

European Missions

Cancer



Improving the lives of more than 3 million people by 2030 through prevention, cure and for those affected by cancer including their families, to live longer and better

Implementation Plan

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Mission on Cancer

Implementation plan

(September 2021)

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Executive summary

Mission on Cancer

The Horizon Europe Mission on Cancer embodies a true mission approach by integrating innovative approaches to research, public health, data sharing, digital policies, and citizen engagement to jointly achieve with the Europe's Beating Cancer Plan an **ambitious goal of improving the lives of more than 3 million people by 2030, through prevention, cure and for those affected by cancer including their families, to live longer and better**¹ (annex 1). It seeks to provide transformational and systemic responses based on clear goals, realistic objectives, and credible timelines.

Cancer is a major and growing societal challenge: each year, 2.7 million people in the EU-27 are diagnosed with cancer, while 1.3 million die from the disease². This number will increase rapidly due to ageing populations, unhealthy lifestyles, unfavourable health determinants, and environmental and working conditions.

These trends risk being accentuated by the effects of the COVID-19 pandemic by impacting cancer patients in two ways. Firstly, cancer patients have an increased risk of developing severe forms of COVID-19 due to comorbidity. Secondly, during the pandemic, cancer control activities have been paused, stopped, altered, or delayed. Regular check-ups, monitoring and treatments have been halted or limited and screening programmes and clinical trials stopped. These impacts are expected to exacerbate the number of cancer diagnoses, quality of life and deaths from cancer in the next years. The COVID-19 crisis has also further exposed inequalities in access to healthcare due to lack of health professionals, uneven geographical availability of services or other structural problems in health systems. These developments will have long-lasting effects on prevention and cancer control, which the Mission will need to address in the coming years.

Cancer puts immense pressure on European health systems, and this is expected to increase further due to the growing incidence of cancer and more and as more people live longer with their disease following the recent introduction of personalised treatment and care interventions. In 2018, the total cost of cancer³ in Europe was estimated at €199 billion⁴ (EU-27 plus Iceland, Norway, Switzerland, and the United Kingdom). Total costs ranged from €160 per capita in Romania to €578 in Switzerland⁵. Health expenditure on cancer care totalled €103 billion, of which €32 billion were spent on cancer drugs.

¹ Figure is based on EU-27, figure based on Mission Board' advice, see detailed explanation under Mission objective and in section 8 "Monitoring Framework" and Report of the Mission Board: <https://op.europa.eu/en/publication-detail/-/publication/b389aad3-fd56-11ea-b44f-01aa75ed71a1/>

² <https://ecis.jrc.ec.europa.eu/> (figures estimated for 2020)

³ Total cost cover direct costs (resources within the healthcare system), informal care costs, and indirect costs (productivity loss)

⁴ Hofmarcher et al. (2020) [https://www.ejcancer.com/article/S0959-8049\(20\)30026-5/fulltext](https://www.ejcancer.com/article/S0959-8049(20)30026-5/fulltext). It is worth highlighting that there are few international comparative studies on the cost of cancer, as well as a lack of coordinated efforts collecting systematically data among different countries.

⁵ After adjustment for price differences

Informal care⁶ costs were €26 billion. The total productivity loss was €70 billion (€50 billion from premature mortality and €20 billion from comorbidity).

The increasing burden of cancer on society and the rapidly increasing costs of cancer for health systems require collaboration on an ambitious European scale, innovating and integrating fundamental, translational, clinical, and implementation research, underpinned by supportive policy and legislation. Furthermore, today's situation is characterised by individual and often fragmented research activities and policy initiatives aimed to improve cancer prevention and control at EU and national level. There is a need for better understanding of the development of cancer and of effective cancer prevention, screening programmes, diagnostics, and treatments. Existing cancer guidelines are not consistently implemented across Europe, resulting in differences in standards of care and outcomes between and within Member States, and regions. There is also a lack of understanding on the quality of life of patients during and after cancer treatment. Despite progress in cancer control through the implementation of screening programmes in recent years, there is still considerable room for improvements in many countries (mainly in Central and Eastern Europe)⁷.

The Mission on Cancer offers a distinct and comprehensive approach to improve cancer prevention and control by systematically bringing together research, innovation and policy development, in ways that cannot be achieved through individual and often fragmented research activities and policy initiatives at EU and national level.

The proposed Mission on Cancer has the potential to realise fundamental changes in the way research and health policy will address the cancer challenge through its unique approach. In a complementary manner, each of the four Mission objectives (understanding of cancer, prevention, including screening and early detection, diagnosis and treatment, and quality of life) will contribute towards reaching the overall goal by reducing the number of new cancer cases and improving survival rates and quality of life. For example, updated and expanded screening and early detection programmes, implemented by all Member States, reaching more people, will increase the detection of cancers at earlier stages. This will allow for less invasive treatments, which will increase the chances of survival, improve quality of life and diminish healthcare costs.

Four elements will be key to the Mission's success: First, the Mission will systematically identify and exploit research results related to cancer from existing EU and national funded projects, in particular Horizon2020, and accelerate their translation into public health and clinical practice. Second, it will set a common strategic R&I agenda on cancer, which will steer national efforts and streamline investments towards its objectives, and provide dedicated digital infrastructures in support of research. Third, it will create a seamless link between R&I and policy development at national and EU level, including through ensuring the coordination with and supporting the implementation of the Europe's Beating Cancer Plan. It will also bring value to the new Knowledge Centre on Cancer (JRC) and the European Cancer Information System. Fourth, the Mission will increase cross-sectoral collaboration by bringing together relevant actors in health, research, innovation, finance, social sciences and humanities, for a continuous interaction and exchange of experiences and best practices. All of this cannot be achieved through individual initiatives at national or European level and thus represents the **clear added value of the Mission**.

⁶ Informal care is unpaid care or family care, constitutes a significant share of the total long-term care provision in European countries. Estimates suggest that as much as 80% of all long-term care in Europe is provided by informal carers.

⁷ [2018 healthatglance_rep_en.pdf \(europa.eu\)](#)

The Mission will provide clear **guidance on the priority areas and drivers for research**, which will help develop the Horizon Europe work programmes with regard to cancer for 2021-2027. It will set a common strategic R&I agenda on cancer at EU level, which will steer national efforts and streamline national and private investments towards the Mission's objectives. Furthermore, the Mission on Cancer **puts citizens and patients at the centre of R&I and policy** at EU and national level in a structured and meaningful way, which will drive future policymaking towards impactful actions. The mission approach will be the basis for a more coordinated and strategic application of resources for all stakeholders in the field of R&I and health policy related to cancer.

Furthermore, it will enable researchers to analyse combined research, health and any other relevant data at an unprecedented scale, which will be accessible through the creation of the **EU platform UNCAN.eu** by 2023, leading to more rapid breakthroughs in understanding cancer. The Mission will allow patients and survivors to share data through the creation of the **European Cancer Patient Digital Centre** by 2023 and so empower them regarding their care. At the same time, the Digital Centre will become a valuable data resource for research. The Mission will integrate care, research, as well as training and awareness activities in a structured and equitable manner through the creation of a network of **Comprehensive Cancer Infrastructures** by 2025, enhancing not only the quality of care but also decreasing inequalities in access to care. With these elements, the Mission on Cancer shows an explicit and structured approach to research and thus has a **clear and powerful R&I content**.

The Mission will underpin the **Europe's Beating Cancer Plan** by supporting and accelerating novel approaches to research and policy-making to ensure an impactful implementation of the Plan's proposed flagships and actions. The integrated EU platform UNCAN.eu will be a key research component of the Cancer Plan and strengthen its R&I dimension. Equally, the Comprehensive Cancer Infrastructures and the European Cancer Patient Digital Centre have the potential to accelerate progress on cancer research and control while putting the patient at the centre, strengthening the Cancer Plan's direction towards patient-centred care. These infrastructures will become part of a broader digital EU agenda and will be set up within realistic and tangible timeframes.

The Mission on Cancer will scrutinise existing frameworks and incentivise new policy measures for better cancer control. In this regard, the Mission will contribute to improve existing policies related to cancer, or identify the need for new policy measures, through generating knowledge and evidence. For example, it will help to update and expand cancer screening guidelines, and thus enable **continuous feedback to policy processes**, which will facilitate the integration of research results and innovation into clinical practice and health systems in general in a more systematic and timely manner. Furthermore, the Mission strongly advocates **equitable access** along the cancer pathway and applies this principle systemically across four specific objectives. These are (1) understanding, (2) prevention, including screening and early detection, (3) diagnosis and treatment, and (4) quality of life. The R&I activities will be spread over the whole period of the missions 2021-2030, which will be scheduled to underpin relevant policy measures.

The proposed mission approach aims to spark **cross-sectoral collaboration on an ambitious European scale**, in order to integrate fundamental, translational, clinical, and interventional research, and innovation in new ways, which will be essential for decisive progress on cancer. It will build structured multidisciplinary collaboration and allow for continuous interactions among relevant actors in health, research, innovation, finance, social sciences and humanities, and integrate the engagement with citizens, as basis for its implementation. The Mission on Cancer advocates upfront reflections and discussions on the design of proposed actions through continuous, structured dialogues with Member States, stakeholders, and citizens, when developing innovative solutions on the ground.

Furthermore, to provide **new ways for traditional and non-traditional innovators** to contribute to cancer understanding, prevention, diagnostics and treatment, and quality of life support, the Mission on Cancer will support the creation of cancer-focussed Living Labs⁸. Through mutual understanding and creating efficient and effective collaborative approaches to driving innovation, job creation and industrial competitiveness in healthcare and health-related industries, innovation will be steered towards alleviating the cancer burden, as well as generating economic growth, stimulating wellbeing and improvements in key technologies.

As for the important **buy-in within the Commission**, intensive work through the Mission Owners Group and in bilateral meetings has engaged all services most relevant for cancer. Through this process, the Mission on Cancer has already had a tangible impact on policymaking at EU level. First, it helped shape the orientation and content of the Europe's Beating Cancer Plan. Second, due to it being an integral part of the Cancer Plan, a unique governance structure was created for the implementation of both cancer initiatives, both within the Commission (joint inter-service group) and with regard to Member States (joint subgroup on cancer⁹) and stakeholders (Health Policy Platform). With regard to digital aspects, cancer prevention and training, several DGs have committed to supporting the Mission's objective through policy and financial instruments. The Mission will also provide a strategic agenda for the implementation of Horizon Europe partnerships and EIT¹⁰/KICs¹¹ in the health and digital areas.

The implementation of the Mission on Cancer will garner a strong and sustainable **commitment from Member States and regions** to combat cancer throughout Europe. In recent EU Presidency events, Member States called for EU-wide action on cancer research and policy¹². Interactions with the Committee of Regions showed a high interest of regions to engage in and take advantage of the Mission's activities.

Apart from Horizon Europe¹³, the Mission on Cancer will benefit significantly from other **EU funding programmes**, to support major infrastructures. In particular, the EU4Health programme will provide a budget earmarked for cancer to cover the development and roll-out of the network of Comprehensive Cancer Infrastructures. It will also launch preparatory actions for the European Cancer Patient Digital Centre. As there is a strong commitment from Member States, associated countries and regions to tackle cancer, they could decide to mobilise Cohesion Policy Funds to co-fund actions proposed under the Mission (in the past the majority of Member States and regions have been using these funds or investments in the health sector) and could seek synergies with funds from the Resilience and Recovery Facility (some Member States have included actions on cancer).

⁸ Living Labs are defined as user-centred, open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings. In practice, Living Labs place the citizen at the centre of innovation, and have thus shown the ability to better mould the opportunities offered by new ICT concepts and solutions to the specific needs and aspirations of local contexts, cultures, and creativity potentials. https://s3platform-legacy.jrc.ec.europa.eu/documents/20182/138085/Living+labs+for+regional+innovation+ecosystems_update.pdf/7197a890-a0c2-4db6-9e7a-58fd7f63e20d

⁹ Group of experts from health and research ministries established under the Steering Group for health promotion and disease prevention - https://ec.europa.eu/health/non-communicable_diseases/steeringgroup_promotionprevention_en

¹⁰ European Institute of Innovation & Technology

¹¹ Knowledge and Innovation Communities

¹² [Declaration on effective cancer research "Europe: Unite against Cancer" \(dekade-gegen-krebs.de\); Porto-Declaration_Final-1.pdf \(ipoport.pt\); Action Plan EC CoR November 2020.pdf \(europa.eu\)](#)

¹³ Council Decision (EU) 2021/764 of 10 May 2021 establishing the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation, and repealing Decision 2013/743/EU (OJ L 167I , 12.5.2021, p. 1–80)

This **Implementation Plan** aims to be the operational blueprint for how the Commission will deliver on the overall objective of the Mission on Cancer, providing a clear operational and feasible course of action across the four objectives. It specifies the main actions to be undertaken over the lifetime of the Mission, with an emphasis on the first three years (2021-2023). These actions will be complemented with new actions following an iterative consultation and review process that is part of the missions¹⁴. It therefore seeks to demonstrate how delivery of the mission recommendations can be ambitious, realistic and with clear, time-bound and measurable objectives.

