad factors can intersect and restrict a woman's rights and opportunities to avoid modifiable cancer risks and impede their ability to seek and obtain a prompt diagnosis and quality cancer care. At the same time, they serve to unfairly burden and perpetuate an unpaid cancer caregiver workforce that is predominantly female, and hinder women's professional advancement as leaders in cancer research, practice, and policy making. However,

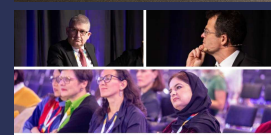
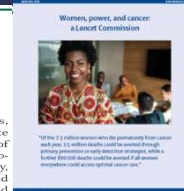
Key findings and priority actions

<https://womenandcancercommission.org/>

Biennial Report 2022–2023–Pillar 1 – CSU

7–9 February 2024

THE LANCET



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Among the 80 or so papers CSU publishes per year, one highlight in 2023 was the Lancet Commission on Women, Power and Cancer that was co-chaired by Dr Soerjomataram, the Deputy Head of the CSU Branch. The actionable recommendations to address the impact of gender and power dynamics on access to cancer prevention and care for women included in the Lancet article were presented in a special launch event in Geneva in September.

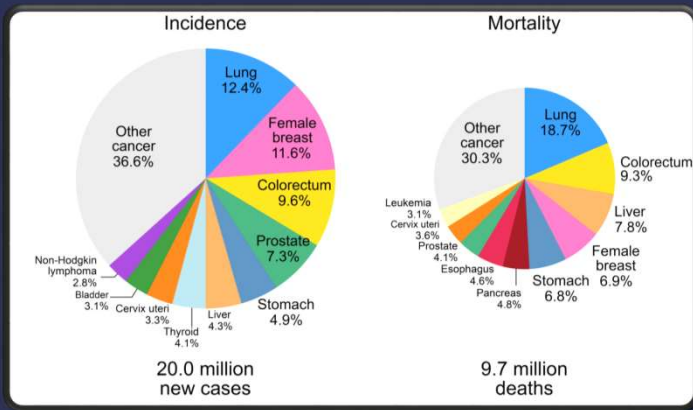
The Lancet Commission brought together experts in cancer care, health system research, implementation science, health economics, gender and feminism, and social science, as well as patient advocates to analyse how women around the world experience cancer and to provide recommendations to policy-makers, governments, civil society, and health and social care systems.

According to the Commission, gender inequality and discrimination influence women's rights and opportunities to avoid cancer risk factors and impede women's ability to seek and obtain a rapid diagnosis and high-quality cancer care.

An accompanying analysis in the Lancet Global Health led by Dr Soerjomataram reported that almost 7 in 10 premature cancer deaths in women could have been prevented. Specifically, of the 5.3 million adults who died prematurely from cancer in 2020, 2.3 million were women. Two-thirds of the deaths of these women – or 1.3 million deaths – could have been averted through prevention, and the remaining one-third could have been avoided through timely and appropriate treatment.

GLOBOCAN 2022 estimates launch, January 2024

The distribution of new cases and deaths for the top 10 most common cancers in 2022, both sexes



15 January, Geneva

- Launch for permanent missions of IARC's 27 Participating States
- Dedicated factsheets and video messages for each Participating State

30 January, Geneva

- WHO/IARC press briefing on the 2022 estimates launch on the Global Cancer Observatory

The GLOBOCAN estimates for 2022 have just been launched online on IARC's Global Cancer Observatory, which includes online facilities for the tabulation and graphical visualization of the GLOBOCAN database **for 185 countries and 36 cancers by age and sex**. The national estimates are built up from the best available sources of cancer incidence and mortality data within each country, including the CI5 and WHO mortality databases and national validity is dependent on the degree of representativeness and quality of the source information.

The pie charts on the left shows that the top 10 cancer types in both sexes account for over 60% of newly diagnosed cancer cases and cancer deaths. Lung cancer is the most commonly diagnosed cancer worldwide in 2022 (12.4% of the total cases), followed by cancers of the female breast (11.6%), colorectum (9.6%), prostate (7.3%), and stomach (4.9%). Lung cancer is also the leading cause of cancer death (18.7% of the total cancer deaths), followed by colorectal (9.2%), liver (7.8%), female breast (6.9%) and stomach cancer (6.8%).

There were two dedicated in-person launches of the 2022 estimates held in recent weeks.

The first on 15 January is an event for the Ambassadors of our 27 Participating States in Geneva for which each Participating State received a media package comprising fact sheets and specially recorded videos tailored to the cancer burden and cancer control in each of the individual countries. The second is a WHO/IARC press briefing which will be held on 30 January that is the official launch of the global cancer estimates for which experts from both IARC and WHO will present the highlights of the new estimates.

Biennial Report 2022–2023: Scientific highlights

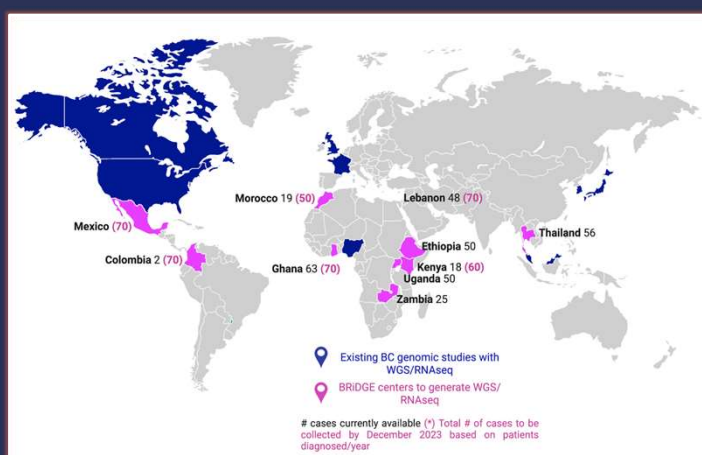
Pillar 2: *Understanding the causes*

The following slides present some scientific highlights from the Biennial Report 2022– 2023 for **Pillar 2 – understanding the causes**, that includes the Genomic Epidemiology (GEM) Branch, the Nutrition and Metabolism (NME) Branch, and the Laboratory support, Biobanking and services (LSB).

O-BRiDGE: Elucidating the GENomic effects of Obesity in BReast cancer. A closer look at low- and middle-income countries

The O-BRiDGE project aims to understand the genomic effects of obesity in DNA damage and DNA damage response (DDR) in breast cancer by conducting integrative genomic analyses of breast cancer patients from LMICs.

- The O-BRiDGE project is co-lead by Sandra Perdomo (GEM), Laure Dossus (NME) at IARC, CNRGH/CEA in France and Cornell University in the US.
- Collaborators in 10 countries in Latin America, Africa and Asia.
- 500 Breast cancer cases whole genome and RNA sequencing data with detailed information on demographics, anthropometric measurements, and histopathology.
- Project period 2024–2027
- Total funding: 890 000 EUR



Breast cancer (BC) is nowadays the most common malignancy and the leading cause of cancer-related mortality among women in all continents. The number of newly diagnosed BCs is projected to grow by over 40% in 2040. A particularly large relative increase will be seen in low- and middle-income countries (LMICs). This projection is solely due to the growth and aging of the population without accounting for the changes in cancer incidence due to prevalence of other associated risk factors including obesity.

Levels of overweight and obesity across LMICs have been increasing rapidly, affecting particularly women in the Middle East, North of Africa, and Latin America. Obesity has been shown to be a BC risk factor for many years. However, studies about the biological and genomic impact of obesity on breast cancer are limited. There is growing evidence demonstrating that obesity drives breast cancer development through biological mechanisms associated with increased levels of DNA damage and impaired DNA damage response (DDR). The burden of obesity in LMICs urges understanding the genomic bases of obesity driven BC in these populations systematically understudied.

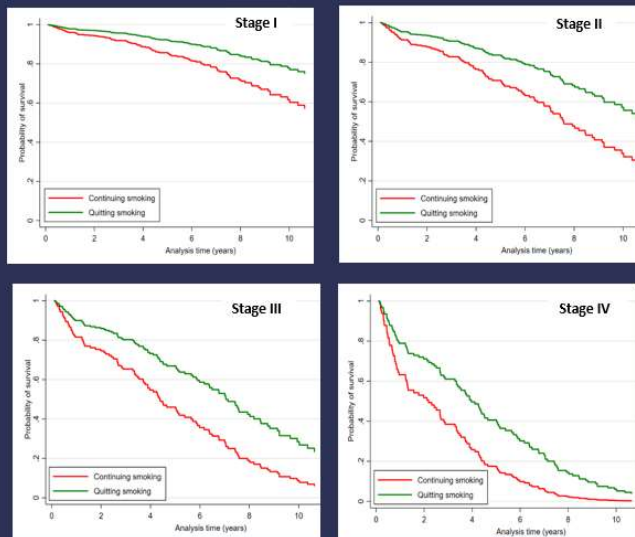
The O-BRiDGE project aims to understand the genomic effects of obesity in DNA damage and DDR in BC by conducting integrative genomic analyses of BC patients from LMICs. Using a comprehensive genomic analysis, GEM will combine whole genome and RNA sequencing data with detailed information on demographics, anthropometric measurements, and histopathology to elucidate the biological effect of obesity in breast cancer development associated with increased DNA damage and impaired DDR in LMICs.

The findings of this work will improve our understanding of the biological mechanisms of obesity as a risk factor for BC development. IARC's focus on women of LMICs where the burden of obesity and BC is increasing will provide additional relevant evidence for preventive interventions in these regions.

Smoking Cessation After Diagnosis of Kidney Cancer Is Associated With Reduced Risk of Mortality and Cancer Progression: A Prospective Cohort Study

Mahdi Sheikh MD, PhD¹; Anush Mukeriyar MD²; Hana Zahed MSc¹; Xiaoshuang Feng PhD¹; Hilary A. Robbins PhD¹; Oxana Shangina PhD²; Vsevolod Matveev MD²; Paul Brennan PhD¹; and David Zaridze MD, PhD²

- 15-year collaborative study between IARC and N.N. Blokhin National Medical Research Centre of Oncology, Russia.
- 212 current smoker patients with **kidney cancer** followed annually for 8 years after diagnosis.
- **Quitting smoking after diagnosis** vs. continued smoking was associated with:
 - 49% lower risk of overall death
 - 46% lower risk of cancer-specific death
 - 56% lower risk of cancer progression

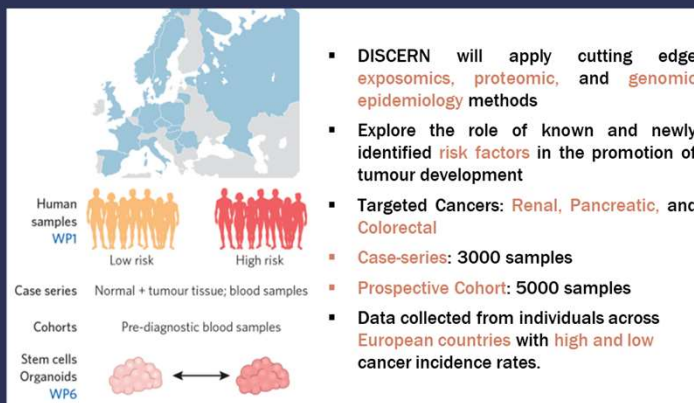


➢ The advantages of quitting smoking following a kidney cancer diagnosis were apparent across all stages of cancer

This study, in collaboration with the N.N. Blokhin National Medical Research Center of Oncology (Russian Federation), recruited 212 patients with primary renal cell carcinoma in 2007–2016 and showed that quitting smoking after diagnosis of renal cell carcinoma may significantly improve survival (HR, 0.51; 95% CI, 0.31–0.85) and reduce the risk of disease progression (HR, 0.45; 95% CI, 0.29–0.71) and of cancer mortality (HR, 0.54; 95% CI, 0.31–0.93) in patients who smoke.

DISCERN: Discovering the causes of three poorly understood cancers in Europe

- Recently Awarded European Commission grant co-lead by Paul Brennan head of the GEM branch at IARC.
- A European multinational consortium of 20 institutions under the coordination of IARC.
- DISCERN received a total of EUR 10M for 5 years (2023–2027)



- DISCERN will apply cutting edge exposomics, proteomic, and genomic epidemiology methods
- Explore the role of known and newly identified risk factors in the promotion of tumour development
- Targeted Cancers: Renal, Pancreatic, and Colorectal
- Case-series: 3000 samples
- Prospective Cohort: 5000 samples
- Data collected from individuals across European countries with high and low cancer incidence rates.



<https://discern.iarc.who.int/>

HORIZON-MISS-2021-CANCER-02

International Agency
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The Discovering the Causes of Three Poorly Understood Cancers in Europe (**DISCERN**) project was started in 2023 and is funded as part of the European Commission Cancer Mission initiative. The overall goal of DISCERN is to understand the causes of three poorly understood cancers in Europe – renal cancer, pancreatic cancer, and colorectal cancer – and to help explain the geographical distribution of these cancer types, including their high incidence in central and eastern Europe.

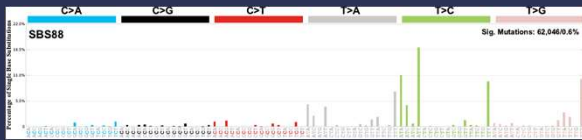
This will be achieved by combining large-scale European biorepositories comprising population-based cohorts and tumour case series with state-of-the-art exposomics and proteomics, as well as genomics technologies that analyse both normal and tumour tissue.

DISCERN will provide the critical evidence base required to develop new prevention strategies for these cancer types in Europe. DISCERN builds on ongoing pan-European initiatives including the European Human Exposome Network (EHEN), the Partnership for the Assessment of Risks from Chemicals (PARC), the Exposome-Powered Tools for Healthy Living in Urban Settings (EXPANSE) project, and the Mutographs project.

Mutational signatures in colorectal cancer from varying-incidence countries

Colorectal cancer is one of the most common cancers and is experiencing an alarming increase among younger individuals

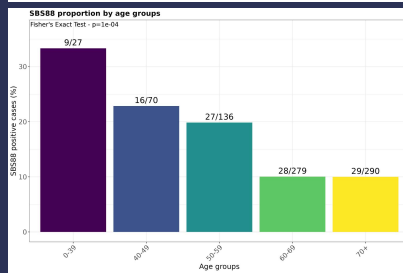
Colibactin signature (SBS88), resulting from *pks+* *Escherichia coli* exposure, has been associated with colorectal cancer tumorigenesis



CANCER GRAND CHALLENGES
MUTOGRAPHS

Biennial Report 2022–2023–Pillar 2 – GEM

Through whole-genome sequencing of **981 colorectal tumours** from **11 countries with varying incidence rates**, we identified several signatures, including **colibactin signature**



Colibactin signature had a higher prevalence in tumors from younger patients, showing a potential role in the increasing incidence of colorectal cancer in younger individuals

20

Mutographs is a Cancer Grand Challenges project that aims to understand the causes of five different cancer types across five continents by generating mutational signature profiles. The initial recruitment of about 6000 cases has been completed, and samples from 4000 cases have been successfully processed at IARC and sent to the Wellcome Sanger Institute (United Kingdom) for whole-genome sequencing. Genomic, exposure, and clinical data will be publicly available through the International Cancer Genome Consortium Accelerating Research in Genomic Oncology (ICGC ARGO) platform.

