

- Mechanisms for determining clinical priorities and development of new models and technologies to interrogate the interactions of cancers and their host;
- Mechanisms for regular training on operating the UNCAN.eu platform as well as data management to all data holders and users;
- Potential links with Horizon Europe health cluster partnerships, in particular: the Innovative Health Initiative; the partnership on Personalised Medicine; the Transformation of Health and Care Systems partnership as well as the partnership on Rare Diseases and the Partnership for the Assessment of Risk from Chemicals.
- Providing a mechanism for regular consultation with EU regions, Member States and Associated countries, who should be engaged from the early steps of development;
- Potential links with EU4Health actions relevant for cancer;
- Links to federated data spaces of genomic data and medical images under the Digital Europe programme;
- Equitable access. Broad representation, in particular of less-developed regions or regions from countries striving to boost their research and innovation potential, is highly encouraged;
- Engagement with citizen and patient advocacy organisations;
- Utility, feasibility, sustainability;
- Due consideration to newly EU-funded initiatives such as HealthyCloud, EOSC-Life and the EHDS Joint Action. Links with topic HORIZON-INFRA-EOSC-2021-01-07; objectives are encouraged as well as with topic HORIZON-INFRA-SERV-2021-01-02 objectives.

Call - Research and Innovation actions supporting the implementation of the Mission on Cancer

HORIZON-MISS-2021-CANCER-02

Conditions for the Call

Indicative budget(s)⁸⁸

Topics	Type	Budgets	Expected EU	Number
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⁸⁸ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2021 and 2022.

Horizon Europe - Work Programme 2021-2022
Missions

	of Action	(EUR million)	contribution per project (EUR million) ⁸⁹	of projects expected to be funded
		2021		
Opening: 22 Dec 2021 Deadline(s): 26 Apr 2022				
HORIZON-MISS-2021-CANCER-02-01	RIA	60.00 ⁹⁰	4.00 to 15.00	10
HORIZON-MISS-2021-CANCER-02-02	RIA	11.00 ⁹¹	Around 11.00	1
HORIZON-MISS-2021-CANCER-02-03	RIA	54.65 ⁹²	4.00 to 15.00	6
Overall indicative budget		125.65		

General conditions relating to this call	
<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

Proposals are invited against the following topic(s):

⁸⁹ Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

⁹⁰ Of which EUR 15.19 million from the 'Digital, Industry and Space' budget and EUR 44.10 million from the 'Health' budget and EUR 0.71 million from the 'Culture, creativity and inclusive society' budget.

⁹¹ Of which EUR 2.79 million from the 'Digital, Industry and Space' budget and EUR 8.08 million from the 'Health' budget and EUR 0.13 million from the 'Culture, creativity and inclusive society' budget.

⁹² Of which EUR 13.84 million from the 'Digital, Industry and Space' budget and EUR 40.17 million from the 'Health' budget and EUR 0.65 million from the 'Culture, creativity and inclusive society' budget.

HORIZON-MISS-2021-CANCER-02-01: Develop new methods and technologies for cancer screening and early detection

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of between EUR 4.00 and 15.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 60.00 million.
<i>Type of Action</i>	Research and Innovation Actions

Expected Outcome: Prevention is the most cost-effective long-term cancer control strategy. In EU-27 and Associated countries, population-based screening programmes exist for three types of cancer (breast, cervical and colorectal cancer), which are often not risk-based. Screening and early detection should become faster, more precise, accessible and affordable. This requires new, sound methods and technologies, including data analytics tools and computing capacities, as well as a robust communication strategy.

The COVID-19 pandemic with its detrimental impact on cancer screening and early detection has demonstrated the need for new and improved screening and early detection solutions.

Proposals under this topic should aim for delivering results that are directed at and contributing to all of the following expected outcomes

- Healthy citizens and cancer patients will benefit from faster, earlier, more precise, personalised, accessible and affordable screening and early detection of cancer.
- Health care professionals will be able to deliver earlier, faster, more precise screening and early detection of cancer.
- Health policy makers will have the evidence to review population-based screening programmes and screening and early detection methodologies in everyday medical practice, and to include new, evidence-based screening and early detection methods, technologies and solutions.

Scope: Research is needed to develop and validate non-invasive, or minimally invasive cancer screening and detection methodologies for everyday medical practice and population-based screening programmes⁹³, including enhanced participation of the target population. These programmes should become faster, more precise and personalised, affordable and accessible.