¹⁴ This approach is in line with Article 8 of the Horizon Europe Regulation, which requires monitoring of the mission progress towards short, medium and long-term targets.

1. Introduction

Mission objective

The Mission on Cancer has set the ambitious **overall goal**, to be jointly achieved with the Europe's Beating Cancer Plan, ***of improving the lives of more than 3 million people by 2030, through prevention, cure and for those affected by cancer including their families, to live longer and better***, by accelerating cancer prevention and control programmes and creating more equitable access to these programmes¹⁵, while systematically monitoring progress in implementation of Mission actions and adapting them accordingly. The Mission on Cancer is based on four specific objectives: (1) understanding, (2) prevention, including screening and early detection, (3) diagnosis and treatment, and (4) quality of life. Together, these objectives address equity, innovation, childhood cancer and personalised medicine as the main transversal priorities, and each of them will contribute in a complementary manner to achieving the overall goal. The actions foreseen under the four objectives will address the whole cancer control continuum, from prevention, early diagnosis, and treatment, to survivor support, palliative and end-of-life care, for all ages and all cancers, including rare and poorly understood cancers¹⁶.

The Cancer Mission Board estimated the potential reduction in mortality from cancer by sex over the years from 2021 to 2030 in each country, based on reductions considered ambitious yet feasible¹⁷.

Based on current cancer trends and cancer control efforts by Member States, mortality across the EU-27 is expected to decrease by 30% among males and 14% among females under the baseline scenario, i.e. continuing without change. Through the proposed actions, between 2021 and 2030, additional reductions in mortality rates going from 14% (baseline scenario) to 20% (Mission scenario) for females, and going from 30% (baseline scenario) to 40% (Mission scenario) for males are expected. All countries will have to do extra efforts to tackle the 'backlog' caused by the impact of the COVID-19 pandemic. Furthermore, for some countries, achieving this level of reduction in mortality will require considerable investments in new infrastructures, with the Mission helping to mobilise considerable funds in this regard. Other countries will be able to improve cancer control through the implementation of new knowledge and evidence into their health systems.

In a complementary manner, each of the four objectives will contribute towards reaching the overall goal/target by reducing the number of new cancer cases in the coming years. At the same time, they will improve the detection and survival rates while increasing the quality of life of cancer patients and survivors.

An **improved understanding** of the development of cancers in the broadest possible sense will enable the development of effective cancer prevention and screening programmes, devices, diagnostic tests, as well as treatment and care solutions adapted to each patient and form the basis for clear advances in the other three objectives. Enhanced and more effective **prevention** measures and programmes will help exploit the potential of preventing 40% of cancers. Optimised **screening and early detection programmes**, which could be expanded to other cancer types and implemented throughout all Member States, will improve the coverage of the target population benefitting from screening programmes and increase the detection of cancers at an earlier stage in a considerable number. This will allow to start

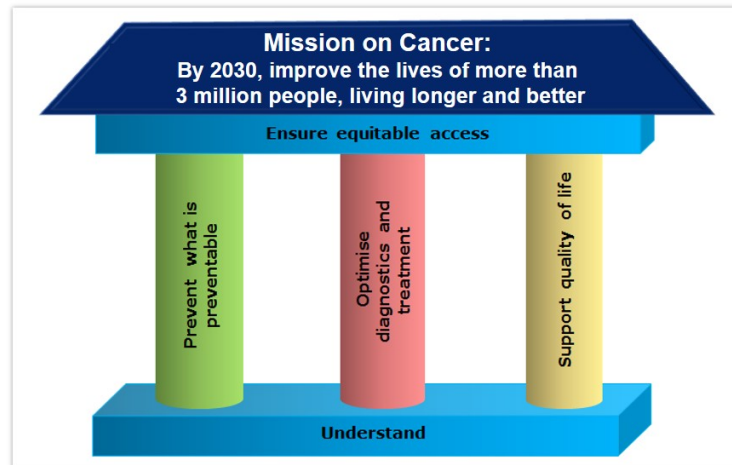
¹⁵ This goal was based on an analysis of avoidable deaths by the International Agency for Research on Cancer (IARC).

¹⁶ Also referred to as refractory or lethal cancers. 5-year overall survival is less than 50% from time of diagnosis.

¹⁷ Based on calculations by WHO/IARC.

adequate and, in more cases, less-invasive treatments, increasing the chances of survival and improving the quality of life of people living with and after cancer.

Optimised diagnostics and treatments of cancer, which are based on the principle of **equitable access**, will ensure more patients have access to the latest, minimally invasive treatments adapted to their conditions, and with minimal secondary effects. A thorough analysis of all key factors and needs related to patients' **quality of life**, including the development of early predictors, better supportive care and monitoring of side effects, as well as the active engagement of patients throughout their disease pathway, will help more people affected by cancer to live longer and better compared to today's situation.



In order to ensure impact within 10 years (2021-2030), the implementation of the Mission on Cancer will be conducted on the basis of **guiding principles**, notably:

- **Ensure equity and access to knowledge, research and care** between and within countries, regions, and between people of different socio-economic backgrounds, genders, and age groups.
- **Promote innovation:** social innovation, novel approaches to public procurement such as pre-commercial procurement, Living-Labs and other methodologies should be systematically pursued to stimulate innovation and out of the box solutions in healthcare and related sectors.
- **Allow for risk taking:** not all innovative approaches will deliver but we can learn from failure and avoid repeating past mistakes.
- **Work with “the coalition of the willing”:** Not all Member States and associated countries have to work on all specific objectives, but equally national and regional differences in Europe should be taken into account. A group of Member States may decide to advance on certain intervention areas and implement actions, sharing their experiences and best practices with the other Member States.
- **Communication and citizen engagement:** An informed and engaged citizen community, including cancer patients and survivors, constitutes a great asset for the successful deployment of this Mission through national mission hubs, which will be created for all missions, as well as through annual events.

Political context

In response to calls from members of the European Parliament in 2019, the Commission President Ursula von der Leyen announced a “*European Plan to fight cancer to support Member States in improving cancer control and care*”, as a key component of her political guidelines 2019-2024. This

followed a call from the Chairman of the EPP group, Manfred Weber, who proposed a “*European Masterplan to join our forces to fight against cancer*” as part of this election campaign in 2019.

On 3 February 2021, the Commission adopted **Europe’s Beating Cancer Plan**¹⁸, as part of the new European Health Union. It constitutes a renewed EU commitment to cancer prevention, treatment and care and calls for “a whole-of-government approach” that focuses on the patient, maximises the potential of new technologies, aims to eradicate inequalities in access to cancer, and delivers improved health outcomes to patients. The Europe’s Beating Cancer Plan sets out a new approach to the entire disease pathway, from prevention to quality of life of cancer patients and survivors. It includes 10 flagship initiatives and 32 actions¹⁹ spanning across policy areas from employment, education, social policy and equality, through marketing, agriculture, energy, environment and climate, to transport, cohesion policy, and taxation – many of those inspired by the scientific advice given by the Cancer Mission Board²⁰. The Commission explicitly recognises the contribution of the Horizon Europe Cancer Mission in Europe’s Beating Cancer Plan.

With the EU strategy “**Shaping Europe’ Digital Future**” adopted in February 2020, the Commission aims at preparing the transition to a society powered by digital solutions and bringing in people’s lives and health the best of digital technologies that really work for them. The Mission on Cancer supports the Digital Agenda through building new digital infrastructures, which will accelerate the digitalisation of health systems, allowing cancer patients and survivors to exchange data and stay connected with healthcare providers. In particular, the proposed European Cancer Patient Digital Centre, where patients will be able to share their own health data, will become part of the future **European Health Data Space**, which will provide the framework for the secure exchange of health data throughout the EU.

Moreover, the Mission will contribute to the political priority of a stronger Europe in the world and the EU’s Global Approach to Research and Innovation by fostering multilateral cooperation on policy issues as well as cooperation among researchers and on data sharing infrastructures.

Mission on Cancer and Europe’s Beating Cancer Plan: close linkages

The Mission on Cancer is an integral part of the Europe’s Beating Cancer Plan. Both initiatives were developed in close co-ordination. Several of the mission proposed activities, namely the UNCAN.eu initiative, a network of Comprehensive Cancer Infrastructures, the Cancer Patient Digital Centre, screening guidelines, and the Childhood Cancer initiative will support the Europe’s Beating Cancer Plan and thus creating a seamless link between R&I and policies.

Equally, the implementation of these recommendations will accelerate the digital transformation in the area of R&I and health, contribute to the European Data Strategy and the European Health Data Space through developing concepts for data sharing, mining and analysis, also using Artificial Intelligence and supercomputing, adapted to digital health research.

The Europe’s Beating Cancer Plan has established a **novel joint governance model**, to discuss and review the implementation of both initiatives (see details under ‘governance’), which represents a unique **added value of the Mission** compared to today’s governance structures related to individual policy areas, both within the Commission and in the dialogue with Member States and stakeholders.

¹⁸ https://ec.europa.eu/health/sites/default/files/non_communicable_diseases/docs/eu_cancer-plan_en.pdf

¹⁹ https://ec.europa.eu/health/sites/default/files/non_communicable_diseases/docs/eu_cancer-plan_annex_en.pdf

²⁰ Names of board members are listed under governance.

Overall, the Mission on Cancer will play a major role in supporting the implementation of the Europe's Beating Cancer Plan and delivering on its objectives through several ways:

- i. The Mission on Cancer will deliver innovative concepts and solutions for implementing specific parts of the Europe's Beating Cancer Plan, thus going beyond research & innovation.
- ii. The Mission on Cancer will generate knowledge and evidence for the implementation of new actions in the areas of understanding, prevention, diagnosis, treatment, and quality of life.
- iii. The Mission on Cancer will constitute a point of contact with European citizens, who will be fully involved in co-creating specific activities. Citizen engagement activities at national level will represent a real added value for the Cancer Plan, by building trustful dialogues with citizens and providing direct citizens' feedback on the proposed initiatives.
- iv. The Cancer Mission Board is part of the overall governance of the Europe's Beating Cancer Plan, and will act as a scientific advisory group during its implementation. The Chair and vice-Chair have observer status in the Member States' subgroup on cancer²¹, which consists of experts from health and research ministries.

In summary, the Mission's role in pushing the implementation of the Europe's Beating Cancer Plan towards evidence-based and innovative approaches, which systematically reflect citizens' needs, represents a **clear added value of Mission** to EU and national policy-making, which might be used as an example for other health policy areas in the future.

Member States' commitment to tackle cancer

With Member States being primarily responsible for the organisation of their health systems and given the different nature of national health systems and national priorities, the involvement of and support by Member States will be indispensable to develop and implement most recommendations and actions under the Mission, for example the integration and use of new screening guidelines. At the same time, the Mission on Cancer will support Member States through generating new evidence, allowing them to allocate budget more efficiently, as well as through leveraging significant funding at EU level in support of implementation.

In recent months, Member States have made several high-profile calls for EU-wide action on cancer research and policy. First, the *Declaration on Effective Cancer Research*²², which the Council Presidency Trio (DE, PT and SL) signed in October 2020, emphasises the role of national interdisciplinary cancer centres in research, patient care and teaching of health professionals. It also stresses the importance of active patient participation in the full translational cycle from research to care, to put patients at the centre of shared decision-making. Second, at the informal meeting of the Health Ministers in March 2021, an overwhelming majority of Member States expressed support for the Europe's Beating Cancer Plan. They drew attention the synergies with their national plans, which they had adapted or would adapt to align them with the EU Cancer Plan. Member States also emphasised the reduction of inequalities as a key priority and highlighted the role of prevention in cancer control. Third, the *Porto Declaration on Cancer Research*²³, presented during the Cancer Research Summit on 3 May 2021 of the Portuguese Presidency, calls for high-quality infrastructures for translational research, clinical and prevention trials and outcomes research, to enable a comprehensive translational cancer research approach focused on personalised medicine, covering the entire cancer research continuum.

²¹ Details on the subgroup are included under governance.

²² [Declaration on effective cancer research "Europe: Unite against Cancer" \(dekade-gegen-krebs.de\)](#)

²³ [Porto-Declaration_Final-1.pdf \(ipoporto.pt\)](#). The declaration is open for signatures by citizens and institutions.

2. Intervention logic

The intervention logic reflects what the Mission on Cancer aims to achieve (its specific objectives) and how and when these specific objectives will be achieved. It also outlines the outputs envisaged, as well as the underlying assumptions, and technological readiness levels (TRLs)²⁴. The specific objectives in the areas of (1) understanding, (2) prevention, including screening and early detection, (3) diagnosis and treatment, and (4) quality of life take account of transversal challenges and solutions with regard to equity and childhood cancer and take into account the current state of the art in R&I (annex 2). In these four areas, which are all closely interconnected, there are important gaps (explained below) that the Mission seeks to address in a comprehensive way in order to achieve the goal of improving the lives of more than 3 million people by 2030, through prevention, cure and for those affected by cancer including their families, to live longer and better:

Understanding: Despite considerable progress on where, how and when cancer starts, much more needs to be done to understand why certain people, gender and age groups (with co-morbid conditions) are at a higher risk of getting cancer than others, suffer from side-effects, how cancer spreads, and resists available treatment (thus affecting the quality of life of people living with and after cancer). These uncertainties limit the design of effective and cost-effective cancer prevention and screening programmes, devices, diagnostic tests, as well as treatment and care solutions adapted to each unique patient. The cancer research, healthcare providers, patient care communities and industries in the EU are quite fragmented and do not typically benefit from patient/citizen engagement from the start.