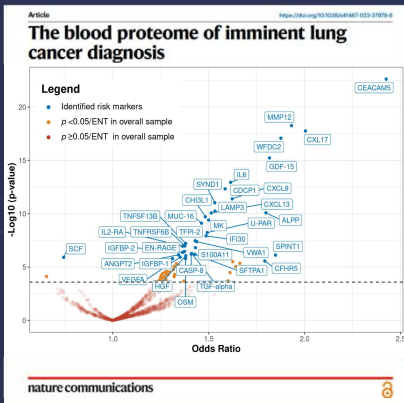
Through whole-genome sequencing of **981 colorectal tumours** from **11 countries with varying incidence rates**, GEM identified several signatures, including **colibactin signature**. **Colibactin signature (SBS88)**, resulting from *pks+* *Escherichia coli* exposure, has been associated with colorectal cancer tumorigenesis.

Colibactin signature had a higher prevalence in tumors from younger patients, showing a potential role in the increasing incidence of colorectal cancer in younger individuals.

The INTEGRAL programme: Optimizing early detection of lung cancer using circulating biomarkers

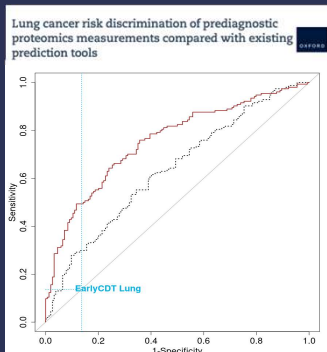
INTEGRAL (2018-2023)

The Lung Cancer Cohort Consortium, Nat Comm 2023



Lung cancer is preceded by altered levels of many circulating proteins

Feng et al, JNCI 2023



JNCI JOURNAL of the NATIONAL CANCER INSTITUTE

Proteins can improve lung cancer risk discrimination

INTEGRAL-AT (2023–2028)

- Funded by US NCI
- IARC budget: US\$ 3.3 million
- Implementation of biomarkers for LDCT screening eligibility
- Proteomics of lung cancer in never smokers



Biennial Report 2022–2023–Pillar 2 – GEM

7–9 February 2024

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The INTEGRAL program was a major US NCI funded initiative aiming to **develop biomarkers of lung cancer and improve lung cancer early detection** that finished in 2023. The overall budget was around US\$ 12 million and split across three projects, one of which was led by IARC in the GEM Branch.

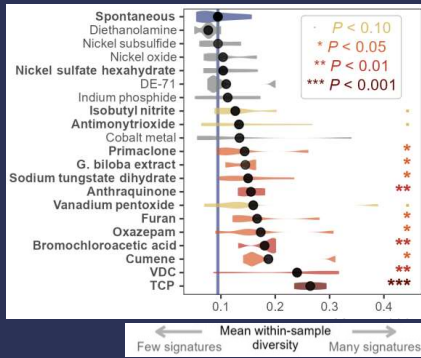
In the initial round of funding, IARC focused on identifying novel protein-biomarkers using state of the arts proteomics technologies (Olink Proteomics). Using prediagnostic blood samples from six cohorts from the **Lung Cancer Consortium (LC3)**, IARC identified **36 circulating proteins strongly associated with risk of lung cancer** (Nature communications, 2023). In a separate publication IARC demonstrated that these proteins provide substantial information on lung cancer risk over and above that afforded by detailed smoking information (JNCI 2023). Based on these results, IARC developed a customized lung cancer protein panel that can be used to measure absolute concentrations of 21 selected proteins at reasonable cost (60-100 euros per sample).

The INTEGRAL-AT program was funded in 2023 (to 2028) to continue the work of the initial INTEGRAL project. Within this project, IARC will develop a **clinical risk prediction model** based on 15 cohorts from the LC3 consortium that were assayed using the customized protein panel (1700 cases and 3000 controls using a case-cohort design). IARC will carry out implementation studies to evaluate the acceptability of using the customized protein panel in assessing eligibility for LDCT screening for individuals who are currently not eligible within a population-based screening program in Kentucky, US. IARC will also carry out a novel discovery analysis in never smokers to identify novel risk markers that are specific to lung cancer occurring in this group. The budget for the INTEGRAL-AT program is similar to the initial INTEGRAL-AT project (about US\$12 million) and IARC has a budget of about US\$ 3.3 million.

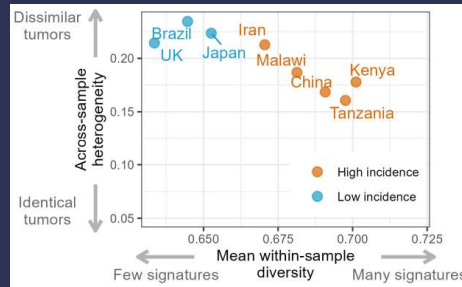
IARC is represented by Mattias Johansson and Hilary Robbins in the INTEGRAL and INTEGRAL-AT projects, and key partners include Christopher Amos from Baylor College in Houston, Rayjean Hung from Lunenfeld-Tanenbaum Research Institute in Toronto, Xihong Lin from Harvard, Boston.

Variability of mutational signatures is a footprint of carcinogens Do carcinogens cause DNA damage?

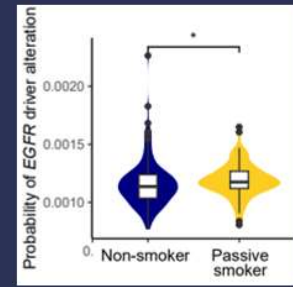
Mice exposed to 20 carcinogens
(Riva *et al.* 2020)



Esophageal SCC across continents
(Moody *et al.* 2021)



Lung cancer in never smokers
(Zhang *et al.* 2020)



Yes, most carcinogens leave a DNA footprint, increasing the diversity of mutational processes

Results encourage a re-examination of the genomic impact of numerous substances, potentially influencing carcinogen classifications and cancer prevention policies

Whether carcinogens cause DNA damage is one of the most fundamental question in oncology.

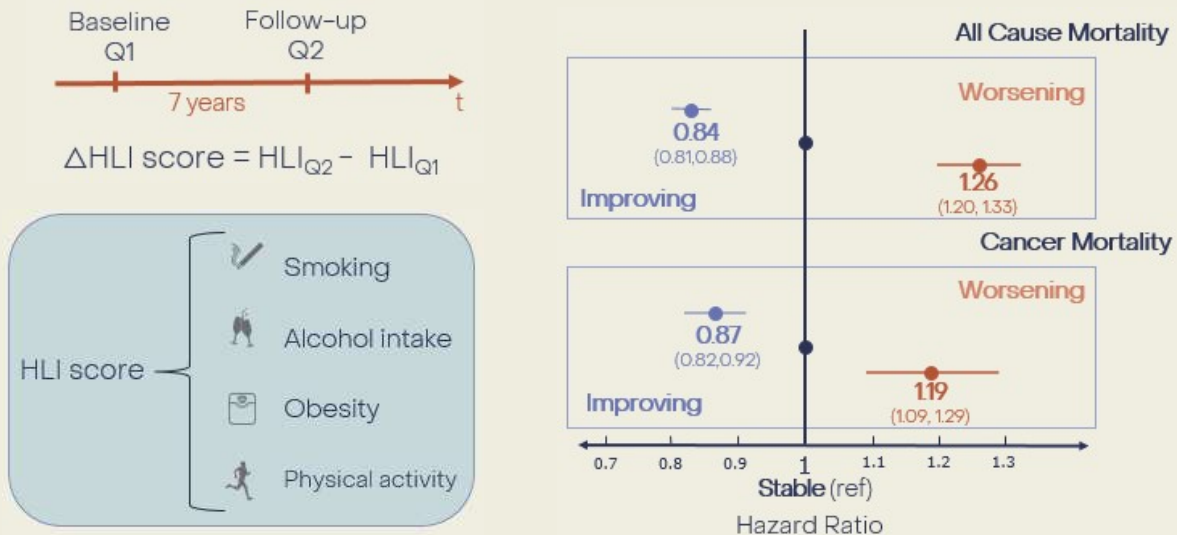
Researchers from the rare cancers genomics team applied a novel **statistical method** inspired from ecology and evolution to genomic data from four **major studies used to claim that carcinogens mainly cause cancer through non-genetic processes.**

They found that:

- contrary to the general belief, **most carcinogens do leave a footprint on DNA**, by increasing the diversity of mutational processes
- this increased diversity of mutational processes is **associated with the geographic incidence of cancer**
- tissues suffering diverse mutational processes were **more likely to gain cancer driver mutations**, such as EGFR mutations in never or passive smokers

These results encourage a re-examination of the genomic impact of numerous substances and introduce new tools for the analysis of the genomic effects of other substances, potentially influencing carcinogen classifications and cancer prevention policies.

Lifestyle changes and mortality



Biennial Report 2022–2023–Pillar 2 – NME

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Matta et al, BMC Medicine, 2024

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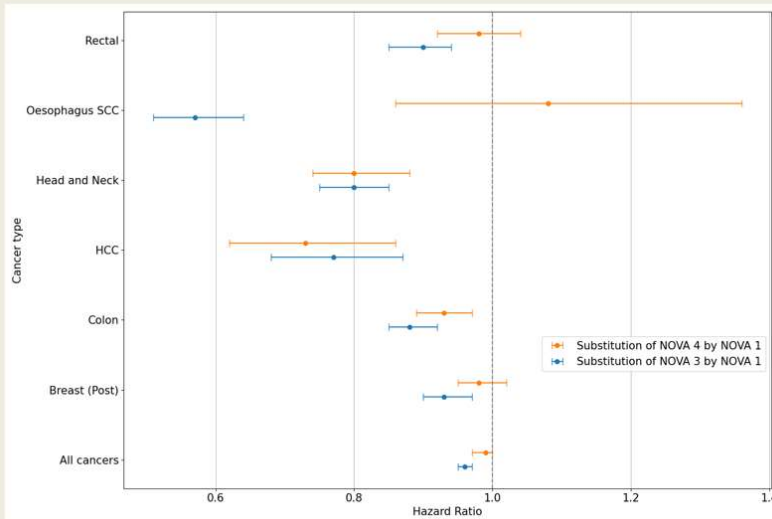
Leveraging longitudinal lifestyle assessments within EPIC, scientists in the NME branch assessed the associations between lifestyle changes and mortality. Changes in the lifestyle habits were evaluated by means of the Healthy Lifestyle Index, a composite score of participants' smoking history, alcohol intake, obesity and physical activity, assessed at baseline and during follow-up.

Compared to a stable lifestyle over time, improving the lifestyle was associated with 16% lower all-cause mortality and 13% lower cancer mortality.

Conversely, worsening HLI was associated with a 26% increase in all-cause mortality and 19% cancer mortality. Results were similar for women and men and were robust to potential reverse causation.

The study highlights the importance of studying multiple lifestyle factors combined, rather than isolating any individual habits. The results bring strong translational evidence that adopting a healthier lifestyle during adulthood is beneficial with respect to all-cause and cancer mortality.

Food processing and cancer risk in EPIC



N = 450 111

- Effect of replacing 10% of **processed foods (NOVA 3)** OR **ultra-processed foods (NOVA 4)** by 10% of minimally processed foods on cancer incidence

Replacing (ultra-) processed foods by minimally processed foods was **inversely associated** with the risk of overall cancer and several specific cancers

Kliemann et al, Lancet Planet Health, 2023

Biennial Report 2022–2023–Pillar 2 – NME

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Food processing has been hypothesised to play a role in cancer development.

This study investigated the association between dietary intake according to amount of food processing and risk of cancer at 25 anatomical sites using data from EPIC.

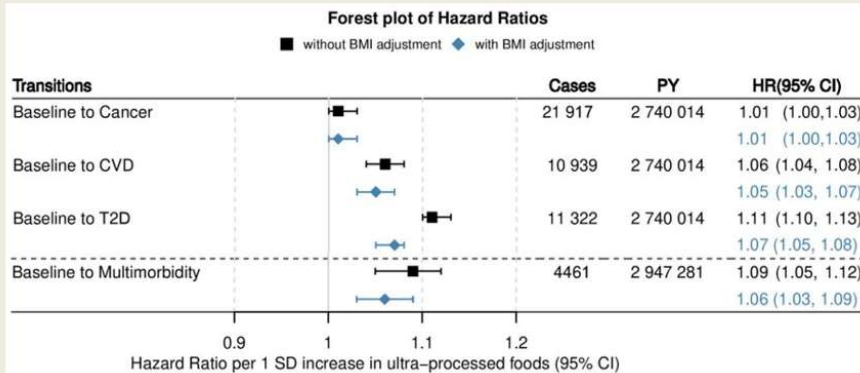
The NOVA classification system was used to estimate the amount of minimally processed food (NOVA1), of processed food (NOVA3) and of ultra-processed foods (NOVA4) for each study participant.

Replacing 10% of processed foods (NOVA 3) by minimally processed foods (NOVA 1) was associated with reduced risk of overall cancer, head and neck cancers, oesophageal squamous cell carcinoma, colon cancer, rectal cancer, hepatocellular carcinoma, and postmenopausal breast cancer. A 10% substitution of ultra-processed foods (NOVA 4) with 10% minimally processed foods (NOVA 1) was associated with reduced risks of head and neck cancers, colon cancer, and hepatocellular carcinoma.

These findings suggest that the replacement of processed and ultra-processed foods and drinks with an equal amount of minimally processed foods might reduce the risk of various cancer types.

Ultra-processed foods and risk of multimorbidity

- Among 266 666 men and women from EPIC, **ultra-processed foods** (UPF) was related to the risk of cancer and cardiometabolic (CDM) diseases
- UPF was also associated with **multimorbidity** (more than one chronic condition within a participant)



These findings can inform preventive strategies for reducing the risk of multimorbidity from cancer and CDM diseases

Consumption of ultra-processed foods and risk of multimorbidity of cancer and cardiometabolic diseases: a multinational cohort study

Articles

Cordova et al, *Lancet Regional Health – Europe*, 2023

The relationship was estimated between consumption of ultra-processed food and the risk of multimorbidity defined as the co-occurrence of at least two chronic diseases in an individual among first cancer at any site, cardiovascular disease, and type 2 diabetes.