Proposals should address all of the following:

⁹³ Refers to secondary prevention

- Based on weaknesses, gaps and possibilities for further development of existing screening and early detection methods and technologies (including those used in population-based screening programmes), develop and validate non-invasive (or minimally-invasive) cancer screening and detection methodologies. This includes ‘integrated diagnostics’⁹⁴ based on, for example, imaging, tissue, fluid or exhaled breath gas biomarkers, and agile screening methodologies including digital technologies (such as self-sampling, mobile screening units, digital apps or smart wearables, sensors, telemedicine and remote monitoring technologies combined with sophisticated data analytics tools), duly considering digital and health literacy of people.
- Proposals should assess the potential uptake of these methods and technologies in national health systems, clearly identify the target population and consider implementation needs (including health workforce skills). Applicants should also consider aspects of effectiveness, affordability and accessibility when proposing solutions, particularly to enhance participation of the target population.
- Proposals should consider the use of living labs or other implementation research models that use open knowledge and (social) innovation systems and support end-user engagement.
- The influence of age and early-life factors and determinants; genetic risk; socio-economic status; behavioural, including lifestyle risk factors; environmental factors; as well as social, cultural, sex and gender aspects, including inequalities, should be taken into account across all aspects mentioned above. In addition, differences within and between countries and regions should also be reflected.

Expected stage at project start: Technological Readiness Level 4 and above.

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.

Due consideration should also be given to other relevant EU-funded initiatives⁹⁵. Successful applicants will be asked to liaise with these different initiatives where applicable⁹⁶, with the Commission acting as a facilitator.

The funded actions should build upon resources made available by the Knowledge Centre on Cancer⁹⁷, and complement actions under the future Innovative Health Initiative, EIT Health

⁹⁴ Combines information from radiology, imaging, pathology, genetics, genomics, phenotyping, laboratory testing, information technology, artificial intelligence, machine learning, etc.

⁹⁵ Such as HealthyCloud, EOSC-Life and the European Health Data Space (EHDS) Joint Action. Topics HORIZON-INFRA-EOSC-2021-01-06 (FAIR and open data sharing in support of cancer research), HORIZON-INFRA-SERV-2021-01-01 (Research infrastructures services to support research addressing cancer), HORIZON-HLTH-2021-DISEASE-04-01 (Improved supportive, palliative, survivorship and end-of-life care of cancer patients), HORIZON-HLTH-2021-CARE-05-02 (Data-driven decision-support tools for better health care delivery and policy-making with a focus on cancer).

⁹⁶ Applicants are not expected to contact these initiatives before the submission of proposals.

Knowledge Innovation Community initiatives⁹⁸, and the Digital Europe programme (Cancer Imaging Initiative, Genomics)⁹⁹.

Furthermore, all projects funded under this topic are strongly encouraged to participate in networking and joint activities with other ongoing projects under the mission on cancer and other cancer relevant projects, as appropriate. These networking and joint activities could, for example, involve the participation in joint workshops, the exchange of knowledge, the development and adoption of best practices, or joint communication activities. This could also involve networking and joint activities with projects funded under other clusters and pillars of Horizon Europe, or other EU programmes, as appropriate. Of particular importance in this context is topic HORIZON-MISS-2021-COOR-01-01, “Coordination of complementary actions for missions”.

The Commission may facilitate Mission-specific coordination through future actions. Therefore, proposals should include a budget for the attendance to regular joint meetings and may consider covering the costs of any other potential joint activities without the prerequisite to detail concrete joint activities at this stage. The details of these joint activities will be defined during the grant agreement preparation phase and project duration. In this regard, the Commission will take on the role of facilitator for networking and exchanges, including with relevant initiatives and stakeholders, if appropriate.