Prevention, screening and early detection: Prevention is the most cost-efficient long-term cancer control strategy and it is better than any cure. Prevention is supported through policies such as the promotion of health-enhancing physical activity and sport. It is known that 40% of cancers could be prevented²⁵, but an enhanced and more personalised understanding of effective prevention measures is needed as well as improvements of the existing prevention programmes. Health literacy among EU citizens offers room for improvement. In general, citizens are not aware that certain cancers can be prevented or avoided through disease prevention strategies.

National screening programmes exist for only three cancers (colorectal, breast and cervical), are not risk-based, and not all of the targeted population have access to them, including persons with disabilities. As quality assurance and available resources vary across screening programmes, they do not always reach their objectives. In addition, the general population (and general practitioners) are not fully aware of cancer symptoms, limiting the early detection of cancer.

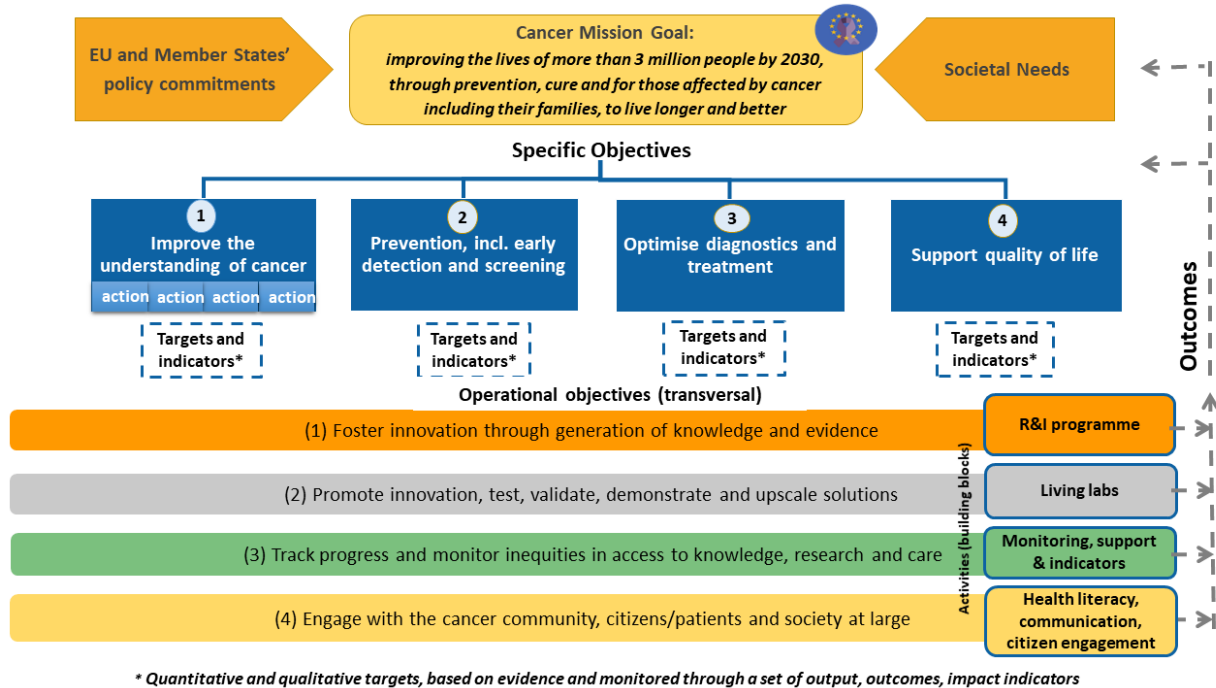
Diagnosis and treatment: Time to cancer diagnosis is usually too slow, or early diagnostic tests do not exist. This is due to poor understanding of the full range of the almost 200 different types (and many subtypes) of cancer. Despite established best practices, such as treatment guidelines and standards of care, these are not consistently implemented across Europe. This results in unacceptable differences in standards of care and outcomes between and within Member States, regions and between different socio-economic groups. Moreover, cancer patients often present with comorbid conditions, do not have equal access to the latest (gender-specific) treatments across Europe (e.g. immunotherapy) or to the full range of such treatments, and patients are not empowered to make informed decisions on their

²⁴ TRL 1-9, see https://www.earto.eu/wp-content/uploads/The_TRL_Scale_as_a_R_I_Policy_Tool_-_EARTO_Recommendations_-_Final.pdf. Depending on the nature of the research to be carried out, the desired TRL levels or stages in clinical trials to be achieved, will be made explicit in call topic texts.

²⁵ Soerjomataram et al. (2018). <https://pubmed.ncbi.nlm.nih.gov/30445359/>

treatment. Childhood cancers (all are rare) and adult rare cancers need particular attention. Access to state-of-the-art clinical trials is insufficient, fragmented and not equally available across Europe.

Quality of life: The quality of life of patients during and after cancer treatment is generally characterised by a lack of understanding or sufficient consideration of patient needs. Physical and mental health problems, comorbidities, late side-effects and disabilities often reduce quality of life. Unfortunately, stigmatisation of patients and survivors negatively impacts careers and creates challenges when obtaining health insurance or mortgage. This generates a substantial burden for cancer patients, survivors, their families, but also for countries’ health systems and society in general.

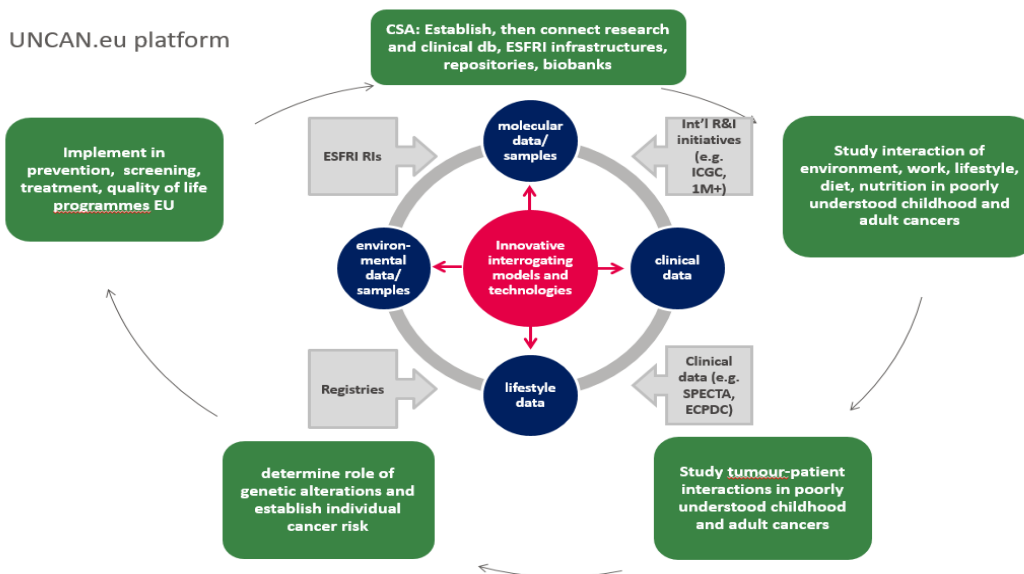


The following sections describe the proposed actions per specific objective. A comprehensive, tabular overview of actions, implementers, synergies and resources is provided in Section 5 “Overview of mission objectives, outcomes, actions, resources, implementers, synergies and timelines.”

2.1 Specific objective 1: Improve the understanding of cancer

The first specific objective of the Mission is to improve understanding of the development of cancer in the context of the environment, work, and lifestyle in the broadest possible sense (e.g. air pollution, occupational risk, diet, socio-economic status, etc.) as well as the role of genetic risk in developing cancer and disease outcome.

UNCAN.eu, a European initiative to **UN**derstand **CAN**cer, will be a novel platform that will bring all relevant players and information together, based on existing efforts in Europe and beyond. It will combine research, patient health and any other relevant data (e.g. from longitudinal cohorts, geographical observations, consumer and lifestyle data) at an unprecedented scale. A key expected outcome is that the new understanding gained from the analysis of this wealth of data could be applied to other diseases beyond cancer.



Actions

(1) Establish the 'UNCAN.eu' platform by 2023 (2021-2023): a unique digital platform where researchers from all over the world share and have access to high-quality research data. Already through dedicated funds for a Coordination and Support Action under the Missions Work Programme for 2021-2022, a blueprint for the UNCAN.eu platform will be developed in order to prepare a fully-fledged, sustainable platform managed by Member States, associated countries and stakeholders in the following years. A critical part of the future UNCAN.eu platform will be to ensure data interoperability and re-utilisation, while guaranteeing full protection of privacy and applying FAIR²⁶ data principles. The platform will be built in line with concepts such as privacy-by-design, differential privacy and federated learning, as such fully contributing to the European Data Strategy.

Implementers: Academia, citizens/patients, SME/industry/charities, Member States

This is the first action to start with in 2021. To follow, and in order to make effective use of this platform, Horizon Europe **calls for proposals in 2022-27** will be launched in order to:

(2) Better understand healthy versus cancer cells at individual and population level (2021-2028): how do healthy and cancer cells interact and develop because of risk factors in environment, at work, because of pollution, lifestyle, diet, physical inactivity, obesity (risk factor for multiple cancers), nutrition, microbiotics, during pregnancy, etc., in poorly understood childhood and adult cancers at all stages of cancer, any age or part of society. Stage: Pre-clinical / early clinical.

Implementers: Academia, citizens/patients, SME/industry/charities

(3) Better understand cancer-patient molecular, cell, organ, organismal interactions (2023-2029): study tumour-patient interactions at unprecedented detail in poorly understood childhood and adult cancers, taking advantage of novel models, biomarkers and technologies. Stage: Pre-clinical /early clinical.

Implementers: Academia, citizens/patients, SME/industry/charities

²⁶ FAIR principles: Findable, Accessible, Interoperable, and Reusable

(4) Determine the role of genetics in cancer (2024-2030): understand how underlying genetic and epigenetic changes predispose individuals to cancer and affect disease outcome (e.g. response to drugs) and assess individual cancer risk by means of polygenic risk scores. Stage: phase I & II trials.

Implementers: Academia, citizens/patients, SME/industry/charities

As **outputs** of these activities to be supported by the Mission, researchers will be able to:

- Develop new models, biomarkers, technologies for research (e.g. organoids, single cell analysis, imaging, data algorithms, diagnostics).
- Better understand the biology, differences of time of onset, prognosis, and disease characteristics of childhood cancers, including sex and gender differences²⁷.
- Generate knowledge on the evasion of the patient's immune system by cancer, understand viral and microbial infections, better understand common and rare cancer subtypes in different age groups, effects of inflammation, role of healthy patient tissue and genetic changes in disease outcome and individual cancer risk over time.

The main **expected outcomes** of the activities undertaken include:

- A comprehensive understanding of the development and origin of cancer that enables rational approaches for cancer prevention, treatment and care and so reduce cancer incidence, improve outcomes for patients, such as living longer with cancer (survival) and with a better quality of life. This will also reduce societal and financial costs.
- Buy-in and **rational integration (synergies)** with European Strategy Forum on research infrastructures²⁸ (BBMRI²⁹, EUBi, EATRIS³⁰, ELIXIR³¹, etc.), European Health Data Space, EORTC Spectra platform, Lifetime, the 1+ Million Genomes initiative, the Cancer Imaging Initiative, the One Million Microbiomes from Human Project, research institutes, Comprehensive Cancer Infrastructures, patient organisations, and international genetic consortia.

One of the **targets** to monitor progress on the UNCAN.eu platform by 2030 is:

- 500,000 cancer-healthy tissue paired samples available in the platform with complete clinical outcome data³².

The targets and indicators will be further defined by the Monitoring Taskforce (see section 8).

These actions will be supported through the Horizon Europe programme, the Digital Europe programme (cancer imaging initiative), the Joint Research Centre (cancer registries), and national support (databases and registries) and research programmes.

Once the platform will be operational it could be envisaged to allow access to industry against fees. Charities and foundations are expected to come in to jointly financing the research activities.

²⁷ A few examples: the age-of-onset, prognosis, incidence and mortality of cancer in men and women differ; colorectal cancer and glioblastoma are clinically different diseases in men and women.

²⁸ www.esfri.eu

²⁹ European research infrastructure for biobanking : www.bbmri-eric.eu

³⁰ European Infrastructure for Translational Medicine: www.eatris.eu

³¹ www.elixir-europe.org

³² A large number of sample pairs is required to enable comparative analysis, e.g. presence of immune cells or genetic expression patterns in cancer tissue vs. healthy tissue.