Ultra-processed foods were defined according to the NOVA classification. These are foods that contain ingredients that people would not add when they cook homemade food. These additions may include colourings, sweeteners and preservatives that extend shelf life. Typical ultra-processed foods are mass-produced packaged breakfast cereals, biscuits, reconstituted meat products, instant noodles, as well as soft and/or sweetened carbonated drinks.

The study reported strong positive associations between ultra-processed foods and the risk of cancer, CVD and T2D. Associations are partially mediated by obesity.

These findings will inform on preventive strategies for reducing the risk of multimorbidity from cancer and cardiometabolic diseases.

Gut microbiome and hepatobiliary cancers (HBC)

Unhealthy dietary patterns



Microbiome dysbiosis



Translocation of pathogenic species

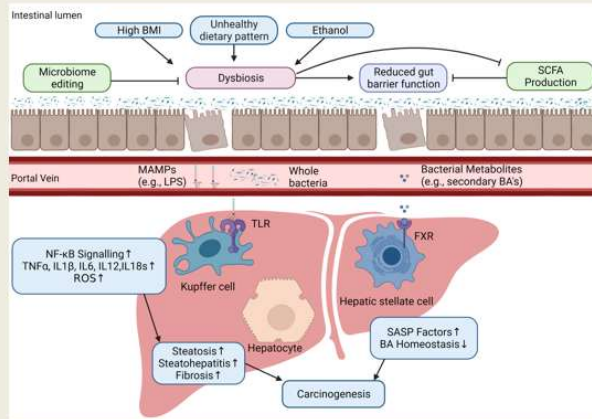


Metabolic dysfunction?



Hepatobiliary tumorigenesis?

Main Goal: Highlight the role of gut microbiome composition in HBC development



Active research to identify:

LC-MS metabolites of:

- gut microbiome composition and diversity
- gut barrier functionality

Daniel et al, Hepatology, 2023

NME scientists also described the impact of unhealthy dietary and lifestyle habits on altering the metabolism of the gut microbiome and promoting the growth of pathogenic species.


Gut microbiome dysbiosis can degrade the gut mucosal barrier, causing the leakage of highly inflammatory bacterial metabolites towards the liver, where they induce inflammation, hepatic fat accumulation and systemic metabolic dysfunction.


These biological processes may promote tumorigenesis in the hepatobiliary system and in distant anatomic sites. In the NME Branch, preliminary evidence showing HCC promoting role of bacterial derived endotoxins has been published. Ad hoc research is planned to identify bacterial-derived metabolites from LC-MS untargeted metabolomics to investigate the role of dysbiotic gut microbiome in cancer development.


This evidence will provide guidance on the role of healthy lifestyle habits to promote healthy gut microbiome and favour cancer prevention.

Are pre-diagnostic circulating lipids associated with colorectal cancer?

What we did

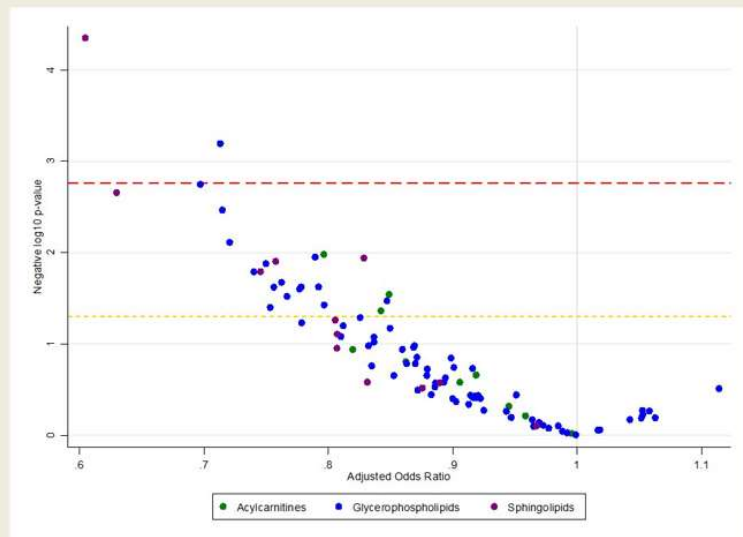
 Nested case-control study in the EPIC study

 N = 1,591 cases and 1,591 matched controls in EPIC

 Exposures: 97 pre-diagnostic lipids
Outcome: colorectal cancer risk

What we found

- **24 lipids** inversely associated with colorectal cancer
- **2 lipids** associated after Bonferroni:
 - **SM (OH) C22:2**
 - **PC ae C34:3**
- Consistent results after excluding early years of follow-up



Harewood et al, eBiomedicine, 2024

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Lipid dysregulation is an important factor in carcinogenesis, but the potential role of specific lipid metabolites in colorectal cancer development is unclear.

A large-scale prospective, nested case-control study was conducted within EPIC to investigate the associations between pre-diagnostic circulating levels of 97 lipid metabolites and colorectal cancer risk.

We identified two lipid metabolites, hydroxysphingomyelin (SM (OH)) C22:2 and acylalkylphosphatidylcholine (PC ae) C34:3, which were inversely associated with colorectal cancer risk after multiple comparisons correction.

These findings may provide insights into the role of lipid metabolism in colorectal cancer development.

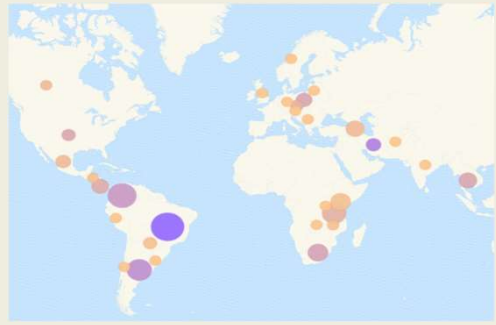
Laboratory Services and Biobank

Large international Biobank

Total number of samples registered: **6 030 521**
Total number of sample movements: **1 810 389**
Total number of projects registered: **395**
Total number of providing countries: **88**

Increased storage capacity: replacement of 38 liquid nitrogen tanks

- increased capacity to **840 goblets** from 720 per medium size tank; to **1320 goblets** from 810 per large size tank
- transfer of **~25 000 goblets (~ 4 200 000 samples)** from old tanks into the new ones during the move



IARC importation of biological samples (2018-2023), by geography



New LN2 tanks

LSB collaborates extensively with various research branches, adapting to specific project requirements, which can vary significantly from year to year. Facilitating global research initiatives, LSB receives and dispatches biological samples from numerous countries worldwide, having processed samples from 88 countries over the past five years.

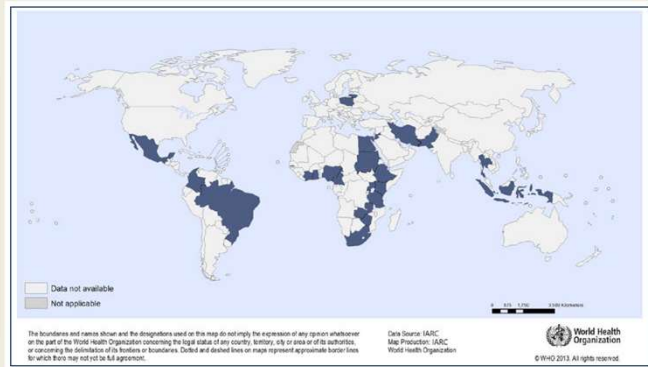
A substantial investment has been made in state-of-the-art laboratory equipment upon transitioning to the Nouveau Centre. The next strategic phase involves centralizing operations and concentrating on addressing data requirements, aligning with ongoing efforts by the Information Technology Services (ITS) at the Agency.

The current IARC biobank houses slightly over six million samples, with approximately two million accessed for research purposes. The recent addition of cutting-edge equipment not only augments our existing capabilities but also positions the Agency to efficiently cater to large cohorts and support international research endeavors involving biological samples for the foreseeable future.

IARC BCNet members

- Institutional membership
- Commit to conduct collaborative studies in areas of common interest
 - Agree to share expertise
- Develop common standards/protocols for LMICs
- When possible, will host other members and collaborators for training

39 institutions, 24 countries



BRAZIL: Banco de Células do Rio de Janeiro; Barretos Cancer Hospital; Instituto do Câncer do Estado de São Paulo/Fundação Faculdade de Medicina
CAMEROON: Faculty of Medicine and Biomedical Sciences, Université de Yaoundé; Université des Montagnes
COLOMBIA: Clínica de la Costa Ltda;
COTE D'IVOIRE: Institut Pasteur de Côte d'Ivoire; **EGYPT:** Aswan University; Children's Cancer Hospital Egypt – 57357; Faculty of Medicine, Cairo University; Integrated Biobank of Mansoura, School of Medicine, Mansoura University; Medical Research Institute, Ain Shams University; Medical Research Institute, Alexandria University; National Cancer Institute; National Liver Institute; Shifaa Al Orman Hospital, Luxor; South Egypt Cancer Institute, Assiut University; **ETHIOPIA:** Jigjiga University; **GHANA:** Breast Care International, University of Health and Allied Sciences; **INDONESIA:** Faculty of Medicine, Universitas Gadjah Mada; **IRAN:** Golestan Cancer Biobank; **JORDAN:** King Hussein Cancer Center Biobank; **KENYA:** Ampath Reference Laboratory; Maseno University; **LITHUANIA:** National Cancer Institute; **MEXICO:** Instituto Nacional de Cancerología; **NIGERIA:** College of Medicine, University of Ibadan; Irrua Specialist Teaching Hospital; Obafemi Awolowo University Teaching Hospitals Complex; **PAKISTAN:** Liaquat University of Medical Health and Sciences; Shaikat Khanum Memorial Cancer Hospital and Research Centre (SKMCH&RC); **POLAND:** Biobank Lab, Department of Molecular Biophysics, University of Lodz; Wrocław Research Centre EIT+ Biobank; **SOUTH AFRICA:** National Health Laboratory Service (NHLS), NHLS/Stellenbosch University Biobank; **SUDAN:** Institute of Endemic Diseases (IEND), University of Khartoum; Radio-Isotope Centre Khartoum; **THAILAND:** National Cancer Institute; **THE GAMBIA:** Medical Research Council (MRC) The Gambia Unit; MRC International Nutrition Group; **UGANDA:** Makerere University College of Health Sciences; **UNITED REPUBLIC OF TANZANIA:** Kilimanjaro Clinical Research Institute; **ZAMBIA:** Centre for Infectious Disease Research in Zambia; **ZIMBABWE:** African Institute of Biomedical Science & Technology; University of Zimbabwe College of Health Sciences.

To address the under-representation of biological resources in international research that come from low- and middle-income countries (LMICs), the LMICs Biobank and Cohort building network (BCNet; <https://bcnet.iarc.fr/>) was established by IARC in 2013. Currently, **39 institutions from 24 countries** are members of BCNet. During the last year, BCNet continued to provide information, expertise and to deliver presentations and training workshops to external collaborators (indicatively: Kenya, Indonesia, Philippines, Malaysia, AORTIC conference, etc.)

BCNet actions are funded by the Center for Global Health, National Cancer Institute, NIH, USA.

Impact of COVID-19 on Cancer (IMCOCA) – what went right

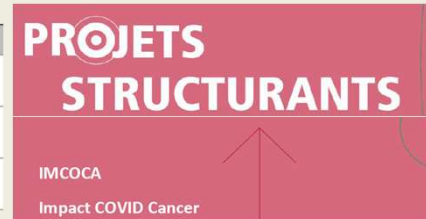
Examples of local adaptations to an evolving situation with lasting innovations for cancer care

- Interdisciplinary coordination was reinforced at the hospital level via COVID reflection cells, which helped to decide overall hospital policy and to collectively debate difficult cases;
 - Telemedicine was greatly expanded during the crisis;
- In the Lyon Metropole, it continues to be widely used in oncology care, including by different categories of professionals (oncologists, pharmacists, nurses).

Examples of new interdisciplinary coordination during the crisis

Type of professionals mobilized	Impact
Pharmacy; occupational physician; healthcare volunteers from other services to conduct vaccination campaigns	Fast and coordinated vaccination roll-out for healthcare professionals and vulnerable patients
Healthcare providers in certain sites/structures that did not take COVID patients	Patients could be received by other services in a large hospital group, enabling care not to be delayed
Interdisciplinary research teams (clinical trials)	Joint work from different research teams who worked together for the first time

Bogaert et al, PLOS Global Public Health, 2023

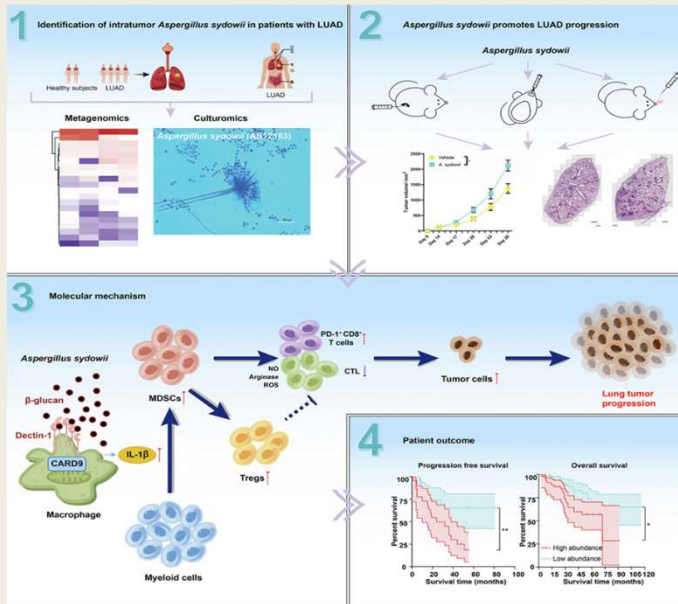


This is a keystone project (projet structurant) funded by CLARA in collaboration with the Centre Léon Bérard (CLB, Lyon), aimed at investigating the impact of COVID-19 on cancer.

A large number of guidelines issued in English and pre-vaccine availability (n=175) were systematically reviewed, together with any evidence that they were followed and how well.

The study underlined the capabilities of local actors to adapt to evolving situations, and that the means of doing so have in some cases delivered lasting innovations for local cancer care.

