

## Roadmap: Europe's Beating Cancer Plan

### A Statement by the Helmholtz Association of German Research Centres

The Helmholtz Association fully supports the commitment and the initiative of the European Commission to fight the growing burden of cancer in an aging society by implementing an ambitious EU Cancer Plan. With 1.3 million cancer deaths per year in Europe, cancer represents a major disease burden for our society. Concerted EU-wide efforts to improve prevention, detection, and treatment of the disease are needed to complement national programs, reduce the incidence of this devastating disease, and improve survival rates and quality of life for cancer patients throughout Europe.

In recent years, precision medicine approaches to the diagnosis and treatment of cancer have provided promising results and should be further expanded. However, many gaps in our understanding of this complex disease, or rather collection of diseases, still remain; and initiatives to improve prevention, diagnosis and treatment will not be fully effective until novel tools that shift the paradigm in understanding causes and offer ground-breaking early detection and treatment approaches are developed. Thus, to ensure the success of Europe's Beating Cancer Plan, cutting-edge evidence-based basic, pre-clinical, and translational research is necessary to drive true technology innovation. Europe-wide collaboration amongst researchers should play a central role in implementing the EU Cancer Plan. In the following, we highlight some areas where research can make a significant contribution towards the successful implementation of Europe's Beating Cancer Plan.

**Prevention** programs are highly promising and urgently needed, with substantial potential impact on the reduction of new cancer cases. However, too little is known about the underlying risk factors, both genetic and environmental, that can lead to cancer. Large-scale cohort studies will make it possible to identify susceptible individuals and to derive novel preventive strategies. Cancer prevention programs focused on exposure and lifestyle should thus be grounded on evidence-based research findings on risk factors and implementation research. European expert networks should be strengthened to improve knowledge transfer and achieve maximum exploitation of expertise in developing and validating methodologies and strategies that can identify individuals at high risk, implement initiatives to reduce carcinogen exposure, and provide universal access to primary prevention programs. The widespread application of preventive vaccinations must be strengthened. At the same time, however, there is an urgent need for research into the development of new vaccines, for example against hepatitis C virus (HCV), a major cause of hepatocellular carcinoma. A vaccine is indispensable to achieve the WHO goal of reducing the number of new HCV infections by 90 percent until 2030.

**Early detection and diagnosis** are highly effective in reducing cancer-associated mortality. The development of innovative and sensitive methods and new technologies to detect early and premalignant stages of tumors and to improve cancer screening programs and early treatment of cancer should be given high priority. Interdisciplinary approaches will be key. Basic and pre-clinical research findings should be complemented with a biomedical engineering culture that enables translation into clinical applications, whilst ensuring that patients across all Member States will have equal access to them. Guidelines and recommendations on screening, diagnosis and therapy based on research results should be harmonized using coordinated networks of experts.

A paradigm shift in the traditional discovery and treatment model should be achieved by investing in technology that offers new treatment concepts by moving away from the trial-and-error nature of today's

clinical trials. Emphasis on technology that complements the concept of traditional discovery is essential for pioneering human-based approaches that enable the development of design-based treatment principles and high-throughput hypothesis testing in translational laboratories.

**Access to state-of-the-art cancer treatment and care** should be achieved for patients across all Member States. Key components of treatment rely on new technologies in surgery, drug therapy (chemotherapy, targeted therapies, immunotherapy), cell engineering, as well as on research infrastructures, notably for radiotherapy. Continual support for innovative fundamental and preclinical research will provide the basis and engine for the development and validation of these effective new therapeutic concepts. This should explicitly include fundamental and clinical research on cancer-related complications, e.g. cachexia, and treatment-related complications, e.g. of surgery and radiotherapy, since both types of complications impair quality of life and increase mortality across most types of cancers.

**Comprehensive Cancer Centers (CCCs)** combining fundamental and translational research with multidisciplinary cancer care and a portfolio of investigator-initiated clinical trials should be established in each EU country. Partnership models between newly created and existing CCCs would be helpful to facilitate the creation of new CCCs in countries where they do not yet exist. To what extent structural funds could play an important role both for the creation and the European partnering of these centers should be explored.

Additional funding of **academia-initiated clinical trials** is urgently needed to expedite patients' access to precision medicine approaches. It could be a role for the European Innovation Council to facilitate the funding of this vital step for market access of new treatments.

One of the main aims of the EU Cancer Plan is to improve **quality of life for cancer patients, survivors and carers**. The effectiveness of preventive and therapeutic interventions, including health-related quality-of-life aspects, should be validated in outcomes research approaches addressing factors like survival benefits, psychosocial and socioeconomic aspects, or palliative care. Cancer patient communities should be actively involved in the different stages of policy-making.

**Knowledge, data and scientific evidence** can be generated from EU-wide shared data banks providing access to standardized, patient-derived health data combined with artificial intelligence approaches to mining large sets of “-omics” and real-world data. By identifying new correlations, predictions regarding therapy response and resistance, relapse, or side effects can bring significant improvements. Accordingly, an important activity of the EU Cancer Plan could be to provide the resources needed to connect, expand, and provide EU-wide access to existing or new national data banks, whilst conforming to the provisions of the European General Data Protection Regulation on sharing personal data.

**Education and training of the next generation of cancer researchers and clinicians** is key to creating an innovative and interdisciplinary environment that fosters knowledge transfer throughout the EU leading to the development of promising, innovative treatment approaches that reach cancer patients in the shortest possible time. Correspondingly, training and education programs, including exchanges amongst different European universities, CCCs, and research institutions, should be implemented in all the different fields addressed within the EU Cancer Plan.

In summary, the **overarching objective of the Europe's Beating Cancer Plan** should be to foster the development of a **seamless, pan-European continuum integrating cancer research and healthcare** through initiatives in the following areas: (1) promoting knowledge transfer at all levels, (2) developing pan-European infrastructures and networks of expertise and excellence, (3) involving stakeholders from all relevant sectors

and disciplines, all of which will (4) lead to the formulation of evidence-based, quality-assured standards for cancer prevention and multidisciplinary cancer care, and the assessment of long-term therapy outcomes and their impact on cancer prevention and quality of life for EU citizens. In addition to building new knowledge, it is of utmost importance to build new tools that will help not only on accelerating the collection of knowledge but also its effective use into novel treatments, serving the true meaning of translation.

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