HORIZON-MISS-2021-CANCER-02-02: Develop and validate a set of quality of life and patient preference measures for cancer patients and survivors

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 11.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 11.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries will be subject to the additional access rights: The selected beneficiaries must provide the results from the survey, including validation of the metrics, within two years from the start of the project for the purpose of developing EU policies and

⁹⁷ Especially through the ‘European Guidelines and Quality Assurance Schemes for Breast, Colorectal and Cervical Cancer Screening and Diagnosis’, and the ‘European Cancer Information System (ECIS)’, see https://knowledge4policy.ec.europa.eu/cancer_en

⁹⁸ <https://eithealth.eu/who-we-are/>

⁹⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0694&qid=1623079930214>

	programmes.
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Expected Outcome: Cancer patients and survivors have specific and currently largely unmet needs. These require deeper insights into quality of life aspects, patient preferences and unmet needs so that health and care systems can better address them. This will improve patients' and survivors' quality of life and ensure that they can achieve personal and professional goals, including return to work if they wish so, while respecting individual, social and cultural rights and values. New metrics, self-reported evidence from the perspective of those who are affected, and an expanded high-quality data collection and analysis, using appropriate digital tools, are needed to adequately capture quality of life aspects of cancer patients and survivors. This should serve to orient clinical practice as well as health, social care, and employment policies with the goal of delivering innovation and improving the quality of life of cancer patients, survivors and their families to the highest possible levels, and facilitating their return to work and active participation in society.

Proposals under this topic should aim for delivering results that are directed and contributing to all of the following expected outcomes

- Cancer patients, survivors and caregivers will benefit from enhanced quality of life, more effective and less burdensome treatments with better supportive care and counselling approaches.
- Health care professionals, supportive workers, counsellors and industry will be better aware of the (unmet) needs, expectations and preferences of cancer patients, survivors and their relatives and be compelled to address them.
- Regulators and institutions will have a set of metrics, which they can include in decision making about risks and benefits of new health interventions.
- Health Policy Makers will have a set of metrics at their disposal, which they can include in their health information and performance measurement systems.
- Labour market and social protection policy makers will benefit from additional evidence to consider in the design of labour market and social protection policies that are facilitating return to work and active participation in society.

Scope: The long-term goal of the Mission on Cancer is to support the development of a framework of newly defined, harmonised and systematic surveys, as well as to collect new and update existing quality of life data and registries information, using appropriate digital tools. These surveys should be launched regularly across all countries and be reviewed with researchers, care providers, health insurance companies, industry as well as policy makers so that more timely, supportive and affordable care can be provided and relevant policy measures can be taken.

Proposals should address all of the following:

- Conduct analyses of existing quality of life data from studies, surveys and registries together with patients and with a particular focus on patients' needs, including return to work. These analyses serve to identify problems, fill gaps and validate sets of minimal quality of life measurement tools and approaches for different types of cancer.
- Set up collaborative approaches with patients, communities and multidisciplinary research teams (for example in the form of living labs, making use of citizen science, social innovation or other participatory research methods). Within this co-design process, quality of life measurement tools and approaches should be developed to capture key elements of quality of life from the perspective of those affected by cancer, which are not captured (adequately) with established metrics.
- These metrics 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.
- Prepare and conduct a pilot of newly defined, harmonised and systematic quality of life surveys across the EU-27 and Associated countries, reflecting both its diversity (social, cultural, geographic, demographic, health and social protection systems) and unique differences in incidence and mortality of cancer indications. The surveys should gather data using established quality of life metrics and serve to validate the newly developed metrics focussing on cancer, making use of digital tools for data gathering and analysis where relevant.
- These surveys should form the basis for a comprehensive comparison of the quality of life of cancer patients and survivors across and within countries, as well as between different groups, and prepare the ground for future regular, more extensive high-quality data collection.
- The influence of age and early-life factors and determinants; genetic risk, socio-economic status; environmental factors; behavioural, including lifestyle risk factors; as well as social, cultural, sex and gender aspects including inequalities (e.g. access to care), should be taken into account across all aspects mentioned above.
- The most promising quality of life and preference measures and metrics should be validated.

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.

Due consideration should also be given to other relevant EU-funded initiatives¹⁰⁰. Successful applicants will be asked to liaise with these different initiatives where applicable, with the Commission acting as a facilitator¹⁰¹.

The funded actions should build upon resources made available by the Knowledge Centre on Cancer¹⁰², and complement actions under the Europe's Beating Cancer Plan¹⁰³, and possibly Horizon Europe Partnerships¹⁰⁴.

All projects funded under this topic are strongly encouraged to participate in networking and joint activities with other ongoing projects under the mission on cancer and other cancer relevant projects, as appropriate. These networking and joint activities could, for example, involve the participation in joint workshops, the exchange of knowledge, the development and adoption of best practices, or joint communication activities. This could also involve networking and joint activities with projects funded under other clusters and pillars of Horizon Europe, or other EU programmes, as appropriate. Of particular importance in this context is topic HORIZON-MISS-2021-COOR-01-01, "Coordination of complementary actions for missions".