The effects of mycobiome on cancer



- The findings show that the presence and ratio of fungal species in cancer cells – the **intratumour mycobiome** – can, despite their low abundance, promote tumour progression by inducing an immunosuppressive microenvironment
- This study adds to the observations that the mycobiome, as well as the microbiome, contributes towards a microenvironment that plays a critical role in promoting tumour progression, by diverting human immune-suppressing responses

Liu et al, Cancer Cell, 2023

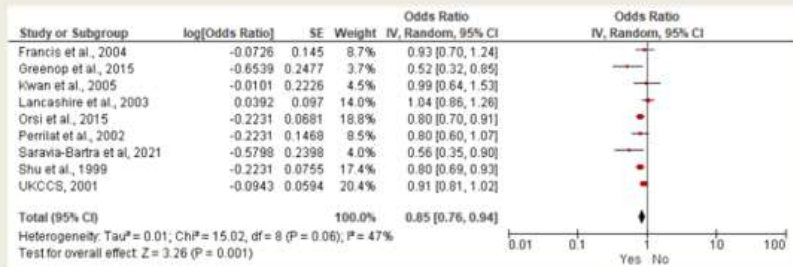
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In collaboration with Shanghai Jiao Tong University, IARC investigated the amount of fungus present in lung adenocarcinoma tissue and found that the abundance of fungi in tumour tissue was higher than that in matched non-tumour tissue. IARC also found that whereas the ratio of certain fungal species was similar in non-tumour tissues and some tumour tissues, more aggressive tumour subtypes had a greater difference in the relative proportion of these species. This finding suggests a potential correlation between fungal growth and the aggressiveness of lung adenocarcinoma. The study was published in Cancer Cell.

Investigating the effect of children nutrition on the microbiome and ALL



Random-effects model examining the association between breastfeeding (Yes versus No) and risk of childhood ALL

Note: the individual estimate (OR) from the studies is represented by the red box, and the black diamond represent the estimate of the meta-analysis

- Long-term collaboration between LSB, NME and Columbia University
- **Objective:** to examine the effects of both antenatal and postnatal nutrition on risk of developing acute leukaemia in children
- **Findings:**
 - the most abundant and conclusive evidence points to the **protective role of breastfeeding**
 - However, the reviewed studies did not provide sufficient evidence on the role of early diet in the development of childhood acute leukemia, revealing a knowledge gap that the study will address

Kintossou et al, Nutrients, 2023.

This work is a long-term collaboration between LSB, NME and Columbia University.

IARC examined the effects that both antenatal and postnatal nutrition may have on a child's risk of developing acute leukaemia, by examining the diets of mothers before the birth of their child and the diets of children during their first few years of life. These research studies were published in the journal *Nutrients* and in the *International Journal of Environmental Research and Public Health*.

The systematic review and analysis of literature relating to the diets of mothers-to-be during pregnancy noted that regular consumption of fruits and supplementation with folic acid during pregnancy are two factors that may offer protection against the development of acute leukaemia in children.

Biennial Report 2022–2023: Scientific highlights

Pillar 3:
*From
understanding
to prevention*

The following slides present some scientific highlights from the Biennial Report 2022–2023 for **Pillar 3 – from understanding to prevention**, that includes the Environment and Lifestyle Epidemiology (ENV) Branch, the Epigenomics and Mechanisms (EGM) Branch, and the Early Detection, Prevention and Infections (EPR) Branch.

Computed tomography (CT) during childhood or adolescence and the subsequent risk of cancer

- Cohort study in nine European countries with CT examination, data downloaded from radiology departments, following up for cancer incidence
- Around 900 000 children/adolescents with 6.9 million person-years under risk, with a total of 790 cases of haematological malignancies and 165 brain cancers
- Risk estimation:

Excess relative risk per 100 mGy:

Leukaemia/lymphoma 2.0 (1.1 – 3.1)

Brain cancers 1.3 (0.5 – 2.7)

- Confirms importance of dose adjustment



Bosch de Basea Gomez et al, Nat Med, 2023; Hauptmann et al, Lancet Oncol, 2023

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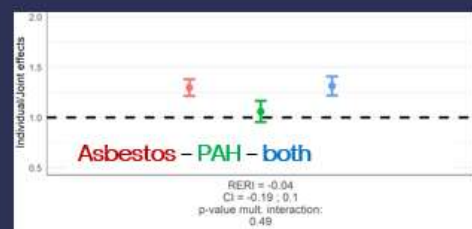
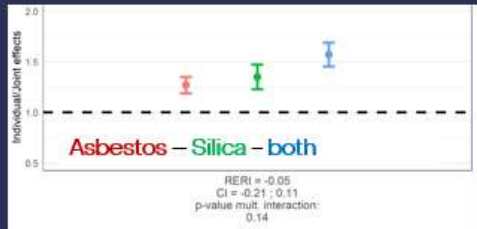
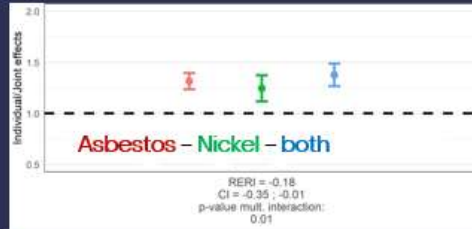
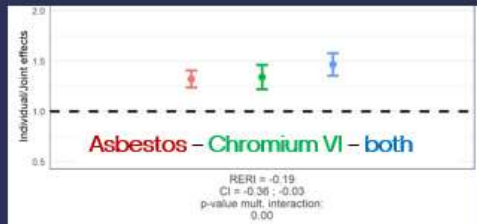
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Main results of the IARC coordinated and EU funded EPI-CT study were published last year in Nature Medicine (haematological malignancies) and in Lancet Oncology (brain cancers). The study used radiology department data from nine European countries to estimate organ-specific doses to ionizing radiation for children and adolescents with at least one computed tomography examination, with enrolling more than 900 000 persons accumulating almost seven million person-years at risk during follow up. An excess relative risk of 2 per 100 mGy bone marrow dose was observed for all haematological malignancies combined, corresponding for example to a 3-fold relative risk at 100 mGy.

A somewhat lower but still significantly increased excess relative risk per 100 mGy brain dose was also observed for brain cancers, of which most were gliomas. Attempts to adjust for that some of the CT examinations may have been conducted because of prodromal symptoms of the disease led to lower estimates but the associations remained robust and plausible.

While CT examinations remain important and even life-saving diagnostic tools, efforts need to be endorsed to do dose adjustment for children and adolescence for CTs with sufficient planning time, and CTs for other than medical reasons should be discouraged.

Joint effects of occupational lung carcinogens



Olsson et al, Environ Health Perspect, 2024

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Main results from the IARC coordinated SYNERGY project are reported in the slide. While much research has been done to identify individual workplace lung carcinogens, little is known about joint effects on risk when workers are exposed to multiple agents, which is often the case.

In this slide we show the effect of asbestos alone and together with chromium VI, nickel, silica, and PAH. The effect of two lung carcinogens is generally higher compared to the individual exposures, but with small or no deviations from additive or multiplicative effects.

These analyses includes almost 17 000 lung cancer cases and 21 000 control subjects from 14 case-control studies in Europe and North America

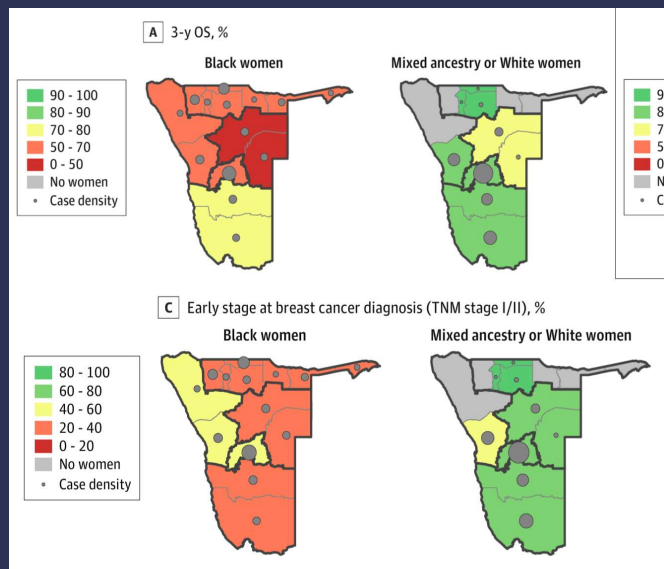
These results, as well as results by major lung cancer subtype and by smoking status, have recently been accepted for publication in the Environmental Health Perspectives.

ENV Activities Across Africa



- Cancers: Esophagus, Bladder, **Breast**, Childhood
- Wellcome-funded DELTAS-II network 60+ MSc, PhD, Postdoc
- Example: **ABC-DO**: Informing and implementing the the **WHO Global Breast Cancer Initiative (GBCI)**

GBCI KPI's in Namibia: ABD-DO



The ENV Branch has strong research activities in the field in Africa, including on esophageal cancer etiology, bladder cancer early detection with GEM, Childhood cancer and breast cancer. The Branch is also supporting a large Wellcome-trust funded African network of capacity building of over 60 scientists in cancer research.

The ABC-DO study, the African Breast Cancer Disparities in Outcomes study provides an excellent example of how IARC research has informed and can be used to evaluate the WHO Global Breast Cancer Initiative.

Here we can see the evaluation of GBCI key performance indicators (KPIs) in the Southern African country of Namibia. We see 3-year survival and stage at diagnosis, identifying race-specific needs across specific segments of the breast cancer journey.

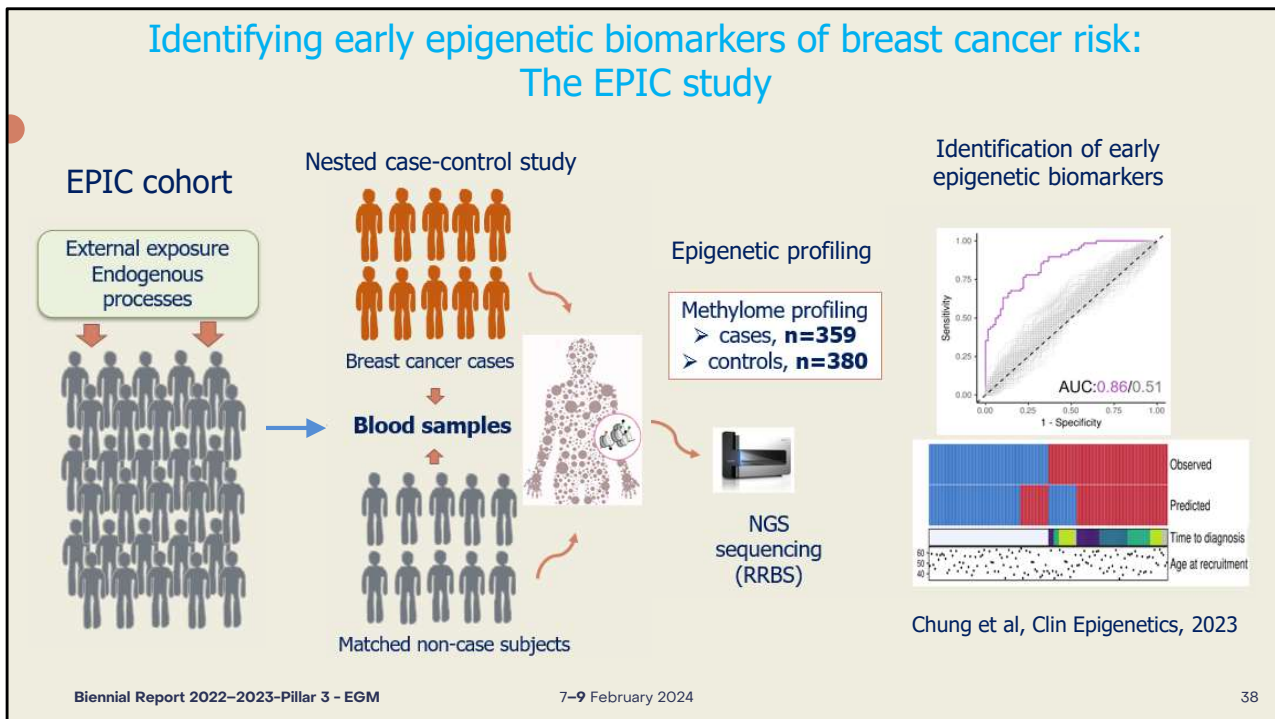
ENV Capacity Building in Africa

- US\$ 4 Million Wellcome Trust grant via **Science for Africa Foundation**
- Research infrastructure and personnel development
- 90 students MSc, PhD, Postdoctoral fellows
- Egypt, Ethiopia, Nigeria, Tanzania, South Africa, international partners: Germany and IARC



The ENV branch is also supporting a large Wellcome-trust funded African network of capacity building of over 90 scientists in cancer research, across master, PhD and postdoctoral fellows. The network involves Egypt, Ethiopia, Nigeria, Tanzania and South Africa, with a view to develop African led, African Administered research. IARC is supporting through teaching activities, supervision and hosting of several postdoctoral fellows.

Identifying early epigenetic biomarkers of breast cancer risk: The EPIC study

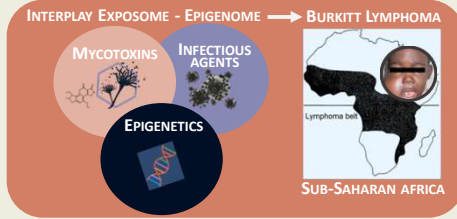


This study based on the prospective cohort EPIC (funded by EU TRANSCAN scheme) aimed at identifying of a panel of early epigenetic biomarkers of breast cancer risk. EGM performed genome-scale DNA methylation analysis of blood samples in a nested case-control study within the EPIC cohort and applied machine learning algorithms to develop a classifier model capable of discriminating between individuals who developed breast cancer (up to 13 years before clinical diagnosis) from those who did not.

The identification of early epigenetic biomarkers of breast cancer risk could serve as an important component of future risk stratification strategies, allowing for the development of personalized screening programmes that maximize benefit and equity, while minimizing harm and cost.

