

Chapter 11: Major Cancer Problems and Prospects for Prevention: A European Perspective

Walter Ricciardi

Walter Ricciardi discusses challenges and strategies to address the cancer pandemic within the European context, by featuring initiatives across Europe—like the Mission on Cancer. While continuing to foster research efforts, these initiatives aim at supporting and strengthening national commitments that should promote, on the one hand, prevention, diagnosis, and treatment of cancer, and, on the other hand, the quality of life of cancer patients, survivors, and their families as well as caregivers.

Cancer is an umbrella term for more than 200 diseases. These have in common the uncontrolled growth and spread of abnormal body cells, affecting tissues and organs. Considering that Europe has a quarter of all cancer cases and less than ten percent of the world's population, it is evident that cancer is a huge threat for Europe's citizens and health systems. Each year, 2.6 million people in the twenty-seven European Union countries (EU-27) are diagnosed with cancer. This number is expected to increase rapidly because of aging populations, unhealthy lifestyles, and unfavorable environmental conditions. Almost three quarters of all cancers in the European Union (EU) occur in people aged sixty or above. Without strong action, the number of cancer cases in Europe will increase by twenty-five percent by 2035.

Although survival rates of several cancer types have improved over the last decades, cancer still kills 1.2 million people in the EU-27 each year. The probability of receiving a timely diagnosis of cancer and of surviving the disease differs substantially across Europe because of major inequities in access to cancer knowledge, prevention, diagnostics, treatments, and care. The chances of surviving cancer also depend highly on the type of cancer,

as some cancers are still not well understood, including several childhood cancers.

The current COVID-19 pandemic puts high pressure on health systems' capacities and resources. This is a severe threat to cancer prevention, detection, and treatment. It may also impact funding for cancer research, innovation, and care, as countries may reset their priorities and reallocate resources. At the same time, the COVID-19 pandemic has also shown health systems' and society's resilience and potential to adapt rapidly to changing circumstances, as it has accelerated the development and acceptance of new technologies as well as built strong collaborations across sectors and borders.

Increasing survival proportions results in more Europeans living with and after cancer. There are more than twelve million cancer survivors in Europe. However, being cancer-free does not mean being free of the cancer experience. Many survivors experience side-effects from treatment, which may only become apparent years after completing treatment and may intertwine with other comorbidities as survivors get older. Physical and mental health problems significantly impact the survivors' quality of life, affecting their ability to play a full role in society and in the workforce. In addition, many survivors experience stigmatization. This is reflected in difficulties in getting a job or having a career and in obtaining health insurance or other financial products (e.g., life insurance for a mortgage). This situation generates a substantial burden for cancer survivors and their families but also for countries' health systems and society in general.

Given that the challenges that arise from cancer for European citizens and countries are vast, conquering cancer in Europe calls for multiple actions by many stakeholders, both at the national level and EU level. At EU level, citizens, cancer patients, survivors and their family members and caregivers may benefit from bundling of cancer knowledge, sharing of expertise, and exchange of data. The EU could offer large scale research on less prevalent cancers by providing a platform for sharing knowledge and data and for exchanging experiences from best practices and innovations within countries. Previous EU Research and Innovation Programmes and other actions have addressed various challenges in cancer research,

prevention, and care. However, the increasing burden of cancer in Europe and the rapidly increasing costs of cancer for health systems and society require collaboration on an ambitious European scale, innovating and integrating fundamental, translational, clinical, and interventional research, underpinned by supportive policy and legislation, as well as a strong commitment from member states to break barriers across Europe.

As an integral part of the Horizon Europe Framework Programme for Research and Innovation (2021–2027),¹ a set of European Research and Innovation Missions aim to deliver solutions to some of the greatest challenges facing Europe. Cancer is one of these challenges. The Mission report produced explains how a mission-driven approach can save and improve the lives of millions of European citizens exposed to cancer and its risk factors.² It sets out the goal of the Mission on Cancer and makes recommendations on how to achieve this goal.

In designing the Mission on Cancer, the European Commission invited a Board of European experts—on cancer research, innovation, policy, healthcare provision and practice—to define an ambitious and measurable goal with a substantial impact on and relevance for society and European citizens. The Commission also asked the Board to propose a coherent set of actions to achieve this goal in a set timeframe. These actions will be implemented through Horizon Europe and other instruments of the European Union and its Member States and aligned with other initiatives at EU and Member State level.

In finalizing this Mission report, the Board was assisted by the Cancer Mission Assembly, inputs from a wide network of experts and organizations, including academic, private sector, and advocacy groups. In addition, the Board received input from the twenty-seven Member States, members of the European Parliament, and several Directorates-General of the European Commission, as well as a number of consultations and

¹ European Commission, “Horizon Europe,” 2021, ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en.

² European Commission, “Conquering Cancer, Mission Possible,” September 2020, ec.europa.eu/info/publications/conquering-cancermission-possible_en.

engagement sessions with EU citizens, cancer patients, and survivors organized in their countries and native language or in online meetings with participants from across the entire EU.