2.2 Specific objective 2: Prevention including screening and early detection (prevent what is preventable)

The second specific objective of the Mission is to boost cancer prevention for EU citizens by generating knowledge on current and potential cancer risk factors, including interactions between multiple risk factors and by improving the performance of the existing screening programmes as well as, through research, developing new screening tools that can be integrated in new screening programmes and easily implemented at national level.

2.2.1 Prevention

Many of the actions proposed by the Mission Board under this specific objective have been included in the Europe's Beating Cancer Plan, which outlines a comprehensive policy and regulatory agenda on prevention. Furthermore, the Mission on Cancer helped shape the new Knowledge Centre on Cancer, launched by the Joint Research Centre (JRC) in June 2021, which will expand its European Cancer Information System (ECIS) and its Health Promotion and Disease Prevention Knowledge Gateway to become an 'evidence clearing house' on prevention.

The EU Legislation on occupational safety and health (OSH) is essential to ensure and protect the health and safety of the almost 170 million workers in the EU. Good OSH legislation is a prerequisite for a healthy and productive workforce and it is an important aspect of both competitiveness and sustainability of the EU economy. Despite the progress, there were still many workers dying each year from work-related illness. Carcinogens contribute to an estimated 100,000 occupational cancer deaths at the workplace each year. The EU commitment to fight work-related cancer is also in line with the strategy of the Roadmap on carcinogens³³ 2020-2024. Maintaining and improving protection standards for workers and prevention of cancers at work is an ongoing effort of the EU OSH legislation.

Therefore, this specific objective will complement and enhance the implementation of existing EU and national prevention policies through comprehensive knowledge generation, including evidence for design and innovative concepts for implementing effective measures. Through its citizen engagement activities, the Mission will systematically integrate citizens' feedback on prevention measures, help tailor those to the specific needs of different population groups, which will accelerate the achievement of prevention targets.

It will not only support the broad and cross-policy prevention agenda of the Europe's Beating Cancer Plan but also represent a unique knowledge platform, which provides targeted evidence on a continuous basis to support many other EU and national initiatives beyond cancer, for example longitudinal cohort studies, implementation and real world outcomes research on prevention strategies, risk factors and determinants of health behaviour and social change, such as commercial determinants of health (e.g. campaigns to allure young people into consumption of tobacco, alcohol and unhealthy diet) or social and environmental determinants of health (e.g. inadequate transportation, unsafe neighbourhoods).

Actions

(1) Develop a one-stop cancer information centre on prevention (2022-2025): With support of the Mission, the JRC's Knowledge Centre on Cancer and its 'Health Promotion and Disease Prevention Knowledge Gateway' will become an evidence-clearing house to support Member States in

³³ <https://roadmaponcarcinogens.eu/>

implementing effective cancer prevention strategies, including health promotion programmes. Data and best practices from all Member States will be systematically collected and analysed. Specific improvements will be suggested to the Member States as part of an on-demand policy support facility, including where the experience of other Member States can be emulated. Peer reviews or other knowledge exchange mechanisms will be facilitated. In 2021, the evidence will be provided with the results of ongoing research³⁴, but from 2022-2023 onwards additional research will be launched under actions (2) and (3), based on gaps identified with the Member States.

Implementers: Academia, Member States, regions, citizens/patients, JRC, WHO/IARC

(2) Boost research and innovation into risk assessment (2024-2027): To provide evidence that underpins and complements all relevant Commission policies, which address risk assessment (chemicals, environment, work), such as the protection of workers from the risks related to exposure to carcinogens or mutagens at work (EMPL), the future Partnership on Assessment of Risks from Chemicals (RTD), and the new database for information on Substances of Concern In Products (SCIP)³⁵, managed by the European Chemicals Agency (ECHA). Stage: observational studies.

Implementers: Academia, citizens/patients, SME/industry

(3) Conduct implementation research on cancer prevention (2022-2030): To reduce the incidence of cancer as a public health problem by addressing bottlenecks and barriers identified through research carried out while proven solutions/ strategies are implemented at the level of local communities, regions and Member States (i.e. taking into account differences across Europe). Examples include addressing known risk factors (tobacco, harmful consumption of alcohol, diet, physical inactivity, exposure to UV and Radon), mutagens, carcinogens, environmental pollution (air, soil, water, and food), health literacy, and determinants of health (e.g. socio-economic, commercial). Stage: late stage clinical trials, observational studies.

Implementers: Academia, citizens/patients, SME/industry

(4) Establish synergies on prevention with other missions (2023-2026): Actions under the other four Missions³⁶ (described in the sections on synergies) will help prevent the development of cancer. In turn the mission on cancer through actions on sustainable procurement (e.g. to increase energy efficiency of healthcare services and buildings), and prevention of contamination of food and water with pharmaceuticals/chemicals will contribute to help the other missions achieve their goal. The national mission hubs will form the entry point for policy dialogue on all of these actions at Member State level.

Implementers: Academia, SME/industry, citizens/patients, Member States, regions, health NGOs

As **outputs** of these steps, policy-makers will have access to:

- Evidence on effective prevention measures;
- Evidence on new carcinogens.

The **expected outcomes** of & targets for activities undertaken include:

- At least five new health promotion and prevention strategies developed, which are tailored to the needs of vulnerable populations (including but not limited to people with disabilities, migrants

³⁴ Examples: SMOKEFREEBRAIN: <http://smokefreebrain.eu/> ; EUREST-PLUS: <http://ensp.network/eurest-plus/>

³⁵ <https://echa.europa.eu/scip>

³⁶ climate neutral and smart cities; soil health and food; healthy oceans, seas coastal and inland waters; adaptation to climate change, including societal change;

and ethnic minorities, homeless people, children, pregnant women, the elderly and other socioeconomically disadvantaged groups)³⁷.

One of the suggested **indicators** to monitor progress by 2030 for all 27 Member States and associated countries is:

- Number of prevention programmes addressing childhood and adult populations established in each Member State;

The targets and indicators will be further defined by the Monitoring Taskforce (see section 8).

These actions will be funded under Horizon Europe, including Partnership on Assessment of Risk from Chemicals (risk exposure), supported by the JRC (new Knowledge Centre on Cancer (KCC), including the update and extension of European Cancer Information System (ECIS)), EU4Health Programme (e.g. HPC vaccination, European Code against Cancer, best practices, etc.), Erasmus+ programme (training), national prevention programmes, and research organisations such as the European Organisation for Research and Treatment of Cancer (EORTC)³⁸.

Actions 2 and 3 will benefit from the activities of the Smart Cities Mission and the Soil Health Mission to help achieving impact on prevention. The EC Group of Chief Scientific Advisors will prepare scientific advice on cancer screening by early 2022³⁹.

2.2.2 Screening and early detection

(1) Optimise and improve access to existing screening programmes (2024-2029): through research, and in close collaboration with the Knowledge Centre on Cancer and the Member States, the Mission will identify weaknesses and possibilities to improve current cancer screening programmes in order to make them faster, more accurate and more personalised. Member States will be able to request support under the Technical Support Instrument to improve their screening programmes. The evidence on weaknesses and possible improvements will be provided with the results of ongoing research⁴⁰ but later additional research funded by Horizon Europe will be based on gaps and opportunities identified with the Member States.

Implementers: Academia, Member States, regions, healthcare and insurance providers

(2) Develop new methods and technologies for screening and early detection (2021-2026): through research the Mission will develop non-invasive (or minimally-invasive) cancer screening and detection methodologies ('integrated diagnostics' - imaging, tissue, fluid, clinical biomarkers), also using Artificial Intelligence. In dialogue with the Member States and with support from the JRC, it will bring them into everyday medical practice with the aim to enhance participation of the target population in population-based screening programmes. The COVID-19 pandemic with its detrimental impact on cancer screening and early detection has demonstrated the need for more agile screening methodologies (e.g. self-sampling, home-based, digital apps). This action will therefore be a priority action under Horizon Europe work programme 2021. Stage: Technological Readiness Level 4 and above.

Implementers: Academia, citizens/patients, SME/industry

³⁷ https://ec.europa.eu/employment_social/2010againstpoverty/extranet/vulnerable_groups_en.pdf

³⁸ [European Organisation for Research and Treatment of Cancer - EORTC : EORTC](https://www.eortc.org/)

³⁹ [Cancer screening | European Commission \(europa.eu\)](https://ec.europa.eu/health/cancer/screening/)

⁴⁰ Examples: MYPEBS, <https://www.mypebs.eu/>; EU-TOPIA, <https://eu-topia.org/>

(3) Develop early predictors/tests (2025-2030): through research the Mission will develop early predictors before the onset of disease (i.e. at asymptomatic stage), so that people can anticipate and adapt accordingly. Integrating the use of these predictors in national health systems, treatments will be possible at an earlier, potentially curable stage, which will reduce treatment morbidity, healthcare costs and prospects to overcome the disease. Stage: Technological Readiness Level 4 and above.

Implementers: Academia, citizens/patients, SME/industry

As **outputs** of these steps,

Policy-makers will have access to:

- Evidence on new, non-invasive cancer screening methods that can be integrated in screening programmes.

Clinicians will be able to use:

- New laboratory tests in their clinical practice to assess the individual risk to develop cancer.

The **expected outcomes of and target for** activities undertaken include:

- At least five validated early detection methods ready to be included into screening programmes.

One of the suggested **indicators** to monitor progress by 2030 is:

- The number of national or regional population-based screening programmes whose design includes risk-based approaches.

The targets and indicators will be further defined by the Monitoring Taskforce (see section 8).

These actions will be funded under Horizon Europe, including the Innovative Health Initiative (research on diagnostics), the EU4Health programme (data collection to assess screening programmes), S&T support from the JRC (KCC, ECIS), the Digital Europe programme (Cancer Imaging Initiative), Technical Support Instrument (technical assistance to implement screening programmes), Erasmus+ programme (training programmes), the Marie Skłodowska-Curie Actions and the European Institute of Innovation and Technology (research and innovation), and national programmes (e.g. screening).

2.3 Specific objective 3: Optimise diagnostics and treatment

The third objective of the Mission is to optimise the diagnostics and treatment of cancer based on the principle of equitable access. This applies not only to the results of high-quality cancer research, but also to ensure patients have access to the latest, most personalised, minimally invasive treatments for their conditions, and with minimal secondary effects. The specific biology and needs of childhood cancers, along with cancers in adolescents and young adults, should be fully taken into account when developing new treatments. There is a uniform use of quality criteria set by accreditation standards. Health professionals should be regularly re-trained on new technologies for diagnosis and standards of care.

Actions

(1) Support the creation of a Network of Comprehensive Cancer Infrastructures (CCIs) by 2025 (2021-2025): the Mission will develop a quality assurance scheme valid for EU-27 and associated countries, to complement the set-up of a network of CCIs across Member States established through the Europe's Beating Cancer Plan, and support future research, training, and awareness raising/communication activities. A mission approach will provide the framework to join the expertise and experiences of existing CCIs and to-be CCIs, and co-design the way in which the network can be established, improved, enhanced and sustained through EU-wide agreements and continuous engagement of patients and other stakeholders. These CCIs will consist of either national or regional infrastructures that provide

resources and services to support, improve and integrate cancer care, research, training of care professionals and education for cancer patients, survivors and families/carers. Once set up at regional and/or national level, the CCIs are envisaged to form a network between Member States to enable cross-border cooperation that will improve patients' access to high-quality cancer care and clinical trials on innovative diagnostics and treatments; the thematic European Reference Networks on cancer will be closely associated with the CCIs.

Implementers: Academia, healthcare providers, citizens/patients, SME/industry, Member States

(2) Develop twinning programmes (2024-2028): to ensure a common understanding of excellent care and knowledge sharing for better equity in access to quality care as well as research activities to be carried out by CCIs, the Mission will develop twinning programmes between comprehensive cancer centres in western and eastern Europe, which focus on the management of lung, breast, prostate and colorectal cancer as well as rare, including childhood, cancers. This will include education, health service organisation, criteria for clinical trials, deployment of innovative solutions, exchange of guidelines, a best practice programme with technical support, monthly tumour boards, and short stays of oncologists, radiation therapist, surgeons, and other relevant health staff.