Assessment of epigenetic changes induced by mycotoxins and Epstein Barr virus underpinning Burkitt lymphoma development in children from Africa

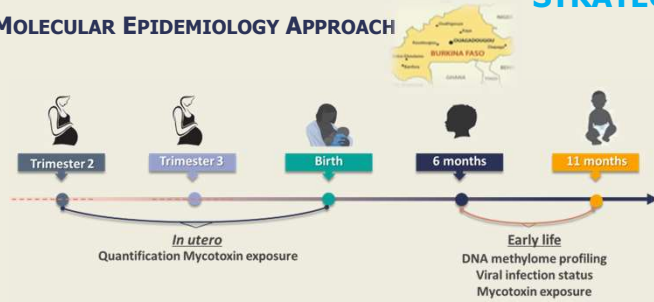
BACKGROUND



OUTCOMES

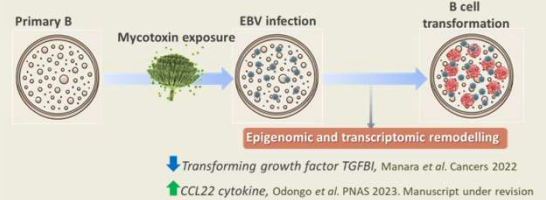
- Identification of risk factors of endemic Burkitt Lymphoma
- Mechanisms of carcinogenesis
- Biomarkers of exposures
- Identification of a synergistic impact of the mycotoxin Aflatoxin B1 and EBV on immune pathways and cancer related genes

MOLECULAR EPIDEMIOLOGY APPROACH



STRATEGY

IN-VITRO APPROACH



Biennial Report 2022–2023-Pillar 3 - EGM

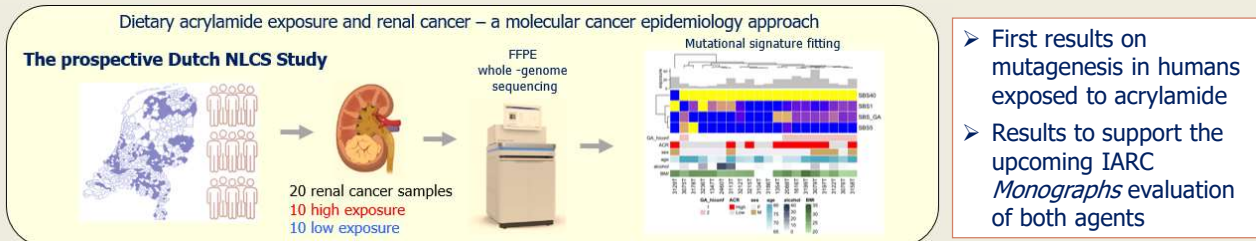
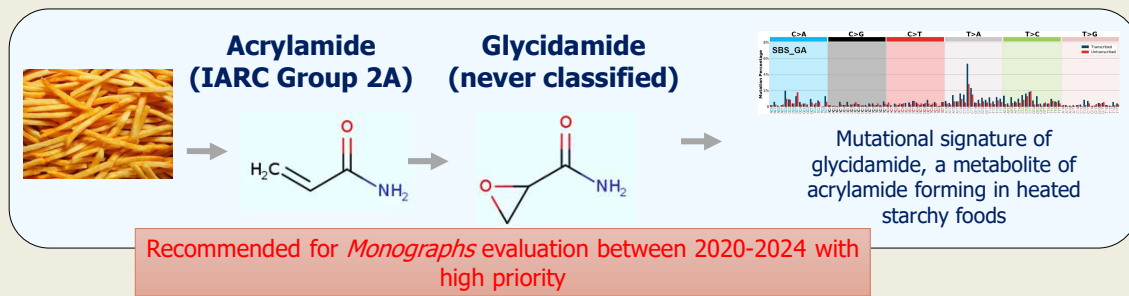
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A collaborative study between EGM and Belgian collaborations investigates the synergistic impact of early life exposure to mycotoxins and Epstein-Barr virus in the development of endemic Burkitt lymphoma, the most prevalent childhood cancer in sub-Saharan Africa.

To understand the role of these risk factors in endemic Burkitt lymphoma development and identify early epigenetic biomarkers, EGM studied the impact of those exposures on the epigenome using state of the art technologies and unique samples from endemic regions in Africa. EGM revealed so far a synergistic impact of the mycotoxin Aflatoxin B1 and EBV on cancer related pathways.

Dietary acrylamide and its role in renal cancer: the MODARC study



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This EGM's collaborative study MODARC, funded by WCRF International, focuses on renal cancer development following exposure to the dietary contaminant acrylamide, a probable human carcinogen (classified Group 2A by the IARC *Monographs* in 1994). Both acrylamide and its reactive metabolite glycidamide are on the **2020–2024 high-priority list for evaluation by the IARC *Monographs***. The MODARC study combined **innovative genome sequencing** from archived tissues from **the Netherlands Cohort Study on Diet and Cancer**, with **advanced analysis of mutational signatures**.

MODARC has generated first-of-its-kind results on acrylamide mutagenesis in human cancer. These will be likely considered in the planned re-evaluation and evaluation of both compounds by IARC *Monographs*.

Single-dose HPV vaccine and impact evaluation

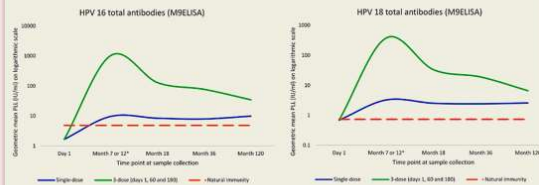
Evidence from IARC's Indian HPV vaccine study was one of the major evidence base underlying **WHO's single-dose recommendation** and its adoption in various countries. Based on the study outcomes, IARC evaluated **single-dose impact** using **evidence-based** and **context-responsive modelling**

Evidence from Indian IARC HPV vaccine study

High non-inferior efficacy against persistent HPV 16/18 infections in single-dose recipients¹

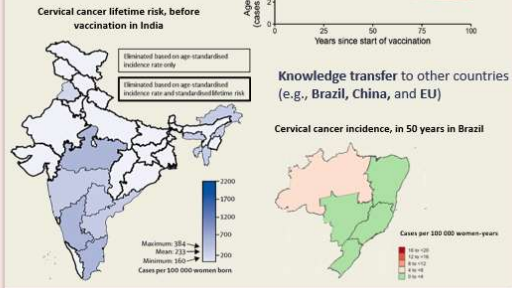


Durable antibody response in the single-dose recipients 10 years post-vaccination (>90% remained seroconverted against HPV 16/18)²



Evidence-based modelling

In India, single-dose vaccination is expected to **eliminate cervical cancer in 50 years**³ and **more cost-effective** than two-dose vaccination⁴



Biennial Report 2022–2023–Pillar 3 – EPR

7–9 February 2024

¹Lancet Oncol (2021); ²Vaccine (2023); ³Lancet Oncol (2022); ⁴BMJ Glob Health (2023)

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Evidence from IARC's Indian HPV vaccine study was one of the major evidence base underlying **WHO's single-dose recommendation** and its adoption in various countries. Based on the study outcomes, IARC evaluated **single-dose impact** using **evidence-based** and **context-responsive modelling**.

IARC found that a national single-dose HPV vaccination programme for girls in India could substantially reduce the incidence of cervical cancer, **to below the incidence rate set by WHO** as the threshold for the elimination of cervical cancer as a public health problem.

The threshold would be achieved both nationally and in each Indian state.

If introduced now, HPV vaccination would prevent close to **1 million cases of cervical cancer** over the lifetime of birth cohorts currently aged 10 years or younger.

Randomized controlled trial supported by NCI/NIH evaluating treatment options for cervical precancers

Objectives

- To develop a portable, battery-driven, handheld thermal ablation (TA) device
- To compare the treatment success of TA with cryotherapy and LLETZ for the treatment of cervical precancers in Lusaka, Zambia
- Study cost-effectiveness of TA over cryotherapy

Outcomes (unpublished data)

Randomized VIA +ve women (N=3124) eligible for ablative treatment

	Randomization arm				Chi ² p-value
	Thermal abl n (%)	Cryotherapy n (%)	LLETZ n (%)		
Overall (irrespective of HIV status)					
Participants randomized	1042	1041	1041		
Participants followed up one year after treatment	722 (69.3)	717 (68.9)	732 (70.3)		0.361
Participants with treatment success	534 (74.0)	510 (71.1)	522 (71.3)		0.405
Stratified by HIV status					
HIV -ve participants with treatment success		86.9%		83.9%	86.5%
HIV +ve participants with treatment success		62.7%		60.9%	62.6%

Conclusions

- TA had similar treatment success rate compared to cryotherapy and LLETZ
- Poor treatment success rate among women living with HIV, regardless of treatment modality used
- TA is cost-effective, compared to cryotherapy and LLETZ
- TA is well accepted by providers and participants
- TA was recommended by WHO based on earlier data from our study
- The final results of this large RCT will strengthen the recommendation

Pinder et al, Lancet Oncol, 2020

Presented at the IPVS 2023 and AOGIN India 2023 conferences

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EPR reports the pilot phase of a randomized controlled trial in routine screen-and-treat clinics providing cervical screening using visual inspection with acetic acid (VIA) in Lusaka, Zambia. The objectives of this randomized controlled trial were:

- To develop a portable, battery-driven, handheld thermal ablation (TA) device
- To compare the treatment success of TA with cryotherapy and LLETZ for the treatment of cervical precancers in Lusaka, Zambia
- Study cost-effectiveness of TA over cryotherapy

Non-pregnant women aged 25 years or older, who were eligible for ablative therapy were recruited. Participants were randomly assigned (1:1:1) to thermal ablation, cryotherapy, or large loop excision of the transformation zone (LLETZ), using computer-generated allocation. The primary endpoint was treatment success, defined as either human papillomavirus (HPV) type-specific clearance among participants who were positive for the same HPV type at baseline, or a negative VIA test at 6-month follow-up, if the baseline HPV test was negative. Per protocol analyses were done. Enrolment for the full trial is ongoing. Here, findings are presented from a prespecified pilot phase of the full trial. The final analysis of the full trial will assess non-inferiority of the groups for the primary efficacy endpoint.

Results from this pilot study preliminarily suggest that thermal ablation has similar treatment success to cryotherapy, without the practical disadvantages of providing cryotherapy in a low-and middle-income country (LMIC). However, the study was not powered to establish the similarity between the techniques, and results from the ongoing randomised controlled trial are needed to confirm these results.

CanScreen5: Global data repository to support cancer screening programmes

Objectives

- Collect data on Cancer Screening programme policies, protocols & characteristics
- Harmonize and collect screening programmes data to assess key performance indicators
- Build capacity of programmes to improve quality through systematic data collection



Hybrid training for program managers

Improving the Quality of Cancer Screening



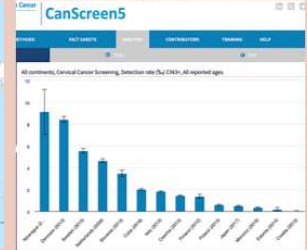
Interactive platform to submit & visualize screening data

- 25 parameters describing programme organization
- 7 Key performance indicators for breast, cervical & CRC screening
- Data collected from 84 countries published in 2023

Cervical cancer screening tests included in protocol in different countries



Detection rate of CIN 3+ from cervical screening programmes



Cancer Screening in 5 continents (CanScreen5) is a global data repository to support cancer screening programmes.

It reports the status and performance of breast cancer ($n = 57$), cervical cancer ($n = 75$), and colorectal cancer ($n = 51$) screening programmes in 84 countries in 2023.

Data collected mainly from the Ministry of Health in each country, using a harmonized set of criteria and indicators, were made publicly available through a web-based portal.

The CanScreen5 framework involves a training programme organized by IARC, geared towards imparting foundational cancer screening principles and quality improvement. Training of trainers was provided to 44 countries (17 in Africa and 27 in the Community of Latin American and Caribbean States [CELAC]), with participants nominated by each country's health authorities.

Assessment of capacity of health systems to deliver HPV detection based cervical screening: CBIG-SCREEN implementation research project in Europe

Objectives

- Development of protocol & tools to assess capacity of health systems to roll out HPV detection-based screening
- Pilot implementation of the protocol & tools to assess health systems capacity in Estonia, Portugal, and Romania

Methods

A three-step capacity assessment protocol was developed to evaluate the capacity to roll out HPV detection-based screening in each country. These steps are:

- Desk review of cervical screening policies and governance, screening protocols, information system, and quality assurance
- Facility visit to screening, and colposcopy & treatment centres by a trained team
- Interview of key informants (macro and meso level stakeholders)

Based on observations from the assessment, country-specific readiness scores were ascribed across different components of screening services

Key Outcomes

Spider graphs depicting the readiness scores for screening services in Estonia, Portugal and Romania.

[These scores indicate the readiness and capacity of the country to deliver the respective services as part of the cervical screening process]

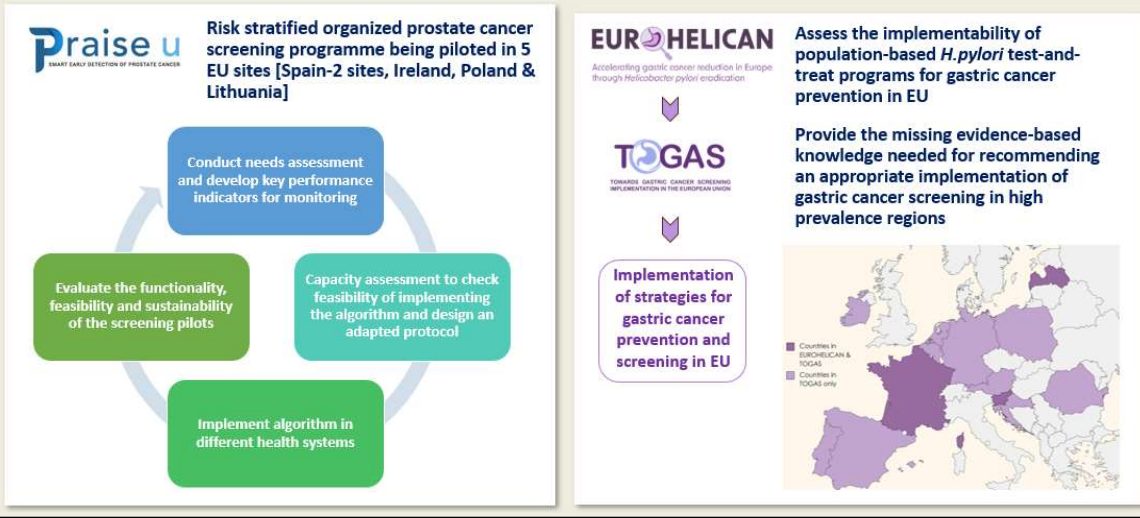


EPR leads a work package to implement cervical cancer screening strategies for vulnerable women in the European Union as part of the CBIG-SCREEN project. CBIG-SCREEN, which was launched on 26 March 2021, is coordinated by the French National Institute of Health and Medical Research (Inserm) with partners including local health authorities, experts in public health and epidemiology, regional cancer institutes, and cancer societies in different European countries.

Screening programmes significantly reduce mortality from cervical cancer, but they remain largely inaccessible and underutilized by vulnerable subpopulations of women, resulting in inequalities in the European health-care system. Cervical cancer is the third most common gynaecological cancer and the second most common in women younger than 45 years. In Europe, more than 61 000 women are diagnosed with cervical cancer per year and almost 26 000 of them will die from the disease. CBIG-SCREEN aims to improve access to and provision of cervical cancer screening to vulnerable groups of women. The vulnerable subpopulations that the project will focus on are women of low socioeconomic status, women living with HIV or other sexually transmitted diseases, incarcerated women, sex workers, and migrants who may not have had access to cancer screening in their country of origin and find it difficult to navigate health-care systems in their new homes.

Extending population-based screening programmes to prostate and gastric cancers in Europe – IARC role in the pilots

2022 EU Council Recommendations
 2.2 Extend PSA screening in combination with MRI as a follow up test
 2.3 Extend population-based screen and treat programmes for *H. pylori* for high prevalent areas



IARC is involved in pilot projects to extend population-based screening programmes to prostate and gastric cancers in Europe.