The Commission may facilitate Mission-specific coordination through future actions. Therefore, proposals should include a budget for the attendance to regular joint meetings and may consider covering the costs of any other potential joint activities without the prerequisite to detail concrete joint activities at this stage. The details of these joint activities will be defined during the grant agreement preparation phase and project duration.

In this regard, the Commission will take on the role of facilitator for networking and exchanges, including with relevant initiatives and stakeholders, if appropriate.

HORIZON-MISS-2021-CANCER-02-03: Better understanding of the impact of risk factors and health determinants on the development and progression of cancer

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of between EUR 4.00 and 15.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

¹⁰⁰ Such as HORIZON-HLTH-2021-DISEASE-04-01 (Improved supportive, palliative, survivorship and end-of-life care of cancer patients), HORIZON-HLTH-2021-CARE-05-02 (Data-driven decision-support tools for better health care delivery and policy-making with a focus on cancer).

¹⁰¹ Applicants are not expected to contact these initiatives before the submission of proposals.

¹⁰² Especially through the 'European Guidelines and Quality Assurance Schemes for Breast, Colorectal and Cervical Cancer Screening and Diagnosis', and the 'European Cancer Information System (ECIS)', see https://knowledge4policy.ec.europa.eu/cancer_en

¹⁰³ Including the planned Cancer Inequalities Registry, see work programme for 2021 for EU4Health Programme at https://ec.europa.eu/health/sites/default/files/funding/docs/wp2021_annex_en.pdf.

¹⁰⁴ https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe_en

<i>Indicative budget</i>	The total indicative budget for the topic is EUR 54.65 million.
<i>Type of Action</i>	Research and Innovation Actions

Expected Outcome: This topic will contribute to the achievement of the mission’s goal through a better understanding of the impact of risk factors¹⁰⁵ and health determinants on the development and progression of cancer (including metastasis). The focus should be on poorly understood¹⁰⁶ cancers and cancer subtypes, including in children and adolescents. To that end, proposals under this topic should aim for delivering results that are directed, tailored towards and contributing to all of the following expected outcomes

- Researchers and health professionals will understand which risk factors and determinants spur the development and progression of cancer and how. This forms the basis for the design and optimisation of prevention, screening and early detection interventions for poorly understood cancers and cancer subtypes, including in children and adolescents.
- Researchers and innovators from different disciplines and sectors will support the development of the UNCAN.eu¹⁰⁷ platform by producing, integrating and correlating comprehensive data from multiple sources (ensuring accessibility and re-usability of data, models and tools created).

Health Policy Makers use the improved understanding of risk factors and determinants in the design of cancer-related health policies in the EU-27 and Associated countries and beyond, including for prevention, screening and early detection.

Scope: Despite important progress, overall understanding of cancer remains incomplete, for both common and rare cancers and the growing number of cancer subtypes, including in children and adolescents. This requires a new dimension and level of investment in innovative research, including high-potential, potentially disruptive and high-risk projects. There is a need to better understand which risk factors and determinants affect the development and progression of cancer and how.

Proposals should address all of the following:

- Develop a systematic understanding of cellular processes with a focus on the transition from a healthy state to cancer initiation and progression, at the individual or population level.

¹⁰⁵ Relevant risk factors include both internal and external ones, such as genetic predisposition, those in the environment, at work, because of pollution (chemicals, noise, air, radiation, etc.), lifestyle, diet, physical inactivity, obesity, nutrition, microbiota, infectious agents, etc. At all stages of cancer, across all age and societal groups.

¹⁰⁶ Includes refractory cancers and cancer subtypes, at any stage of the disease in any age group and part of society, with a 5-year overall survival less than 50% from time of diagnosis.

¹⁰⁷ Under the mission work programme a Europe-wide platform, UNCAN.eu, will be established, utilising existing, relevant research infrastructures. The platform should enable integration of innovative models and technologies with longitudinal patient data, samples and biomarkers for identification and translation to patients.