Implementers: Academia, Member States, healthcare providers, citizens/patients

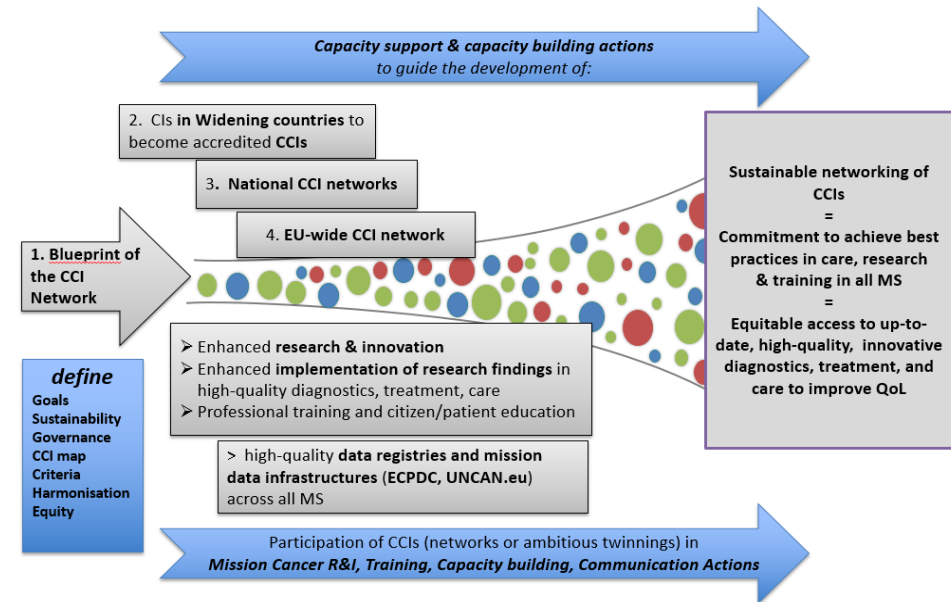
(3) Develop a clinical trial programme on diagnostics (2023-2027): the Mission will support an innovative clinical trial programme focused on diagnosis optimisation, building on existing and minimally invasive diagnostic techniques, including imaging, and/or implementation research of validated AI-powered integrated diagnostic methods (e.g. imaging, tissue, fluid, clinical biomarkers). Stage: Phase II / III clinical trials.

Implementers: Academia, citizens/patients, SME/industry/charities, healthcare providers

(4) Develop a clinical trial programme on treatments (2022-2023): the Mission will support an innovative clinical trial programme on optimising treatments through advanced personalised medicine approaches, putting patients at the centre, in particular trials with a focus on better quality of life (e.g. de-escalation radiation treatment, minimally invasive surgical / radiological /endoscopic treatment), including for rare cancers. Stage: Phase II & III clinical trials.

Implementers: Academia, citizens/patients, SME/industry/charities, healthcare providers

In terms of priority setting for 2021-2023, the Mission will start with the treatment-related action and research support for the development of Comprehensive Cancer Infrastructures and twinning programmes, to then focus on diagnostics (as there are breakthrough innovations in this field that need to mature before additional research could bring products to the market).



As **outputs** of these steps,

Health professionals will be able to use:

- optimised diagnostic methods;
- new/optimised treatment modalities, including new drugs and technologies, covering adult rare and childhood cancers (all childhood cancers are rare).

Patients will:

- have improved access to comprehensive cancer structures in their country, which apply high standards of care;
- benefit from improved diagnostic technique and treatment methods;

The **expected outcomes** of activities undertaken include:

- A clinical trial network throughout the EU-27 to support the sustainable conduct of academic trials;

Some of the main suggested **targets including indicator** to monitor progress by 2030 are:

- 90% of eligible cancer patients have access to CCIs by 2030;

The targets and indicators will be further defined by the Monitoring Taskforce (see section 8).

These actions will be funded through the Horizon Europe, including Innovative Health Initiative (research on diagnostics and treatments), Partnership on Transforming Health and Care Systems (digitalisation of health systems), and Partnership for personalised medicine (development of diagnostics and treatments), EU4Health programme (creation of CCIs, Treatment Capacity and Capability Digital Mapping' project) as well as EURATOM (research on diagnostic and cancer therapies involving radiation), industry (development of therapies). The Erasmus+ programme, the Marie Skłodowska-Curie actions and the European Institute of Innovation and Technology will also contribute through training, education, research and innovation. Other expected funding sources include national funding, as well as, depending on the countries/regions initiatives, Cohesion Funds (CCIs, medical equipment), RRF (some Member States, such as CZ, have included actions on cancer) and EIB loans (CCIs, PALLAS new medical

isotopes reactor⁴¹). Charities, such as the Anticancer Fund,⁴² CERN, and organisations like EORTC, SIOPE, E.C.O., EAPM, may contribute as well.

2.4 Specific objective 4: Support quality of life

The fourth objective of the Mission is to improve the quality of life of cancer patients, survivors and their families through widely analysing all key factors and needs that are related to the quality of life (QoL). This includes also developing early predictors for QoL, less affecting therapies, better monitoring, novel diagnostic technologies and more engagement for palliative care.

Actions 1 and 2 will be prioritised under the Horizon Europe Work Programme 2021/22 as they constitute the ‘human face’ of the Mission and form the basis for engaging with citizens, allowing to address their needs and also get a better understanding of inequalities in access to care.

Actions

(1) Collect and analyse data on today’s unmet needs of cancer patients and survivors (2021-2025):

Using a co-design approach with patients, communities and researchers through Living Labs, quality of life metrics and indicators will be developed to capture key elements of quality of life from the perspective of those affected by cancer, based on their personal life goals and values. Existing QoL care data from surveys and registries and Real World Data will be analysed together with patients with the intention to collect patients’ needs, to identify problems, to fill gaps and to validate sets of minimal QoL items and approaches for each type of cancer. Newly defined, harmonised and systematic QoL surveys will be launched regularly at different intervals across all countries in order to compare and define highest QoL levels. This systematic approach should cover subjective perceptions of the positive and negative aspects of cancer patients’ symptoms, including physical, mental, emotional, social, cognitive functions, disease symptoms and treatment side effects as well as needs for palliative care. Supportive care and counselling approaches should be reviewed, compared and enhanced so that patients and survivors can better achieve their personal life goals. Barriers for palliative care will be identified in order to develop strategies for better and extended palliative care services. The awareness about the benefits from palliative care will be enhanced in areas of absence, misconception or insufficient awareness. Improving the cancer journey also implies changes in workforce requirements, capacities and trainings to achieve high level data collection, storage and analysis. In addition, explanatory guidelines for citizens and patients will be developed. Information collected should be fed back to researchers, care providers, industry as well as policy makers so more timely and supportive care can be provided and relevant research actions or policy measures taken.

Implementers: Academia, citizens/patients, SME/industry/charities, healthcare and insurance providers

(2) Set up of the European Cancer Patient Digital Centre (2021-2023): to provide personalised care for cancer patients and survivors the Mission will set up a European Cancer Patient Digital Centre (ECPDC), starting with a study on feasibility, utility and sustainability of the ECPDC.

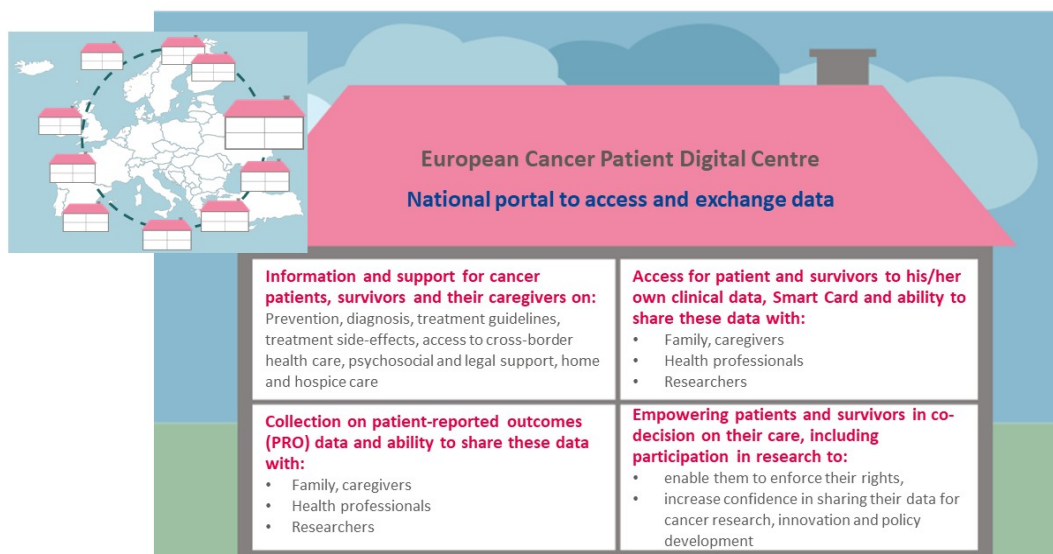
Patients and survivors will be able to access their own clinical data, to deposit clinical and patient-reported health data in a standardised, ethical and interoperable manner, and share their data with healthcare professionals and researchers in a secure way. The ECPDC should provide QoL information at the individual level, and it should monitor treatment side-effects and other outcome measures through standardised patient-reported outcome and experience measures (PROMs, PREMs). Moreover, patients

⁴¹ In planning phase. [PALLAS. Vital - Pallas Reactor](#)

⁴² [Investing in promising cancer treatments, putting patient needs first \(anticancerfund.org\)](#)

would receive a ‘smart card’⁴³ with personalised information on diagnosis, treatment and follow-up recommendations to foster a long-term, individual care plan, which will be funded under the EU4Health Programme.

Data within the ECPDC will also be a valuable resource for research to improve the understanding of the global and real impact of cancer on patients and survivors’ lives. The chart below describes the main functions of the ECPDC in more detail: information and support for cancer patients, survivors and their families and caregivers; patient access to their own clinical data, collection of patient-reported outcome data, and patient empowerment for co-decision around care or participation in scientific research (e.g. clinical trials).



The ECPDC will be a virtual network of national infrastructures of patient-controlled health data, integrated within a larger European network of infrastructures, to which each Member State should have a single access portal. All nodes should have common features (e.g. reference point for information, data access and exchange at patient level, secondary use of data for research) and, if relevant, additional country-specific functions. To fully play their roles, the ECPDC national nodes should also be adequately connected to cancer registries, which are a key resource for studying quality of life. The ECPDC will be developed under the European Health Data Space (EHDS), which will enable cancer patients to securely access and share electronic health records for prevention and treatment across borders, and build on the first EHDS pilots on the secondary use of health data, currently under development. These pilots will develop the needed research infrastructures and will be their testbeds and demonstrators for concepts that can scale up and become an EU-wide infrastructure enabling use and re-use of health data in health research, including in cancer research, across Europe.

Implementers: Academia, Member States, regions, citizens/patients, SME/industry, healthcare and insurance providers

(3) Develop early predictors for quality of life (2024-2030): through innovative research and innovation projects under Horizon Europe, the Mission will develop early predictors for the quality of life of cancer

⁴³ Builds on successful R&I efforts and piloting of the survivorship passport *SurPass* by the childhood cancer community, <https://www.sciencedirect.com/science/article/pii/S0959804918309651?via%3Dihub>

patients and survivors. Quality of life can be reduced by weight loss, systemic inflammatory responses, microbiome dysbiosis or other processes. Comprehensive analysis of these processes, physical functions and quality of life data will help to identify early predictors for the life situation of patients, survivors and their families.

Implementers: Academia, citizens/patients, SME/industry

(4) Design monitoring programmes for survivors of childhood cancer (2021-2027): the Mission will develop longitudinal monitoring programmes for patients afflicted by childhood cancer, which include vulnerability due to early life disruption and potential adverse effects in adulthood.

Implementers: Academia, citizens/patients, SME/industry

As **outputs** of these steps,

Researchers will have:

- More systematic access to a new type of data for research on cancer (e.g. data reported by the patient).

Health professionals will be able to:

- Use new parameters to predict quality of life and prescribe the necessary supportive measures.

Patients and survivors will be able to:

- Have improved access to their clinical and patient-reported data and share it with other healthcare professionals or researchers;
- Receive a 'smart card' (health passport) providing personalised information and support;
- Have increased access to research and clinical trials.

Health policy makers will be able to:

- Monitor progress in ensuring that care provided meets the needs of those affected by cancer and act accordingly.

The **expected outcomes** of activities undertaken include:

- A better understanding of unmet needs of cancer patients, survivors and their families;
- Better supportive and end-of-life care and counselling, thereby reducing societal costs and achieving better quality of life with a focus on cancer patients, survivors and their families;
- Better access to supportive and end-of-life care and counselling services throughout the EU-27;
- Creation of innovative jobs and growth in the area of supportive care and counselling, including for food, sports, services, diagnostics, med-tech and pharmaceutical industries.
- One living lab set up in each Member State to discuss 'quality of Life with cancer' metrics for regular surveys by 2030;

The main suggested **targets including indicators** to monitor progress by 2030 are:

- All Member States report on the QoL survey by 2023;
- Better supportive and end-of-life care and counselling, with reduced societal and financial costs, achieving better quality of life for at least 50% of cancer patients, survivors and their families throughout the EU-27 by 2030.

The targets and indicators will be further defined by the Monitoring Taskforce (see section 8).

These actions will be funded through Horizon Europe, the EU4Health programme (EU Network of Youth Cancer Survivors, Cancer Survivor Smart Card, EHDS), Digital Europe Programme (Cancer Survivor Smart Card), ESF+, ESTAT (surveys), JRC (ECIS), national funding (development and implementation of surveys),

patient organisations (e.g. patient reported outcomes), and organisations such as EORTC, SIOPE, E.C.O., and EAPM. The Erasmus+ programme, the Marie Skłodowska-Curie actions and the European Institute of Innovation and Technology will also contribute to these actions through education, training, research and innovation.