The European Association of Urology, together with consortium partners, has launched PRAISE-U (Prostate Cancer Awareness and Initiative for Screening in the European Union), a project involving 25 institutions across 12 countries that is funded under the EU4Health program. In line with the recommendation, the PRAISE U Project aims to evaluate early detection and diagnosis of prostate cancer through customised and risk-based screening programmes with the goal to align protocols across EU Member States.

Gastric cancer remains a major challenge to public health on a global scale. In Europe, there is a significant geographical variation in *Helicobacter pylori* (*H. pylori*) related gastric cancer incidence with the regions of Central and Eastern Europe having the highest burden. *H. pylori* is the main cause of infection-related cancer worldwide, responsible for 89% of non-cardia gastric cancers. Considering its absolute burden and persisting disparities, gastric cancer is a logical target for urgent action on prevention.

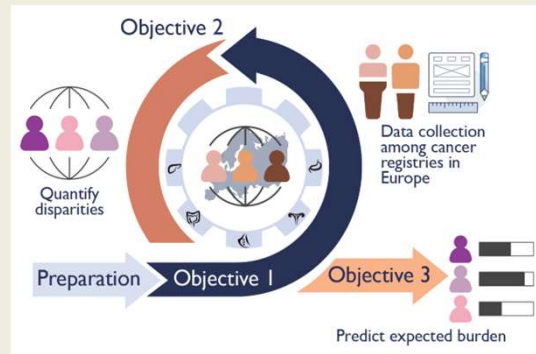
Population-based *H. pylori* test- and treat has therefore been proposed as a strategy for gastric cancer prevention supported by the latest European and International recommendations and Europe’s Beating Cancer Plan 2023–2033. However, no country has yet implemented the strategy for gastric cancer prevention. Some of this inaction may reflect lingering doubts about the feasibility and acceptability of such a strategy at the population level and uncertainty about possible short- and long-term adverse consequences of mass antibiotic treatment. In addition, there is no available guidance on how to best implement it and how to evaluate the programmes for successful implementation.

Co-funded by the EU, the Accelerating Gastric Cancer Reduction in Europe through *H. pylori* Eradication (EUROHELICAN) project aims to assess the feasibility of population-based *H. pylori* test-and-treat strategies. The results of the EUROHELICAN project will aid policy-makers in incorporating the population-based *H. pylori* test-and-treat strategy into their health-care priorities for gastric cancer prevention.

IARC launched a new project focused on the implementation of gastric cancer prevention strategies in the European Union (EU) in Riga, Latvia, on 30 March 2023. This major EU initiative, known as the Towards gastric cancer screening implementation in the European Union (TOGAS) project, aims to provide the missing evidence base for effective gastric cancer prevention in the EU by assessing the needs of EU Member States and target populations in gastric cancer prevention, evaluating various gastric cancer prevention strategies for implementation in the EU by conducting pilot studies in different countries, and ensuring the sustainability and scale-up of the TOGAS results by global dissemination of information.

Cancer Radar

- Aim: **Monitoring the impact** of cancer prevention among individuals with migration background
- **Setting:** Europe (expand to other settings)
- **Partners:** IACR, IARC-WHO, Amsterdam UMC, and cancer registries in Europe
- Support **public health decision making** and **stakeholder's actions**
- Improve the health of migrants



▪ Phases of the project:

Collect cancer risk stratified by birth-country (2023–2024) ← now

Quantify disparities by migration background (2024–2025)

Predict expected and preventable burden (2024–2027)

The aim of the RADAR project is to provide a Europe-wide quantification of the current and future expected disparities of infection-related cancers among migrants and translate these findings together with stakeholders into action.

Biennial Report 2022–2023: Scientific highlights

Pillar 4:
*Knowledge
Mobilization*

The following slides present some scientific highlights from the Biennial Report 2022– 2023 for **Pillar 4 – knowledge mobilization**, that includes the Evidence Synthesis and Classification (ESC) Branch (*under review this year*), and the Learning and Capacity Building (LCB) Branch.

IARC Handbook Vol. 20A - Reduction or Cessation of Alcohol Consumption

In collaboration with WHO Regional Office for Europe (WHO EURO)

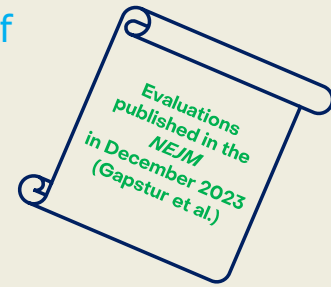
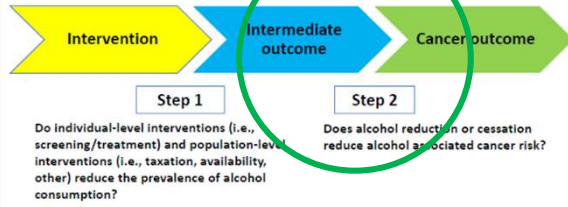


Figure 1. Analytical framework for review of the evidence - Primary prevention

Evidence that the intervention prevents cancer by way of an intermediate outcome (reducing exposure to a risk factor or increasing exposure to a preventive factor)



- Step 1: Volume 20B - Alcohol Control Policies (7 to 11 October 2024)
- **Step 2: Volume 20A - Reduction or Cessation of Alcohol Consumption (22 to 26 May 2023)**

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Strength of the Evidence that Alcohol Reduction or Cessation Reduces Alcohol-Related Cancer Risk

Cancer Site	Strength of the Evidence
Oral cavity	Sufficient
Esophagus	Sufficient
Larynx	Limited
Colorectum	Limited
Breast	Limited
Pharynx	Inadequate
Liver	Inadequate

The IARC Handbooks Programme (IHB) is responsible for producing the *IARC Handbooks of Cancer Prevention*. The *IARC Handbooks* evaluate interventions and strategies for primary and for secondary cancer prevention.

In 2020, request from WHO-EURO to prepare a Handbook on alcohol control. Based on the evaluation framework for primary intervention with an intermediate outcome described in the new Preamble, 2 steps were needed, **step 2 first**, and then step 1 (shown on the slide), in 2 consecutive Handbooks.

Step 2 is Volume 20A and step 1 is Volume 20B.

In 2023 IHB has completed Volume 20A, and the evaluations have been published in the New England Journal of Medicine on 28 December 2023.

IHB evaluated the association between reduction or cessation of alcohol consumption at the seven alcohol-related cancer sites: oral cavity, pharynx, larynx, esophagus, colon, liver and breast. IHB also reviewed and evaluated the mechanisms of alcohol-related carcinogenesis that could be reversed upon cessation.

Overall, there is sufficient evidence for a reduction in cancer risk upon cessation or reduction of alcohol consumption at two sites, for cancers of the oral cavity and of the oesophagus. This is strong enough a message to disseminate widely (even if limited or inadequate for other sites).

Step 2, i.e. Volume 20B, is funded by WHO-EURO, and planning has started with a Scoping Meeting in November 2023.

The full volume of HB19 on oral cancer prevention has also been published in 2023.

IARC Monographs Programme (IMO)

Aim: identify preventable causes of human cancer through systematic review and expert evidence evaluation

Scientific accomplishments in 2023

- Held *Monographs* meetings 133, 134, 135 and Scientific Workshop
- New or updated classifications for nine agents:
 - ✓ **Group 1:** Perfluorooctanoic acid (PFOA)
 - ✓ **Group 2A:** 2-bromopropane, methyleugenol
 - ✓ **Group 2B:** anthracene, aspartame, butyl methacrylate, dimethyl hydrogen phosphite, isoeugenol, perfluorooctane sulfonic acid (PFOS)

IARC MONOGRAPHS VOL. 133
 ANTHRACENE, 2-BROMOPROPANE, BUTYL METHACRYLATE, AND DIMETHYL HYDROGEN PHOSPHITE
 (28 February to 7 March 2023)

Group 2A	Group 2B	Group 2B	Group 2B
2-Bromopropane	Anthracene	Butyl methacrylate	Dimethyl hydrogen phosphite
Group 2A Previously classified as Group 2B	Group 2B Previously classified as Group 2B	Group 2B Previously classified as Group 2B	Group 2B Previously classified as Group 2B

MAIN ISSUES

- Group 2A: Review of epidemiological and toxicological data on 2-bromopropane, including its metabolites, and its potential for genotoxicity.
- Group 2B: Review of epidemiological and toxicological data on anthracene, butyl methacrylate, and dimethyl hydrogen phosphite, including their potential for genotoxicity.

EXPOSURE

- 2-bromopropane: Used in various industrial processes, including the production of brominated flame retardants and as a solvent.
- Anthracene: Found in coal tar, fossil fuels, and as a component of polycyclic aromatic hydrocarbons (PAHs).
- Butyl methacrylate: Used in the production of acrylic resins and coatings.
- Dimethyl hydrogen phosphite: Used as a flame retardant in various polymers.

IARC MONOGRAPHS VOL. 134
 ASPARTAME, METHYLEUGENOL, AND ISOEUGENOL
 (6-13 JUNE 2023)

Group 2B	Group 2A	Group 2B
Aspartame	Methyleugenol	Isoeugenol
Group 2B Previously classified as Group 2B	Group 2A Previously classified as Group 2B	Group 2B Previously classified as Group 2B

MAIN ISSUES

- Aspartame: Review of epidemiological and toxicological data on aspartame, including its potential for genotoxicity.
- Methyleugenol: Review of epidemiological and toxicological data on methyleugenol, including its potential for genotoxicity.
- Isoeugenol: Review of epidemiological and toxicological data on isoeugenol, including its potential for genotoxicity.

EXPOSURE

- Aspartame: Used as a sweetener in various food and beverage products.
- Methyleugenol: Found in various essential oils and spices.
- Isoeugenol: Found in various essential oils and spices.

IARC MONOGRAPHS VOL. 135
 PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANESULFONIC ACID (PFOS)
 (7-18 NOVEMBER 2023)

Group 1	Group 2B
Perfluorooctanoic acid (PFOA)	Perfluorooctanesulfonic acid (PFOS)
Group 1 Previously classified as Group 2B	Group 2B Previously classified as Group 2B

MAIN ISSUES

- PFOA: Review of epidemiological and toxicological data on PFOA, including its potential for genotoxicity.
- PFOS: Review of epidemiological and toxicological data on PFOS, including its potential for genotoxicity.

EXPOSURE

- PFOA: Used in various industrial processes, including the production of fluoropolymer coatings.
- PFOS: Used in various industrial processes, including the production of fluoropolymer coatings.

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The IARC Secretariat held three *Monographs* meetings in 2023 (meetings 133, 134, 135) and Scientific Workshops.

New or updated classifications were achieved for nine agents, as below:

- ✓ **Group 1:** Perfluorooctanoic acid (PFOA)
- ✓ **Group 2A:** 2-bromopropane, methyleugenol
- ✓ **Group 2B:** anthracene, aspartame, butyl methacrylate, dimethyl hydrogen phosphite, isoeugenol, perfluorooctane sulfonic acid (PFOS)

IARC Monographs Programme (IMO)

Scientific accomplishments in 2023

- Joint communication on aspartame cancer hazard identification and risk assessment with WHO/JECFA, 14 July 2023
- Published three articles in *The Lancet Oncology*
- Published two *Monographs* volumes
 - ✓ v.131: Cobalt, antimony compounds, and weapons-grade tungsten alloy
 - ✓ v.132: Occupational exposure as a firefighter
- Other activities:
 - Scientific Workshop on Key-Characteristics-associated end-points for evaluating mechanistic evidence of carcinogenic hazards, July 2023



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IARC and WHO/JECFA issued a joint communication on aspartame on 14 July 2023. IARC assessed cancer hazard identification while WHO/JECFA conducted a risk assessment.

The *Monographs* Programme published three articles in *The Lancet Oncology*, and two *Monographs* volumes, as below:

- ✓ v.131: Cobalt, antimony compounds, and weapons-grade tungsten alloy
- ✓ v.132: Occupational exposure as a firefighter

Among other activities, the *Monographs* Programme organized a Scientific Workshop in July 2023 on Key-Characteristics-associated end-points for evaluating mechanistic evidence of carcinogenic hazards.

WHO Classification of tumours



Aims to strengthen global cancer care and research through its publications

1. 'WHO Classification of Tumours (WCT)' based on new research evidence on cancer
2. 'Cytopathology Reporting Systems'

IC3R collaboration and EVI MAP projects were initiated to generate evidence for the WCT 6th edition and for translation of cancer research findings into practice

The work of the WHO Classification of Tumours Programme (WCT) encompasses the *WHO Classification of Tumours* series (also known as the WHO Blue Books), the *IAC-IARC-WHO Cytology Reporting Systems* series, the IARC histopathology laboratory, and the International Collaboration for Cancer Classification and Research (IC³R).

The WHO Classification of tumours programme aims to strengthen global cancer care and research through its publications:

1. 'WHO Classification of Tumours (WCT)' based on new research evidence on cancer
2. 'Cytopathology Reporting Systems'

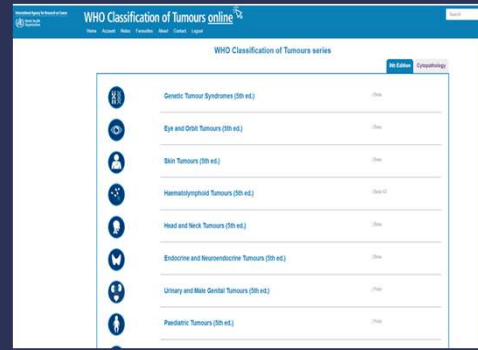
IC3R collaboration and EVI MAP projects were initiated to generate evidence for the WCT 6th edition and for translation of cancer research findings into practice. Mapping the Evidence for the WHO Classification of Tumours: a Living Evidence Gap Map by Tumour Type (EVI MAP) includes an international consortium of five European institutions and one additional international partner, coordinated by WCT. The initiative will enable the identification of evidence gaps, strengths, and weaknesses in the entire spectrum of human tumour classifications, to build a solid framework for future evidence-based pathology practice and research on tumour classification. It aims to inform the WCT editorial process for the upcoming editions of the WHO Blue Books, by creating dynamic interactive evidence maps for human tumours.

WHO Classification of tumours

WCT books in Print



WCT books Online



Cytopathology Reporting Systems in Print



... and 38 journal publications including review articles and research papers

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During the 2022–2023 biennium, the following volumes were published in print (these are also available on the WHO Classification of Tumours Online website; <https://tumourclassification.iarc.who.int/>):

- *Central Nervous System Tumours*, fifth edition (2022)
- *Urinary and Male Genital Tumours*, fifth edition (2022)
- *Paediatric Tumours*, fifth edition (Part A and Part B) (2023).

WCT initiated a dialogue with the International Academy of Cytology (IAC) in 2019, to develop IAC-IARC-WHO reporting systems for cytopathology. The aim of this series is to harmonize cytopathology reporting across different body sites at a global level. The first two volumes – for lung cytopathology and pancreaticobiliary cytopathology – have been published.