- Demonstrate access to and use of multiple comprehensive databases in and well beyond health research and health domains, such as lifestyle, omics, clinical, indoor and outdoor exposure, environmental, urban areas and sprawl, climate, agricultural crop and land use, geo-positioning, and remote sensing. Proposals should build on longitudinal cohorts, case-control studies, biobanks, registries and many other initiatives¹⁰⁸, and use state-of-the-art digital tools for data analyses and modelling, wherever possible.
- Analyse and integrate existing knowledge and high-quality data from biomedical and clinical studies, using advanced technologies such as computer modelling, AI and machine learning with the objective to identify factors and determinants triggering the transition from the healthy state to the initiation and progression of poorly understood cancers and cancer subtypes, including in children and adolescents.
- The influence of age, including in utero and early-life factors and determinants; environmental factors; genetic and epigenetic risk; socio-economic status; behavioural, including lifestyle risk factors; as well as social, cultural, sex and gender aspects including inequalities, should be taken into account across all aspects mentioned above.
- Due consideration should be given to newly EU-funded initiatives such as the Knowledge Centre on Cancer, HealthyCloud, EOSC-Life, the European Health Data Space (EHDS) Joint Action, 1+ Million Genomes / Beyond One Million Genomes (B1MG), the future Innovative Health Initiative and EIT Health Knowledge Innovation Community initiatives¹⁰⁹. Links with topic HORIZON-INFRA-EOSC-2021-01-06 objectives (FAIR and open data sharing in support of cancer research) are encouraged as well as with topic HORIZON-INFRA-SERV-2021-01-01 (Research infrastructures services to support research addressing cancer). Successful applicants will be asked to liaise with these different initiatives where applicable¹¹⁰, with the Commission acting as a facilitator.
- The funded actions should develop synergies with the Partnership for the Assessment of Risk from Chemicals (PARC), the “Human Biomonitoring 4 EU” initiative (HBM4EU)¹¹¹ and the European Human Exposome Network¹¹².

All projects funded under this topic are strongly encouraged to participate in networking and joint activities with other ongoing projects under the mission on cancer and other cancer relevant projects, as appropriate. These networking and joint activities could, for example, involve the participation in joint workshops, the exchange of knowledge, the development and adoption of best practices, or joint communication activities. This could also involve networking and joint activities with projects funded under other clusters and pillars of Horizon Europe, or other EU programmes, as appropriate. Of particular importance in this

¹⁰⁸ Many retrospective, prospective cohorts, case-control studies and initiatives -in health and well-beyond health- at local, regional, national, European and international level, exist.

¹⁰⁹ <https://eithealth.eu/who-we-are/>

¹¹⁰ Applicants are not expected to contact these initiatives before the submission of proposals.

¹¹¹ <https://www.hbm4eu.eu/>

¹¹² <https://www.humanexposome.eu/>

context is topic HORIZON-MISS-2021-COOR-01-01, “Coordination of complementary actions for missions”.

The Commission may facilitate Mission-specific coordination through future actions. Therefore, proposals should include a budget for the attendance to regular joint meetings and may consider covering the costs of any other potential joint activities without the prerequisite to detail concrete joint activities at this stage. The details of these joint activities will be defined during the grant agreement preparation phase and project duration. In this regard, the Commission will take on the role of facilitator for networking and exchanges, including with relevant initiatives and stakeholders, if appropriate.

Other Actions not subject to calls for proposals

Procurement actions

1. Procurement actions to support the mission on cancer

Description: Complementing the intervention area *Understanding and Prevent the preventable*, procurement actions are foreseen in the intervention areas: *Optimising diagnosis and treatment*, and *Quality of life*. The fifth intervention area, *Equitable access*, will be systematically addressed in each of these procurement actions. Results of procurement actions are expected to provide clear and quick answers to fine-tune bold yet realistic mission actions under preparation, including implementation, timing, infrastructural challenges, and governance.

- **Optimise diagnosis and treatment**

A study on the comprehensiveness of cancer care infrastructures in EU-27 and Associated countries to assess both national and regional capacity to support cancer control, including quality standards, staffing and resources (such as training of healthcare professionals, digitalisation and equipment), and economic aspects.

- **Quality of life**

A study on feasibility, utility and sustainability of a virtual European cancer patient digital centre (with references to the European Health Data Space, Digital Europe, ESFRI¹¹³ Infrastructures and JRC Work Programmes).

In addition, a number of specific contracts may be signed under existing framework contracts in order to: (i) support the dissemination and exploitation of project results; (ii) contribute to the definition of future challenge priorities; (iii) undertake citizen surveys, (iv) carry out specific evaluations of programme parts; and (v) organise conferences, events and outreach activities.

Form of Funding: Procurement

¹¹³ <https://lifescience-ri.eu/home.html>