3. Budget

Resources needed for the implementation of the Mission on Cancer will come from multiple sources, supporting different stages for the development and deployment of solutions for end-users, from basic, translational and clinical research through the uptake by health systems, to broad deployment at national and local level. Enablers, such as appropriate R&I and healthcare infrastructures or next-generation professional curricula, will also be supported.

For (physical or digital) infrastructure-related investments, the Mission will mainly rely on the EU4Health programme 2021-2027 and the Digital Europe programme 2021-2027. Cohesion Policy Funds are also expected to contribute in that respect, as well as the JRC's Knowledge Centre on Cancer.

For the research component, including the facilitation and coordination of research activities, of the Mission, Horizon Europe funding and the Horizon Europe partnerships (see below under synergies) will be the main source, complemented by funding from philanthropies and charities as well as contributions of industry through research funding and (potential) fees for use of data.

The Horizon Europe legal base states that up to 10% of the thematic clusters under pillar 2 may be allocated to support missions. This implies that up to 10% of the health cluster will be available from **Horizon Europe to support the Cancer Mission** directly with a budget of minimum €378 million for the first three years⁴⁴.

These funds will be the main source of research and innovation funding for the Mission as well as facilitation and coordination of research activities. Synergies with other Horizon Europe pillars (e.g. ERC, EIC) will be explored. Significant additional resources will be required to improve the accessibility of health systems and support their digital transformation. The Horizon Europe Mission budget will therefore be deployed as “seed” investment aimed at catalysing, unlocking and coordinating additional financing from other sources.

In terms of R&I activities, Horizon Europe funds will be instrumental in (i) improving understanding of cancer (specific objective 1); (ii) providing the evidence and supporting implementation research for better prevention, screening and early detection (specific objective 2); (iii) providing the evidence basis for new or improved diagnostics and treatments, while supporting the development of enabling infrastructures and twinning programmes (specific objective 3); and (iv) identifying the key determinants of quality of life and how to best embed these throughout patient-centred care pathways for best quality of life outcomes (specific objective 4).

The **Horizon Europe WP2021-2022** foresees four topics on cancer: (i) improved supportive, palliative, survivorship and end-of-life care for cancer patients; (ii) developing data-driven decision-support tools for better health care delivery and policy-making; (iii) to support infrastructure development; and (iv)

⁴⁴ Subject to approval of Member States

EIC Pathfinder⁴⁵, with a total budget of € 215 million. The **Horizon Europe Mission WP 2021-2022** will also include a Coordination and Support Action (CSA) to prepare a blueprint for UNCAN.eu (€3 million) and procurement actions, including a study on feasibility, utility and sustainability of the European Cancer Patient Digital Centre.

The **Erasmus+ programme, Marie Skłodowska-Curie actions and European Institute of Innovation and Technology (EIT)** are expected to provide up to a total of €500 million⁴⁶ for projects in education, training, research in the field of cancer and the promotion of healthy life styles. Due to the bottom-up nature of these programmes, the funding cannot be provided through dedicated calls. These programmes are expected to contribute to all four specific objectives. The **sport chapter of the Erasmus+ programme** funds projects promoting physical activity. Besides the general preventive role of physical activity, several projects focus specifically on cancer patients.

The **EU4Health programme 2021-2027** will fund many initiatives outlined in the Europe's Beating Cancer Plan, including major actions proposed by the Mission on Cancer, with a **total of €1.25 billion** over the 2021-2027 period. EU4Health will also finance the European Health Data Space, under which the European Cancer Patient Digital Centre will be developed, a key element of the specific objective 4.

The EU4Health programme will facilitate the uptake of best practices in prevention, screening and early detection (specific objective 2), and improve diagnostics and treatment (specific objective 3) for instance via the creation of a Network of Comprehensive Cancer Infrastructures. The **EU4Health WP2021** will focus on the Comprehensive Cancer Centres, improvement of early detection, cancer training programme, and human papillomavirus vaccination campaigns. The subsequent WPs are expected to increase in volume over the spending period.

The **Digital Europe Programme 2021-2027 (DEP)** will provide financial support of up to €250 million for cancer-related actions. It will reinforce EU's digital capacities by focusing on the areas of artificial intelligence (AI), cybersecurity, advanced computing, data infrastructure, governance and processing. The programme will promote deployment and best use of these concepts in the health sector to maximise the benefits of digitalisation of health and care and bring benefits under all 4 specific objectives of the Mission on Cancer. The **Work Programme 2021** will support the establishment and deployment of a pan-European digital infrastructure facilitating access to cancer images and related patient data (specific objective 1), for more precise and faster clinical decision-making, diagnostics, screening, treatments and predictive medicine (specific objectives 2 and 3). It will also support the deployment of the infrastructure needed to make genomic data securely accessible across EU borders (specific objectives 1, 2 and 3). The AI-on-demand platform and the Testing and Experimentation Facilities for Health will foster integration, testing and validation of advanced AI-based technologies, with the aim of advancing personalised medicine and person-centered care while ensuring compliance with relevant legal, ethical, quality and interoperability requirements.

The newly established JRC's **Knowledge Centre on Cancer (KCC)** will underpin all specific objectives of the Mission, with the diffusion of science and technology knowledge, and fostering the development and uptake of best practices.

The majority of Member States and regions have used **Cohesion Policy Funds** for investments in the health sector in the past. With the clear commitment from the Member States to tackle cancer, these

⁴⁵ https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021/wp_horizon-eic-2021_en.pdf

⁴⁶ This indicative amount reflects the budget of previous cancer-related projects in the period 2014- 2020.

funds, as well as synergies with the Recovery and Resilience Facility, could support the Mission actions. Given the impact of the pandemic on cancer prevention and care, it is likely these investments will aim to recover the backlog through health systems reengineering, to improve cancer prevention and care. Loans from the **EIB** will further help strengthen these investments.

The **Technical Support Instrument**, which can advise on reforms in EU Member States, could be central in facilitating the transformation of health systems. The Mission on Cancer will play an important role to guide national investments and to promote cross-sectoral cooperation, which is key to developing integrated solutions in the health sector⁴⁷.

The **Cohesion Policy Funds** will support actions ranging from health promotion and disease prevention (specific objective 2), improving access to early detection and screening (specific objective 2), and treatment (specific objective 3), as well as research and development projects (all specific objectives, but mainly specific objective 1). For instance, the 'Fast Breast check project'⁴⁸ in Italy is developing a medical device to support better screening of breast cancer. Further opportunities exist to use the funds to address issues identified within the European Semester cycle, including health inequalities. For the Mission on Cancer, Member States and regions could use the funds to invest into comprehensive cancer centres, the implementation of telemedicine solutions, or health workforce skills. The smart specialisation strategies will help guide regional prioritisation in cancer. As Cohesion policy funds are under shared management, Member States and their national and regional authorities will be responsible for setting priorities on the basis of existing needs and for their implementation.

The **Recovery and Resilience Facility (RRF)** represents a great potential for contributing to addressing major issues such as the ones identified by missions. All Member States indicated health as a broad priority area for reforms and investments within their Recovery and Resilience Plans (RRPs), and a number of RRP will include cancer-specific actions⁴⁹. Member States can also use RRF funds for their contribution to Horizon Europe partnerships.

The **Technical Support Instrument** provides on demand tailor-made technical expertise to support Member States in institutional, administrative, and growth-enhancing reforms. The total budget for the instrument is €864 million for 2021-2027 and the support does not require co-financing by Member States. The support can include strategic and legal advice, studies, training and expert visits on the ground, covering the whole cycle of reforms (all specific objectives). Member States can also request support to prepare, amend, implement and revise national plans under the RRF. In the past, Member States used this instrument for colorectal cancer screening (IT, SK, RO). In 2021, Latvia and Slovakia requested support to improve cancer screening policy, which will include recommendations on cancer registry, governance of the system, preparation for OEI accreditation, data collection tools, data flow, access, and management and accountability framework for quality assurance of cancer screening. This project is expected to run for around two years.

EIB investments and long-term loans at advantageous conditions for SMEs and Member States (venture debts) will be an important source of funding. Activities supported by the EIB include (i) specialised infrastructures for treatment (e.g. tertiary hospitals, cancer treatment centres, university teaching

⁴⁷ [Final Report ESI Funds for Health 2.pdf](#)

⁴⁸ Home - Fast Breast Check Project (fastbreastcheck.org)

⁴⁹ This is a preliminary assessment given that some RRP are still under assessment by the Commission and others still require approval by the Council of the European Union based on the proposal by the Commission; see https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en#national-recovery-and-resilience-plans

hospitals), (ii) medical R&D, (iii) Cancer control programmes (infrastructure, equipment, software), and (iv) education of medical professionals. For the Mission on Cancer, Member States may use these investments to create Comprehensive Cancer Centres (relevant to all specific objectives, but notably to specific objective 3). Future investments should be linked to the new European guidelines and quality assurance schemes for screening, diagnosis and care, as outcome of the Mission on Cancer.

The InvestEU programme has the potential to fund infrastructure (all specific objectives) and R&I (specific objective 1), develop pathways/pipelines with clear funding strategy and less invasive diagnostics and treatments (specific objective 3).

Funding from **national research programmes**, aligned to the area of intervention.

Private sector investments, including foundations/charities, are equally important to be considered, for example when it comes to drug development and therapies, also as part of partnerships under Horizon Europe such as the Innovative Health Initiative (see following section on synergies).

4. Synergies

Apart from the Europe's Beating Cancer Plan, there are several other EU initiatives, which will help achieve the goal of the Mission on Cancer. They are presented by intervention area. Regular interactions between the Mission team and the leaders of these different initiatives should ensure appropriate synergies in implementation and avoid duplication of efforts.

Understanding

For a better understanding, the **Partnership on Assessment of Risk from Chemicals** (PARC; EU contribution €200 million)⁵⁰ aims to, as part of its science-policy agenda and its outreach activities, establish synergies with the missions, with a special focus on the Mission on Cancer, to ensure information exchange about exposure, hazard and risk of the prioritised chemicals substances. This dialogue may enable the Mission on Cancer to flag any special interests related to chemical risk assessment. PARC aims to ensure the integration of results into regulatory policy and inform relevant EU and national consultations, which would be relevant for prevention measures under both cancer initiatives. The preceding project, Human Biomonitoring 4 EU (HBM4EU)⁵¹ envisages to provide a specific policy brief on carcinogenic substances it has monitored in the general public and in occupational settings, which can inform the implementation of the Mission. Both the policy brief and the new Partnership PARC are expected to provide evidence that can be integrated in the Knowledge Centre on Cancer, feed the UNCAN.eu platform, and inform the policy dialogue on prevention measures with Member States.

The **European Cancer Information System** (ECIS) plans to open a new section on paediatric cancers, geo-positioning cancer data and linking with relevant (e.g. cancer determinant) data sources. It will also help bring together data to include treatment and staging variables, and to cover data on rare cancers via the EU Platform on Rare Diseases Registration, in collaboration with the European Reference Networks and including information from Biobanks (BBMRI). Access to these data bases will be integrated in the UNCAN.eu platform.

Prevention

⁵⁰ [ec_rtd_he-partnerships-chemical-risk-assessment.pdf](https://ec.rtd.he-partnerships-chemical-risk-assessment.pdf) (europa.eu)

⁵¹ <https://www.hbm4eu.eu/>

In terms of prevention, the **Chemicals Strategy for Sustainability**⁵² aims to deal with hazardous chemicals more rapidly, and effectively reduce the exposure of consumers and professionals to carcinogenic substances, or to other hazardous chemicals that interfere with the endocrine and immune systems. It will also support an R&I agenda for chemicals for the development of safe and sustainable alternatives, which will guide possible research investments under the Mission.

The future **Zero Pollution Action Plan**⁵³, adopted on 12 May 2021, aims to secure healthy ecosystems and a healthy living environment for Europeans through better prevention, mainstreaming the zero pollution ambition into all policy developments, further decoupling economic growth from the increase of pollution, and strengthening the links between environmental protection, sustainable development and well-being. Creating healthy living environments requires eliminating pollution sources such as aerosols and fine particles that are risk factors for (lung) cancer development. Implementation of the Zero Pollution Action Plan will therefore be a direct contributor to achieving the Mission impact on prevention.

The Erasmus+ programme for education, youth and sport aims to contribute to the understanding and prevention of cancer through educational activities, such as student and staff mobility, cooperation and policy reform projects. These capacity building activities will contribute to achieving objectives 2 (prevention), 3 (diagnosis and treatment) and 4 (quality of life) of the Mission. In the period 2014-2020, projects were funded for promotion of health, eating right and healthy lifestyles to prevent cancer; breast cancer screening; support for cancer patients – quality of life of patients and their care-givers; training for cancer health professionals; minorities and cancer; teaching about cancer in schools; cancer data collection and analysis. The **sport chapter of the Erasmus+ programme** funds projects promoting physical activity (104 projects promoting health-enhancing physical activity, 15 sport projects regarding schools and children). Besides the general preventive role of physical activity, several projects focus specifically on cancer patients. The Mission will capitalise on the results of these projects.