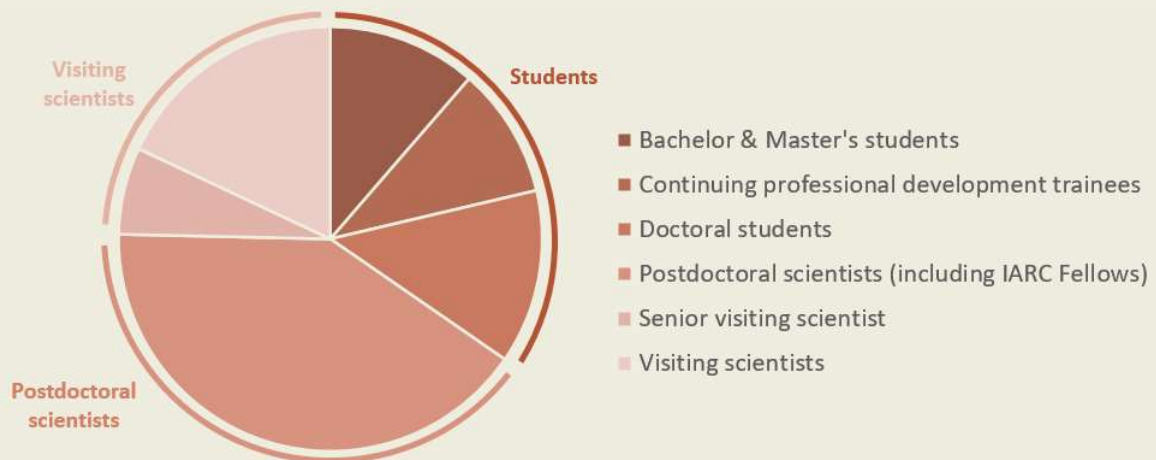
The following volumes were made available on the WHO Classification of Tumours Online website as beta versions:

- *Head and Neck Tumours*, fifth edition
- *Endocrine Tumours*, fifth edition
- *Haematolymphoid Tumours*, fifth edition
- *Skin Tumours*, fifth edition
- *Eye and Orbit Tumours*, fifth edition
- *Genetic Tumour Syndromes*, fifth edition

These six web-based volumes are in various stages of print production. *Head and Neck Tumours* and *Haematolymphoid Tumours* are intended to be produced by the end of 2023 and the rest during 2024.

IARC Research Training and Fellowship Programme

In 2023, **over 200 students, postdoctoral and visiting scientists**, funded from IARC Branches grants or IARC Fellowships



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The IARC Research Training and Fellowship Programme offers researchers at different levels of their career opportunities to get trained at IARC through their participation in collaborative research projects.

Those Early Career and Visiting Scientists (ECVS) are supported either by project funds from IARC Groups or by IARC Fellowships.

Over 200 ECVSs were hosted at IARC in 2023, among which over 70 postdoctoral scientists.

IARC Fellowships - LMICs

October 2022 call – selection 2023

Post-doctoral fellowships

- For postdoctoral scientists wanting to pursue research relevant to IARC's missions
- Last **two years** starting Autumn 2023
- Six funded on RB + two focusing on childhood cancers, supported by Children with Cancer UK
- **Nine fellows awarded** (2 one-year fellowships)

Mid-career scientist awards

- For senior scientists in their mid-career
- **Three awards**
- For a period of **five to nine months**

→ Post-doctoral fellowships

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, for the Call 2022. 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 by IARC a 1-year fellowship, 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.

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 award of two fellowships to scientists who will carry out research on paediatric cancers or cancer in teenagers and young adults.

Overall, the Agency awarded nine IARC Postdoctoral Fellowships to candidates from low- and middle-income countries (LMICs)

→ Mid-career scientist award

With the support of the Scientific and Governing Councils, it was decided in 2020 to discontinue the IARC Senior Visiting Scientist Award and to convert it into more shorter awards targeting mid-career scientists from LMICs. The aim is to develop collaborative research projects with IARC, as well as to contribute to enhance their career prospects and build the capacity of their instruction through longer term collaborations.

The Call 2022 led to the award of three fellowships. The duration is of nine, five and six months, according to the specificities and needs of the project. The selection was made among fifteen applications, nine of which deemed eligible to be considered and recommended for final selection.

IARC Summer School

Edition 2023 - Lyon

- 70 participants
- 40 nationalities **90% LMICs**
- 12 **public live events** – over 1100 registrations and 1000 YouTube views on one event
- Excellent **feedback**

Leveraging impact

- Regional Learning Centres
- South-eastern Asia: **IARC-NCC China** Learning Centre set up in 2023
- Latin America and Portuguese speaking countries: **IARC-Brazil** Learning Centre being set up



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The IARC Summer School in Cancer Epidemiology aims to improve the methodological and practical skills of cancer researchers and health professionals.

→ Edition 2023 - Lyon

In 2023, both modules – Introduction to Cancer Epidemiology, and Implementing Cancer Prevention and Early Detection – were held in a blended format. A brand-new Public Events Series was part of the programme, with 12 live public events successfully organized throughout the period and attracted up to 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.

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.

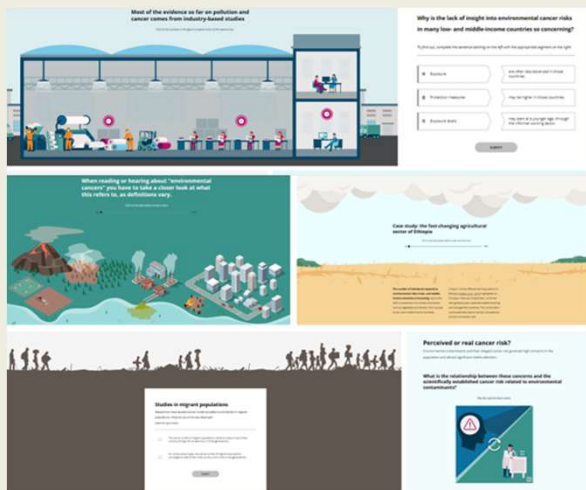
→ Leveraging impact

Regional learning centers are a powerful way to leverage the impact of an institution's courses and learning resources. The Agency and the National Cancer Centre China have collaborated to set up a first regional center, the IARC-NCC China Learning Centre. As formalised through a MoU in May 2023, this joint centre, funded and sustained by NCC China will include: i) the organization of the IARC Summer School's modules in China, targeting researchers and health professionals from China and South-Eastern Asian countries, ii) the joint development of new learning modules, and iii) the organization of Train the Trainers courses in the framework of initiatives such as GICR, CanScreen5 or primary prevention programmes. The first course of the IARC-NCC China Learning Centre (Introduction to Cancer Epidemiology) is planned early 2024.

A similar partnership is being developed with the INCA Brazil and the University of Sao Paulo, in collaboration with other national entities. The first course (both modules) is planned for 2025, targeting health professionals from Brazil, as well as from Asian and African Lusophone countries.

The set up of other similar regional partnerships will be considered, subject to availability of financial resources in LCB to launch and coordinate activities implemented with partners.

IARC Learning portal: learning.iarc.fr



Learning resources

- **Varied approaches:** Pollution and Cancer, FAIR Learning videos
- **Translations:** Cancer Prevention Europe, Improving the Quality of Cancer Screening, Cervical Cancer Atlas

Infrastructure

- Collaboration with the **WHO Academy**
- Input on design provided
- Migration of IARC Learning planned

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Launched in 2019, the IARC Learning portal is a single-entry point to IARC learning resources in different areas of IARC expertise.

During the year, varied approaches were used to develop new learning resources.

For example, the first module of a self-paced e-learning programme on Pollution and Cancer was developed and released as part of the collaboration with the European Society for Medical Oncology. For this “Introduction to Research on Pollution and Cancer” module, a particular attention was given to create an immersive and interactive environment, with professional graphic design tailored to the topic, animated images, as well as several quizzes, exercises, and case studies throughout each learning sequence.

Another example is the “Swamped?” series on managing data according to FAIR principles (Findable, Accessible, Interoperable, and Reusable), which was developed through the Human Exposome Assessment Platform project (or HEAP). The series is an animated-based and engaging introduction to FAIR data principles in five short videos.

Translation of several resources were carried out by IARC during the year.

This is for example the case of the series of modules on the European Code Against Cancer 4th edition, developed by the Environment and Lifestyle Epidemiology Branch in the frame of the Cancer Prevention Europe programme (CPE). The series was translated into five languages (French, Spanish, Hungarian, Polish and German) and deployed as an online learning programme on primary and secondary prevention of cancer, targeting cancer prevention advocates, health practitioners and promoters.

The self-paced learning programme on “Improving the Quality of Cancer Screening” developed in the frame of the CanScreen 5 project with the Early Detection, Prevention and Infections Branch, is now available in Spanish in addition to English and Russian.

In November 2023, to mark three years of the global movement to eliminate cervical cancer, IARC launched online learning resources on cervical cancer screening in additional languages (French, Spanish, Portuguese, and Ukrainian) : Atlas of visual inspection of the cervix with acetic acid for screening, triage, and assessment for treatment; Using HPV tests for cervical cancer screening and managing HPV-positive women – a practical online guide; and Atlas of colposcopy: principles and practice. These resources constitute the backbone of the Comprehensive Learning Programme on Screening, Diagnosis and Management of Cervical Precancer, which was selected by the WHO Academy as part of its first learning programmes to develop/deploy and should be released in 2024.

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2. Highlights from the meeting of the 65th Session of the Governing Council

Director's Report



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The following slides report some highlights from the meeting of the 65th Session of the Governing Council held in Lyon in May 2023.

China's flag joined the other
Participating States'

Highlights 65th meeting GC-Director's Report



IARC welcomed China for their first in-person Governing Council Session in May 2023. The flag of China was raised on its pole, to join the other Participating States' respective flags, as is the tradition for incoming Participating States.

Selection of Director of IARC

The Governing Council selected Dr Elisabethe Weiderpass to continue as Director of IARC for a period of five years from 1 January 2024

Highlights 65th meeting GC-Director's Report

7-9 February 2024



The Governing Council selected Dr Elisabethe Weiderpass to continue as Director of IARC for a period of five years from 1 January 2024.

Director's focus areas for IARC sciences, organisation and management 2024–2028



Highlights 65th meeting GC-Director's Report

7–9 February 2024

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Director's priorities for 2024–2028 are broadly shown in this slide.

Her focus for IARC science, organisation and management 2024–2029 is to:

- Evaluate the MTS 2021–2025
- Take the knowledge gained into account to define a new Medium-Term Strategy for 2026–2030 for a renewed scientific ambition to better prevent cancer worldwide, specifically:
 - Consolidate fundamental activities
 - Provide **new emphasis on the emerging priorities, as defined in the MTS 2021–2025**
 - As a driving concept of its strategy, IARC will deploy its **Open Science policy**
 - **Reinforce IARC's communication strategy** to better **disseminate the results of research on cancer prevention**, based on four years' experience
- Reinforce collaboration with WHO for a better link between science and policy (and give support to WHO Academy training programs)
- Develop management promoting performance, well-being and equity
- Invest for a modern and sustainable research agency

Discussion on the Director's Report

The Governing Council,

1. THANKED the Director for the **Report and for the Key Performance Indicators (KPIs)** provided therein;
2. NOTED with satisfaction the continued efforts made towards further **strengthening coordination and communication between IARC and WHO**;
3. THANKED the Secretariat for its report on **IARC engagement under the Framework of Engagement with Non-State Actors (FENSA)** as part of the Director's Report, in accordance with [Resolution GC/60/R17](#);
4. AGREED that, in support of the IARC Medium-Term Strategy for 2021–2025, the Director would **make partial use of the unbudgeted assessments** of new Participating States in the biennium 2022–2023 towards **IARC's participation in WHO's new Business Management System project**, and to further strengthen **IARC's data protection framework and scientific data management systems**;
5. THANKED the Director for her report on the use of these funds; and
6. EXPRESSED its **satisfaction with the Director's written and oral Reports**.

The Director gave a summary of the Director's Report, including scientific highlights and KPIs on publications and capacity building, cooperation with WHO, strategic partnership, and key figures on personnel. The Governing Council,

1. THANKED the Director for the **Report and for the Key Performance Indicators (KPIs)**;
2. NOTED with satisfaction the continued efforts made towards further **strengthening coordination and communication between IARC and WHO**;
3. THANKED the Secretariat for its report on **IARC engagement under the Framework of Engagement with Non-State Actors (FENSA)** as part of the Director's Report, in accordance with [Resolution GC/60/R17](#);
4. AGREED that, in support of the IARC Medium-Term Strategy for 2021–2025, the Director would **make partial use of the unbudgeted assessments** of new Participating States in the biennium 2022–2023 towards **IARC's participation in WHO's new Business Management System project**, and to further strengthen **IARC's data protection framework and scientific data management systems**;
5. THANKED the Director for her report on the use of these funds; and
6. EXPRESSED its **satisfaction with the Director's written and oral Reports**.

IARC'S COVID-19 and Cancer Initiative: regular update

The Governing Council,

1. NOTED the IARC Secretariat's efforts to **coordinate with existing initiatives in this area**;
2. ENCOURAGED Participating States to **make voluntary contributions** and **provide support to the resource mobilization efforts** towards this initiative; and
3. REQUESTED **regular updates** by the Secretariat on progress throughout the term of the initiative.

As requested by the Governing Council, Dr Freddie Bray and Dr Isabelle Soerjomataram (CSU) gave an update of the COVID-19 and Cancer Initiative which aims to inform IARC's Participating States on mitigation and recovery strategies.

The Governing Council,

1. NOTED the IARC Secretariat's efforts to **coordinate with existing initiatives in this area**;
2. ENCOURAGED Participating States to **make voluntary contributions** and **provide support to the resource mobilization efforts** towards this initiative; and
3. REQUESTED **regular updates** by the Secretariat on progress throughout the term of the initiative.

The Nouveau Centre Building and Resource Mobilization

The Governing Council,

1. EXPRESSED its appreciation to the City of Lyon, the French national authorities, the Région Auvergne-Rhône-Alpes, the Métropole de Lyon, and the City of Lyon for their **continued support**;
2. EXPRESSED its appreciation to the **IARC personnel for their resilience** during the transition phase and the move to the Nouveau Centre;
3. EXPRESSED its deep appreciation to the **donors for their generous contributions** to the “Nouveau Centre” project;
4. AUTHORIZED the Director to **accept further donations** for the purpose of furnishing and equipping the Nouveau Centre;
5. ENCOURAGED Participating States to make **voluntary contributions** and **provide support** to the resource mobilization efforts towards the Nouveau Centre; and
6. REQUESTED the Director to report, every six months, on **resource mobilization efforts** and on Infrastructure apprised of major future developments in relation to the “Nouveau Centre” project.

The Governing Council,

1. EXPRESSED its appreciation to the City of Lyon, for their continued efforts and strong support throughout the challenging period preceding the move to the new building, and to the French national authorities, the Région Auvergne-Rhône-Alpes, the Métropole de Lyon, and the City of Lyon for their continued support;
 2. EXPRESSED its appreciation to the IARC personnel for their resilience during the transition phase and the move to the Nouveau Centre;
 3. EXPRESSED its deep appreciation to the donors for their generous contributions, in cash or in kind, to the “Nouveau Centre” project;
 4. AUTHORIZED the Director to accept further donations, in cash or in kind, for the purpose of furnishing and equipping the Nouveau Centre, subject to and in accordance with applicable internal rules and regulations, including inter alia with regard to FENSA and partner recognition;
 5. ENCOURAGED Participating States to make voluntary contributions and provide support to the resource mobilization efforts towards the Nouveau Centre; and
 6. REQUESTED the Director to report, every six months, on resource mobilization efforts and to keep the Governing Council Working Group on Infrastructure apprised of major future developments in relation to the “Nouveau Centre” project.
- In addition, the Governing Council,
 1. WELCOMED the new convention signed with the Metropole of Lyon on 27 October 2022, which secures the lease of the “Nouveau Centre” building for the next thirty years under conditions acceptable to the Agency; and
 2. ACKNOWLEDGED that the site of the Headquarters of the Agency is now situated at 25 avenue Tony Garnier.

Biennial Report of the IARC Ethics Committee, 2021–2022

The Governing Council,

1. WELCOMED the Biennial Report of the IARC Ethics Committee 2021–2022; and
2. REQUESTED the Director to continue **reporting biennially on issues related to ethics** at the Agency.

The Governing Council,

1. WELCOMED the Biennial Report of the IARC Ethics Committee 2021–2022; and
2. REQUESTED the Director to continue **reporting biennially on issues related to ethics** at the Agency.

Proposed Programme and Budget 2024–2025

The Governing Council,

1. APPROVED the budget for the biennium 2024–2025 at the level of **€48 683 313**;
2. ACKNOWLEDGED that the presentation and priorities of the proposed budget for 2024–2025 are aligned with the IARC Medium-Term Strategy for 2021–2025;
3. DECIDED that the budget shall be financed solely by annual assessments on Participating States as follows:
 - (1) €24 323 172 shall be assessed on Participating States on 1 January 2024
 - (2) €24 360 141 shall be assessed on Participating States on 1 January 2025

A 5% increased regular budget funding, to keep track with rising operational costs, was requested in the next Biennial Budget 2024-2025.

A total budget of **51.12 million euros** was proposed, being distributed to the six main Objectives of the Project Tree.

This 5% increase was fully supported by the Scientific Council who expressed their deep concerns about the severe financial constraints faced by IARC.

The available budget has experienced zero nominal growth for more than a decade, despite major inflationary pressures faced by all organizations worldwide. This poses an existential threat to the highly unique research conducted by the Agency.

The Scientific Council expressed its strongest unqualified support for the Proposed Programme and Budget, along with other current and future actions to improve the financial health of the Agency. Indeed, continued progress against cancer globally depends on such investment.

After discussion, the Governing Council:

- APPROVED the budget for the biennium 2024–2025 at the level of **€48 683 313**;
- ACKNOWLEDGED that the presentation and priorities of the proposed budget for 2024–2025 are aligned with the IARC Medium-Term Strategy for 2021–2025;
- DECIDED that the budget shall be financed solely by annual assessments on Participating States as follows:
 - (1) €24 323 172 shall be assessed on Participating States on 1 January 2024,
 - (2) €24 360 141 shall be assessed on Participating States on 1 January 2025

Proposed Programme and Budget 2024–2025

4. RESOLVED to appropriate an amount of **€48 683 313** to the six main Level 2 objectives of the IARC Project Tree for the biennium 2024–2025 as follows:

Section	IARC Project Tree – Level 2 Objectives	Amount (€)
1.	Describing the occurrence of cancer	4 068 890
2.	Understanding the causes of cancer	9 814 842
3.	Evaluating cancer prevention interventions	5 987 604
4.	Synthesizing and mobilizing knowledge and strengthening global capacities in cancer science	6 628 336
5.	Strengthening the Agency's leadership, governance, strategic engagement, and advocacy	5 401 722
6.	Strengthening the efficiency and effectiveness of the Agency's research and collaboration	16 781 919
	Total	48 683 313

The Governing Council RESOLVED to appropriate an amount of **€48 683 313** to the six main Level 2 objectives of the IARC Project Tree for the biennium 2024–2025 as shown in the Table.

Proposed Programme and Budget 2024–2025

5. DECIDED that the Director shall have authority to **transfer credits between sections of the budget**, provided that such transfers **do not exceed 15%** of the section from which the credit is transferred;
6. DECIDED to grant authority to the Director to use **a maximum of €500 000** in the biennium 2024–2025 from the Governing Council Special Fund **to cover unforeseen budgetary costs due to currency realignments**;
7. REQUESTED the Director to report on the use of the Fund for this purpose in future financial reports; and
8. ENCOURAGED Participating States to contribute to the **Core Voluntary Contribution Account** to supplement the regular budget.
9. REQUESTED the Secretariat to continue dialogue with Participating States who are amenable to providing a voluntary contribution.

The Governing Council

- DECIDED that the Director shall have authority under Financial Regulations Article III, Paragraph 3.3 to transfer credits between sections of the budget, provided that such transfers do not exceed 15% of the section from which the credit is transferred.
- Transfers in excess of 15% of the section from which the credit is transferred may be made with the prior written concurrence of the majority of the Members of the Governing Council;
- DECIDED to grant authority to the Director to use a maximum of €500 000 in the biennium 2024–2025 from the Governing Council Special Fund to cover unforeseen budgetary costs due to currency realignments, subject to availability of cash balances in the Fund, noting the base rate of exchange for 2024–2025 is €0.907/US\$;
- REQUESTED the Director to report on the use of the Fund for this purpose in future financial reports; and
- ENCOURAGED Participating States to contribute to the Core Voluntary Contribution Account to supplement the regular budget.
- REQUESTED the Secretariat to continue dialogue with Participating States who are amenable to providing a voluntary contribution.
- The Secretariat shall report back at the next Governing Council on total voluntary contributions received.

Acceptance of grants and contracts

The Governing Council,

1. CONFIRMED the **provisional approval** given by the Governing Council Chair between sessions, for the following two projects:
 - a) **Revision and update of the European Code against Cancer** [European Commission - European Health And Digital Executive Agency / EU4H (BE) in an amount of €1 500 000.00 for 48 months];
 - b) **Strengthening cancer screening data collection to update European Cancer Information System and improve quality and coverage of cancer screening programmes in Europe** [European Commission - European Health And Digital Executive Agency / EU4H (BE) in an amount of €580 483.00 for 18 months];
2. NOTED the post facto reporting of grants and contracts accepted by the Director;
3. NOTED the amount of interest income apportioned; and
4. COMMENDED the staff on **its success in winning competitive research grants.**

The Governing Council,

- CONFIRMED the provisional approval given by the Governing Council Chair between sessions for the following two projects:
 - a) Revision and update of the European Code against Cancer [European Commission - European Health And Digital Executive Agency / EU4H (BE) in an amount of €1 500 000.00 for 48 months];
 - b) Strengthening cancer screening data collection to update European Cancer Information System and improve quality and coverage of cancer screening programmes in Europe [European Commission - European Health And Digital Executive Agency / EU4H (BE) in an amount of €580 483.00 for 18 months];
- NOTED the post facto reporting of grants and contracts accepted by the Director;
- NOTED the amount of interest income apportioned; and
- COMMENDED the staff on its success in winning competitive research grants.

Appointment of new members of the Scientific Council

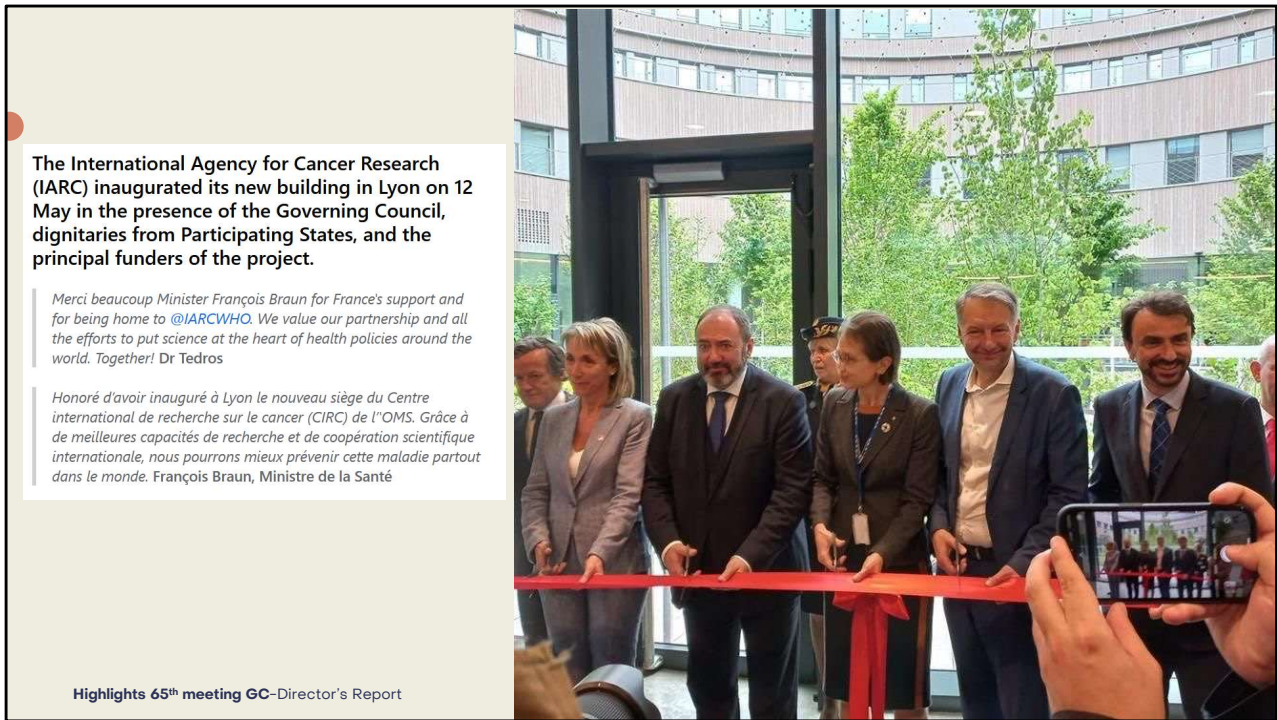
Professor André Karch, **Germany**
Dr István Kenessey, **Hungary**
Dr Prashant Mathur, **India**
Professor Orla Sheils, **Ireland**
Dr Roberta De Angelis, **Italy**
Dr Mohamed Berraho, **Morocco**
Professor Pål Richard Romundstad, **Norway**
Professor Young-Woo Kim, **Republic of Korea**
Dr Valeriy V. Breder, **Russian Federation**
Professor David Gisselsson Nord, **Sweden**

to serve for **four years** on the Scientific Council

The Governing Council appointed:

- Professor André Karch, **Germany**
- Dr István Kenessey, **Hungary**
- Dr Prashant Mathur, **India**
- Professor Orla Sheils, **Ireland**
- Dr Roberta De Angelis, **Italy**
- Dr Mohamed Berraho, **Morocco**
- Professor Pål Richard Romundstad, **Norway**
- Professor Young-Woo Kim, **Republic of Korea**
- Dr Valeriy V. Breder, **Russian Federation**
- Professor David Gisselsson Nord, **Sweden**

to serve for **four years** on the Scientific Council



In the heart of the Lyon-Gerland Biodistrict, IARC inaugurated its New Center (Nouveau Centre) on 12 May 2023, in the presence of numerous officials and researchers from around the world.

Reflecting an open approach to global research, the building has been conceived as a true symbol of IARC's new ambition: to position itself at the forefront of global research in the field of health.

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3. Director's update from the 59th Session of the Scientific Council

Director's Report



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The following slides report some highlights from the 59th session of the Scientific Council held in February 2023.



The Scientific Council, virtual for the third time in 2023, went very well, thanks to IT.

Discussion on the Director's Report

- The Scientific Council (SC) congratulated the Director and her staff on the **Director's Report**.
- **SC recommendations/comments:**
 - The SC commented positively on the **restructuring of IARC** in line with the Medium-Term Strategy 2021–2025.
 - The SC recommended to continue the **communication mechanisms** developed by IARC for wider dissemination of research findings for global public health impact.
 - Dr Mikkelsen, on behalf of WHO DG, as well as the SC, thanked the Director for the **strong endorsement** she has given to **intensify coordination and collaboration between IARC and WHO**.
 - The SC commented positively on the **great success in terms of acquisition of external funding** by IARC investigators; however, it was stressed that this should not be used as an argument to reduce the total regular budget to the Agency.

The Scientific Council congratulated the Director and her staff on the **Director's Report**.

➤ **The Scientific Council provided some recommendations/comments:**

- The SC commented positively on the restructuring of IARC in line with the Medium-Term Strategy 2021–2025.
- The SC recommended to continue the communication mechanisms developed by IARC for wider dissemination of research findings for global public health impact.
- Dr Mikkelsen, on behalf of WHO DG, as well as the SC, thanked the Director for the strong endorsement she has given to intensify coordination and collaboration between IARC and WHO.
- The SC commented positively on the great success in terms of acquisition of external funding by IARC investigators; however, it was stressed that this should not be used as an argument to reduce the total regular budget to the Agency.

Presentation of the IARC cross-cutting Working Group on Cancer Prevention Knowledge Translation and Transfer (KTT) and its IARC Evidence Summary Briefs Series

- The KTT WG welcomed two IARC Scientific Council members for a four-year period as part of its Editorial Board:
 - Dr Ravi Mehrotra (India)
 - Dr Luis Felipe Ribeiro Pinto (Brazil)
- The SC indicated that the materials created to date were already proven to be quite powerful for communicating with stakeholders.
- The SC suggested that the briefs should be provided to cancer control websites to increase dissemination. The use of opinion editorials within journals was also recommended.
- The SC recommended a co-ordinated communication strategy with the WHO regarding dissemination of IARC research findings, beyond the briefs.

Dr Carolina Espina (ENV), as coordinator of the IARC cross-cutting Working Group on Cancer Prevention Knowledge Translation and Transfer (KTT), gave a presentation on KTT and its IARC Evidence Summary Briefs Series.

- The KTT WG welcomed two IARC Scientific Council members for a four-year period as part of its Editorial Board:
 - Dr Ravi Mehrotra (India)
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- The SC recommended a co-ordinated communication strategy with the WHO regarding dissemination of IARC research findings, beyond the briefs.

Thank you

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