The new **HealthyLifestyles4all initiative**⁵⁴ aims to promote healthy lifestyles for all generations. A particular focus will be applied to prevention campaigns and raising awareness of the role of sport and physical activity. With over 15 million participants in 2020, the **European Week of Sport** contributes to the same goal.

There are important potential **synergies with the other four missions** that centre on preventing the development of cancer by limiting the exposure to environmental pollution and carcinogenic substances and lifestyle changes:

- The Soil health and Food Mission aims to promote a pollution free environment, organic farming, safe non-polluted food and healthier diets. This Mission will improve sustainable soil management applying new methods and technologies for measuring the impact of soil management practices on soil health. As consequence, less polluted soils as well as reduced fertiliser and pesticide inputs will ensure better water and air quality and reduce contamination of food with chemicals, which is a major step to reducing cancer.
- The Adaptation to Climate Change Mission aims to improve air quality and air pollution. This Mission will help to stay healthy in a changing climate, including with long-term healthcare related planning and early-warning and surveillance systems and solutions that support human health in the warming world. The Mission will be focusing on resilience towards health risks caused by the

⁵² <https://ec.europa.eu/environment/pdf/chemicals/2020/10/Strategy.pdf>

⁵³ https://ec.europa.eu/environment/strategy/zero-pollution-action-plan_en

⁵⁴ DG EAC initiative based on “Tartu Call for a Healthy Lifestyle (europa.eu)”

effects of climate change, such as more intense extreme weather events. The objective is to increase the quality of life and to guarantee the protection of vulnerable people at higher risk of cancer or mental illnesses such as children, senior citizens, people with disabilities, socially disadvantaged groups etc.

- The Oceans Mission aims to deliver breakthrough innovations to prevent, minimise, remediate and monitor pollution in the ocean and waters. The aim is to significantly reduce plastic, micro plastic, nutrient and chemical pesticides pollution. This Mission will put in place a system to accurately and systematically monitor, forecast and value the health of the ocean and water system as a whole. This approach supports also human health and the prevention of cancer, thus contributing to the objectives of the Mission by lowering the levels and intake of carcinogenic substances in the oceans and waters.
- The Climate Neutral and Smart Cities Mission aims to deliver innovative steps to reduce the urban transport footprint on the environment. It will limit the use of cars in urban areas, digitalise transport operations or developing public transport and biking/walking connections. This approach will enhance the quality of life by bringing massive benefits for citizens' health through better air quality, less road congestion and a healthy living environment. The prevention of cancer will be the consequence of healthier more active mobility and healthy lifestyle changes.

Screening, early diagnosis, treatment and quality of life

The **Innovative Health Initiative** (IHI; EU contribution €1.2 billion), a public-private partnership under Horizon Europe, planned to be set up in 2021, will aim to enable the cross-sectoral development and integration of technologies, know-how, products, and services for people-centred health care. The Mission on Cancer may define priorities for research through the Partnership. The activities supported by this Partnership should be pre-competitive, but may also extend to clinical research and its ambition is to demonstrate the feasibility of timely and well-substantiated integrated, people-centred health technology solutions for prevention, diagnosis, treatment, and management of diseases. IHI is expected to play an important role in supporting the innovation components of the Mission on Cancer, notably through research on diagnosis and treatment.

The proposed Horizon Europe **Partnership on Transforming Health and Care Systems** (EU contribution €100 million), planned to be operational in 2023, bringing together health and care authorities, regions, patients and healthcare professionals, will aim to ensure the transition towards more sustainable, resilient, innovative and high quality people-centred health and care systems. In the draft proposal published in June 2020⁵⁵, it is stated that the Partnership aims to search for synergies with the Mission on Cancer. This Partnership is expected to benefit from the scientific evidence gained from the research actions on diagnosis and treatment as well as on processes and workflows conducted by the Mission and the Horizon Europe health cluster to achieve its goal of transforming health and care systems.

Finally, building on the current **ERA-Net for personalised medicine** (ERA-PerMed⁵⁶), the proposed **Partnership for personalised medicine**, also supported by Horizon Europe (EU contribution €100 million) and to be set up in 2023, aims to encompass a wide spectrum of health and disease areas. As the field of cancer is already well-developed in personalised approaches and with the Mission on Cancer setting clear priorities, it is expected that many projects to be funded under this partnership will

⁵⁵ [ec_rtd_he-partnerships-health-system-transform.pdf \(europa.eu\)](#)

⁵⁶ ERA-PerMed has issued calls since 2018 and will continue doing so until the new partnership starts, has in its first three years funded projects to the tune of over 76 million Euros. Of those around 46%, or €35 million are devoted to projects focusing on cancer. This trend is expected to continue in the new partnership.

address cancer. The ERA-NET co-fund **TRANSCAN-3**⁵⁷ aims to support translational cancer research through cross-national joint calls for proposals, and by an efficient investment of dedicated national/regional public funding, leveraged with foundation/ charity-based resources and EU financial support (2021 - 2026). Regular interactions between the coordinators of these two initiatives and the mission manager should ensure that the research actions for the Mission are complementary to those for these two initiatives.

The recently launched **Strategic Agenda for Medical Ionising Radiation Applications (SAMIRA)** aims at securing the supply of medical radioisotopes in Europe, at improving quality and safety of the diagnostic and therapeutic applications of ionising radiation and at promoting research and innovation in medical applications of ionising radiation. For the 2021-2025 period, the **Research and Training Programme of the European Atomic Energy Community (EURATOM)** will support research on the protection of patients receiving diagnostic and cancer therapies involving radiation sources. This could complement the Mission actions on optimising diagnose and treatment.

The **Pharmaceutical Strategy** aims at supporting competitiveness, innovation and sustainability of the EU's pharmaceutical industry and at boosting the development of high quality, effective medicines, which will support the development of cancer diagnostic and treatments.

Furthermore there are several initiatives considered as more general 'enablers':

The future **European Health Data Space** should promote access to health data for better healthcare, research and policy-making, and to foster the development, deployment and application of digital services for the provision of healthcare. The developments under the European Health Data Space could support linking cancer registries and other sources of health information and that will foster research in diagnosis and treatment of cancer. More precise and faster clinical decision-making, diagnostics, treatments and predictive medicine can be achieved through deployment of digital infrastructures for secure access and federated/distributed analysis of health data, such as clinical, imaging and genomic data.

The Mission is expected to contribute to the **EU Digital Agenda** through building innovative digital infrastructures dedicated to cancer. In particular, the proposed European Cancer Patient Digital Centre, where patients will be able to share their own health data, and that will offer digital services to patients and to researchers, could become part of the future **European Health Data Space**, which should provide the framework for the secure exchange of health data throughout the EU.

The **Knowledge Centre on Cancer (KCC)**, launched in June 2021, will help foster alignment and coordination of EU cancer-related activities at the scientific and technical level. It will act as a knowledge broker, diffusing best practice implementation and issuing guidelines to feed the design and roll-out of new actions under the Europe's Beating Cancer Plan. Research carried out under the Mission on Cancer will support activities of the KCC, which will develop evidence-based European Guidelines and Quality Assurance Schemes for the prevention, diagnosis and treatment of breast, colorectal and cervical cancers. The use of the **European Open Science Cloud** to facilitate the safe exchange of research and health data at EU level will boost the development of the European cloud services.

The European Institute of Innovation and Technology (EIT) and its Knowledge and Innovation Communities (KICs):

⁵⁷ [TRANSCAN-3 Objectives and Partners | Transcan3 translational cancer research program](#), funded under Horizon 2020

- **EIT** can complement missions, through established cooperation between the businesses, education and research organisations and the integration of the knowledge triangle actors in these areas, especially the integration of the education dimension into the innovation web facilitate the creation of novel solutions and technologies.
- **EIT health and digital KICs** can contribute to the Mission with its experience in delivering holistic, transformative, citizen-driven and systemic solutions and innovations to global challenges that address the needs of the market and society, including in the area of healthy living or improved treatment and prevention.
- **EIT Innovation** may enable piloting of products, services or new business models, provide accelerated market access, and facilitate dialogue among innovation actors including citizens, offering an excellent environment for small companies to validate and scale-up their proposition.
- **EIT KIC education** programs and training modules can be developed in a way to support the Mission, so that students, entrepreneurs, professionals and workforce are equipped with the skills and competences suited for the future needs of societies and industries.

The European Universities Initiative⁵⁸ can contribute through collaborative work on education, research, innovation and service to society. They support interdisciplinary and inter-sectoral knowledge-creating teams of students, researchers, public and private sector to work together on cancer-related challenges for example via Living Labs, Innovation Hubs, Catalysts, Science Shops, Pop-up CityLabs, or Hackathons. They will conduct research on cancer, public health, precision medicine and personalised health care and share medical research infrastructure and patient cohorts.

In turn, the actions proposed for the Mission of Cancer are expected to serve other Commission initiatives such as the Artificial Intelligence Agenda, the digital transformation of health and care systems and others.

Artificial Intelligence and High-performing computing: The Mission on Cancer aims to contribute to the EU Artificial Intelligence (AI) agenda by creating and funding research programmes for developing AI diagnostic and therapies, based on the next generation of AI technologies. As an example, the AI potential could be harnessed to research new drugs through intelligent protein folding research. Equally, the Mission may promote High Performance computing for precision medicine, which is used for investigating how mutations in proteins can lead to cancer. Analysing data from simulations, scientists can design candidate drugs explicitly for mutated proteins. The recently adopted Communication “Fostering a European approach to Artificial Intelligence”⁵⁹ aims to create the EU global leadership on AI.

European Data Strategy: the Mission on Cancer calls for the setup of open data and modelling platforms that aim to foster the creation of new virtual environments will improve storage, management, analysis and re-use of research and clinical data, across borders and scientific disciplines, through the creation of the UNCAN.eu platform.

Digital transformation and skills: the Mission on Cancer is expected to advance digital transition of health systems through developing the European Cancer Patient Digital Centre and the network of Comprehensive Cancer Infrastructures. It aims to promote the development of digital skills among health professionals through education and training to increase the use of new technologies and

⁵⁸ https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

⁵⁹ <https://digital-strategy.ec.europa.eu/en/library/communication-fostering-european-approach-artificial-intelligence>, see also the revised Coordinated Plan on AI: <https://digital-strategy.ec.europa.eu/en/library/coordinated-plan-artificial-intelligence-2021-review>

artificial intelligence. Moreover, the proposed oncology-focused Living Labs are expected to enhance cross-sector research, knowledge-sharing and implementation of new technologies.

The **New European Bauhaus initiative**: the Mission on Cancer puts emphasis on cancer prevention and quality of life through the design of healthier living environments, including buildings, (mobile) screening facilities, and citizen engagement venues.

5. International collaboration

Actions implemented under the Mission on Cancer in Europe should synergise with and benefit from initiatives outside of Europe once the Mission is fully operational. Therefore international activities will mostly be planned for the second stage of the Mission implementation

The Mission on Cancer presents an opportunity to foster international collaboration in three different areas: on policies, on data sharing infrastructures and then collaboration among researchers across the globe.

With respect to dialogues on policies and best practices, initial collaboration will focus on prevention, on measures to implement the WHO Framework Convention on Tobacco Control fully or the WHO Best Buys⁶⁰ to reduce harmful alcohol consumption. As a starting point, the Mission will engage with WHO Europe through bilateral meetings to explore concrete areas for cooperation on cancer prevention as well as on cancer registries as a basis for monitoring. Within the framework for cooperation between WHO Europe and Commission, both partners are currently developing a common roadmap, which identified cancer as an important area for cooperation.

The setting up of the UNCAN.eu platform and the patient digital centre, both digital infrastructures for data sharing, may present an opportunity for collaboration on standard setting, data security and GDPR compliance with interested parties such as Canada and the UK. Some Horizon 2020 projects (such as EUCANCan⁶¹, CINECA⁶², euCanSHare⁶³, among others) are supporting collaboration with Canada for human data storage, integration and sharing to enable personalised medicine approaches could support such activities.

To boost effective international cooperation and feed policy on implementation research on cancer prevention in low- and middle-income countries and other low-resource settings (e.g. vulnerable populations in high-income countries), annual scientific meetings will start as of 2022 via the *Global Alliance for Chronic Diseases*, of which the Commission is a founding member⁶⁴.

Moreover, based on successful and unique cooperation modalities, the Mission could expand collaboration between networks working on childhood and adult rare cancers globally in recent years (e.g. Australia, Canada, Japan and the USA). Synergies could also be explored between the Mission and the USA's *Cancer Moonshot* initiative⁶⁵.

⁶⁰ https://www.who.int/ncds/management/WHO_Appendix_BestBuys.pdf

⁶¹ <https://eucancom.com/>

⁶² <https://www.cineca-project.eu/>

⁶³ <http://www.eucanshare.eu/>

⁶⁴ <https://www.gacd.org/perch/resources/admin/gacd-cancer-funding-call-textfinal-1.pdf>

⁶⁵ <https://www.cancer.gov/research/key-initiatives/moonshot-cancer-initiative>

6. Mission specific governance

Central governance

- The European Commission will be responsible for the Mission through a dedicated governance structure. In addition, the Mission on Cancer will benefit from a high degree of a joint approach for its implementation through the Europe's Beating Cancer Plan, which outlines a dedicated governance. A **mission manager** from DG Research and Innovation and a **deputy mission manager** from DG Health and Food Safety will lead the Mission and be its public face. A Mission secretariat will manage the Mission operations and ensure the interactions with other services, Member States, and stakeholders. The preparation of the activities under the joint governance structure will be shared with the DG SANTE cancer team on a weekly basis.
- As part of the governance structure common to all missions, the Mission manager and the deputy manager co-chair the **Missions Owners Group**. The Missions Owners group is composed of the key Commission services: SG, LS, BUDG, ENV, CNECT, JRC, MOVE, JUST, EAC, MARE, AGRI, REGIO, REFORM, AGRI, CLIMA, COMP, DEFIS, ECHO, ECFIN, ENER, DIGIT, ECFIN, EMPL, FISMA, HOME, GROW, INTPA, NEAR, TAXUD, TRADE⁶⁶. The group meets regularly to discuss and review the implementation of the Mission on Cancer. The new **Knowledge Centre for Cancer** (managed by JRC) will assist the Mission managers and the Mission Owners Group.

Consultation and Advice

To prepare the implementation of the Mission's objectives and subsequently to define the actions and mechanisms taken to achieve them, it is essential to establish a structured dialogue with all partners and actors, making use, wherever possible, of existing platforms and groups.

- The renewed **Cancer Mission Board**⁶⁷ will act as an advisory body. In addition to cancer and public health scientists, and innovators, it will include members with experience in implementing national or regional healthcare measures.
- As part of the joint governance structure, DG SANTE and DG RTD created a **joint subgroup on cancer** under the Steering Group for Health Promotion and Disease Prevention (SGPP)⁶⁸. Composed of experts from research and health ministries, it is the only expert group to discuss cross-policy actions related to cancer in an integrated approach. Thematic groups set up under this subgroup can focus on the concrete implementation on different actions (e.g. new screening programmes or the comprehensive cancer infrastructures). The chair and vice-chair of the Cancer Mission Board and EU agencies (e.g. EMA) are observers. The subgroup will inform the SGPP, strategic health configuration of the Programme Committee, and the EU4Health committee. It may also inform the Council.

⁶⁶ This same group is referred to as the EU Cancer Plan Implementation Group in the Europe's Beating Cancer Plan. The Group will work closely with the European Parliament, the Member States, stakeholders, and the Cancer Mission Board functioning as an advisory group.

⁶⁷ Board members: Walter Ricciardi (chair), Christine Chomienne (vice-chairs), Ruth Ladenstein, Martine Piccart, Andres Metspalu, Tomi Mäkelä, Bettina Ryll, Fiona Godfrey, Leja Marcis, Regina Beets-Tan, Konrad Rydzynski, Pedro Pita Barros (until December 2020), Serban Ghiorghiu, Elisabete Weiderpass, Anne Lise Ryel (until December 2020)

⁶⁸ [Steering Group on Health Promotion, Disease Prevention and Management of Non-Communicable Diseases | Public Health \(europa.eu\)](https://europa.eu/steering-group-on-health-promotion-disease-prevention-and-management-of-non-communicable-diseases)

- The **EC Group of Chief Scientific Advisors** will prepare scientific advice on cancer screening by early 2022.
- As part of the joint governance structure, DG SANTE and DG RTD established a dedicated **stakeholder contact group** under the Commission's Health Policy Platform, with more than 300 organisations registered. The group will be regularly consulted on specific aspects of the Europe's Beating Cancer and the Mission; the kick-off meeting took place on 28 May 2021.
- **European Parliament:** since the creation of the temporary BECA committee, EC services and Board members regularly participate in hearings and committee meetings. Future interactions are planned through the ITRE and ENVI committees with a view to prepare political endorsement for policy initiatives and financial decisions.
- **EU agencies:** the decentralised agencies (ECHA, EFSA, and EMA) and the executive agencies (HaDEA, CINEA, REA) will be closely involved in the implementation process.
- A new ecosystem on missions will be created at country level, as the Mission foresees the setting up of **national mission hubs** through a Horizon Europe call, connected transnationally. The Missions Work programme 2021 has a coordination and support action to develop this new ecosystem. The nature of these hubs will differ from country to country, as some already have established structures for mission oriented, transdisciplinary actions. These hubs should allow for a regular dialogue between national and regional authorities on the implementation of Mission related actions and citizen engagement activities. In addition to and connecting with the national mission hubs, a network of national cancer contact points will be created, to provide the entry point for cancer prevention and control related policy dialogue. The monitoring dashboard established at the start of the Mission will serve as a basis for these discussions as well as for feedback from the meetings of the EU joint subgroup on cancer. An **annual citizen engagement event** organised under these hubs will allow citizens to give feedback on the implementation of mission actions, voice their needs and highlight new priorities.
- **At regional level,** the existing smart specialisation platforms will become a key element for the implementation to support regional prioritisation in cancer innovation and support the cross-sectoral mobilisation of funds. Several regions have already chosen health or even cancer and personalised medicine as part of their specialisation. In addition, dedicated partnership contracts between the local/regional and EU level could be envisaged to increase the regions' commitment to provide additional funding in support of the Mission.

Mission on Cancer – governance

EU level
 National level
 Advisory
 Stakeholders

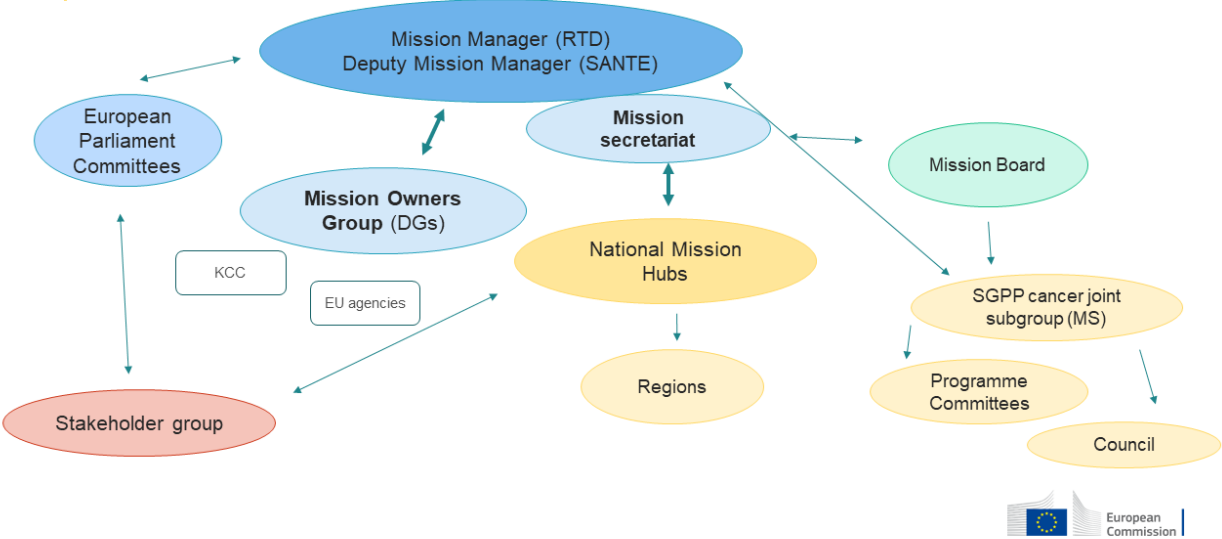


Figure 2- Proposed governance for a Mission on Cancer

7. Monitoring framework

A dedicated monitoring taskforce⁶⁹ established by the Commission will start setting up indicators in the first year (2021) and measure progress against the Mission's overall goal as well as against proposed mission actions on a yearly basis. Progress will be measured against the baseline that will be established in the first year.

Support by the JRC's Knowledge Centre on Cancer, close collaboration with IARC and national/regional population-based cancer registries across the EU will be key. This will require setting up and/or solving long-term operational, organisational and financial capacity challenges of cancer registries in various countries/regions as well as developing the quality of life surveys mentioned above.

To measure progress in achieving the mission goal of '**improving the lives of more than 3 million people by 2030, through prevention, cure and for those affected by cancer including their families, to live longer and better**', the following approach will be used:

3 million lives improved through prevention and cure: The target of 3 million is based on the fact that 40% of cancers are preventable, and with the outcomes and impacts of an extra effort spelt out in the actions proposed under prevention, screening and early detection, that target will be reached. Improvements to diagnosis & treatment will also contribute to achieving the goal. According to IARC's Globocan⁷⁰ and JRC's ECIS data, cancer mortality is expected to decrease by 14% for women and 30% for men. The overall goal of 3 million lives protected would bring an additional reduction, with an expected 20% reduction in mortality for women and 40% for males in Member States and Associated Countries.

To measure progress in cancer control, the use of three major cancer indicators - cancer incidence, cancer mortality, and overall survival - is key. At the beginning of the Mission, corresponding data for each country will be introduced into a country dashboard, to serve as a baseline. This dashboard will include indicators related to important, country specific, mission actions that will be implemented. A bi-annual update of the dashboard will be made available to monitor national progress.

At the beginning (2021) and the end of the Mission (2030) the country dashboard will be complemented with a set of additional indicators to provide an in-depth overview of the country-specific cancer burden (e.g. years of healthy life lost, economic impact of cancer, proportion of cancers prevented).

Living longer and better: As 60% of the cancers are still not preventable, action in this area is needed. We need to take care of the patients, improving diagnosis, in particular early diagnosis, and care so they can live longer and better. Considering the diversity of cancer subtypes, and the individual need of each cancer patient at different steps of the cancer journey, it is very difficult in one sentence to give a quantitative global target for living longer and better. However, the actions proposed under the mission should make a significant difference. In order to demonstrate that difference over time, a Quality of Life (QoL) monitoring Framework will be set up to measure improvements in survival. In addition, although cancer registries don't measure QoL directly, detailed cancer registry data on disease stage, treatment and survival will be used as a first proxy to measure QoL at a population level and combined with a quality of life survey set up by the Mission. A baseline will be set, with the information available at that time through existing surveys.

Inequity/access: measures of inequality between and within countries will be monitored via the Inequalities Register put forward in the Europe's Beating Cancer Plan, and build on national surveys,

⁶⁹ Taskforce will likely consist of RTD, SANTE, JRC, IARC, OECD, and a service provider.

⁷⁰ [Global Cancer Observatory \(iarc.fr\)](http://iarc.fr)

such as the European deprivation index (France, Portugal, Spain, Italy, UK, Slovenia, and Ireland). This index assesses social and territorial inequalities within and between Member States and could be an important tool to assess new research interventions.

8. Citizen engagement and Communication strategy

The Mission on Cancer will constitute a point of contact with European citizens at national, regional and local community levels, who will be fully informed and involved in the implementation of actions to fight cancer. These citizen engagement activities will not only help implement the mission, but also represent a real added value for the Europe's Beating Cancer Plan by building trustful dialogues with and providing direct feedback from citizens on the EU cancer activities and policies, for example through living labs and public innovation.

Citizen engagement activities will target different groups depending on the subject matter the mission wants to engage them on: children & adolescents (e.g. on survivorship and quality of life or on prevention), people suffering from cancer and carers (e.g. on quality of life and palliative care), citizens at large (e.g. on the Cancer Patient Digital Centre), care providers - formal and informal (e.g. on quality of care), (health) policy makers (e.g. on comprehensive cancer infrastructures).

Also different means of engagement will be used, such as focus groups (online or 'live'), surveys and 'town hall' meetings. Importantly these activities will need to take place in the national (local) language and be adapted to the different audiences.

One of the activities envisaged is to co-design a cancer toolkit with citizens and local communities throughout Europe: The toolkit will focus on (1) understanding, (2) prevention, including screening and early detection, (3) diagnosis and treatment, and (4) quality of life. The process of co-designing a cancer toolkit with citizens and local communities itself will serve cancer awareness raising.

A key element in citizen engagement around the Mission is to ensure that citizens get feedback and can provide feedback on actions that are important to them. The annual 'citizen and public innovation days' type of events foreseen via the national mission hubs are meant to offer such a feedback platform.

While there will be an overall **communication strategy** around missions, a specific communication strategy '*Tackling cancer – we need you to make a difference*' (working title) will be developed to inform on the nature of the Mission, the important role citizens play in tackling cancer and how they can actively engage. This strategy will benefit from the experience gathered in setting up the Conference on the Future of Europe and the ideas presented there under the health topic. This communication strategy will be co-developed by DG RTD and DG SANTE, with the help of an external contractor.