This Mission report will be used as a basis for further engagement activities involving stakeholders and citizens and for defining a broad strategy for the first four years of the Horizon Europe Programme. Synergies will be developed with national cancer plans and other actions of Member States, with the actions of other Horizon Europe Missions and with research and investment programs, as well as with other EU policies and actions, in particular the Europe's Beating Cancer Plan.³

The Mission on Cancer will address the whole cancer control continuum; including risk factors; survivorship support; end-of-life care; rare and poorly understood cancers; cancers in children, adolescents/young adults, and the elderly; cancers in socially or economically vulnerable families and among people living in remote areas; and cancer across all member states. While the Mission provides directions and objectives for research and innovation, it will also generate evidence on factors that limit effective policy and support actions to conquer cancer. In this regard, the Mission's actions will be able to make an important contribution to the Europe's Beating Cancer Plan. At the same time, the Cancer Plan will provide opportunities to complement the Mission on Cancer.

The overall goal of the Mission on Cancer is: "By 2030, more than 3 million lives saved, living longer and better."⁴ This goal is consistent with United Nations Sustainable Development Goal (SDG) 3: "Ensure healthy lives and promote well-being for all at all ages." The target of this SDG for non-communicable diseases for 2030 is "to reduce by one third premature

³ European Commission, "Europe's Beating Cancer Plan: A New EU Approach to Prevention, Treatment and Care," February 3, 2021, ec.europa.eu/commission/presscorner/detail/en/ip_21_342.

⁴ European Commission, "Conquering Cancer, Mission Possible."

mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.”⁵

Given the high level of ambition, a comprehensive plan of bold actions supported by all member states and stakeholders—including patients, survivors, caregivers, and the wider public—is required to achieve the Mission’s goal. Effective interventions are needed to improve: (1) prevention; (2) diagnostics and treatment of cancer; and (3) the quality of life of cancer patients, survivors, and their families and caregivers. Hence, these areas are considered the pillars of the Mission. Effective interventions in all these areas require a thorough understanding of cancers, with their causal factors and mechanisms, and their impact of the health of individuals and on healthcare systems; therefore, understanding is considered the basis for actions. Furthermore, effective policy measures are needed, and resources should be allocated to ensure that citizens and other stakeholders in all Member States have equitable access to high-quality prevention, diagnostics and treatment, care and support, including access to research funding and knowledge. Finally, as underscored in the report of Prof. Mariana Mazzucato, “Governing Missions in the European Union,”⁶ the success of the mission-oriented process will lie in the set-up of novel flexible governing structures to correctly balance with an effective portfolio management that enables cross-sectoral and cross-institutional coordination.

Understand Cancer, Its Risk Factors, and Its Impact

Understanding is a key starting point for effective actions to save lives and improve the quality of life of persons with and after cancer, their families, and their caregivers. What we do not understand, we cannot address effectively. Understanding the biological processes in human cells is crucial

⁵ The Global Goals for Sustainable Development, “Goal 3: Good Health and Well-Being,” 2021, www.globalgoals.org/3-good-health-and-wellbeing. See also United Nations Department of Economic and Social Affairs, “The 17 Goals,” 2021, sdgs.un.org/goals.

⁶ Mariana Mazzucato, “Governing Missions in the European Union,” 2019, ec.europa.eu/info/sites/default/files/research_and_innovation/contact/documents/ec_rtd_mazzucato-report-issue2_072019.pdf.

for diagnosing cancer and developing effective treatments. Despite developments in cancer treatment, some cancers are still resistant to all available therapies, and some well-known targets are still untreatable with current drugs. A special focus is deemed necessary on anti-cancer medication innovation for childhood cancers, cancers in adolescents and young adults, and cancers in the elderly because these populations have distinct age-related biological and clinical characteristics.

Understanding the complexity of cancer and the role of factors and determinants (e.g., lifestyle, environment, workplace exposure, sex/gender, and age) is important for developing effective preventive measures. Some factors are known to play a role in the development of cancers, but their precise impact is not yet clear, whereas other causal factors remain to be discovered. Moreover, changing human behavior has proven to be a challenge. Therefore, what is needed is a greater understanding of how people perceive health threats and cancer risks, how they address them, how they behave, and how unhealthy behaviors can be reasonably changed. Furthermore, there is an urgent need to obtain a better understanding of the impact of cancer treatments on patients, both to optimize treatments and improve the patients' quality of life. Many people experience physical and mental health problems even years after their cancer diagnosis and initial treatment. Understanding how everyone reacts to treatment and how treatment affects the patients' and survivors' mental health is crucial for developing more effective care and for supporting patients and their caregivers.

Prevent What is Preventable

Despite improvements in cancer detection and treatment, there is a need for cancer prevention and health promotion to remain a very high priority. Lifestyle is a risk factor for many cancers and, although persistent, a modifiable factor. Around one third of deaths from cancer are due to the five leading behavioral and dietary risks: tobacco use, alcohol use, high body mass index, low fruit and vegetable intake, and lack of physical

activity—as described in the European Code against Cancer.⁷ Furthermore, cancer is the leading cause of work-related deaths. The International Labour Organization estimated that over 106,000 cancer deaths in Europe in 2016 were attributable to occupational causes.⁸

Early detection of cancer can improve cancer treatment outcomes and prevent or reduce the deterioration of health and well-being. Early detection can be achieved by screening, creating awareness of suspicious signals among the population, and screening patients at risk of cancer. Despite the Council Recommendation on cancer screening adopted unanimously by the Health Ministers of the EU in 2003,⁹ in most Member States cancer screening is still not fulfilling the criteria set for population-based, organized programs. Prevention is particularly suited for creating synergies with other EU Research and Innovation Missions, as well as with the European Green Deal,¹⁰ the Farm to Fork Strategy,¹¹ the European Health Data Space,¹² and the Europe's Beating Cancer Plan.¹³

⁷ World Health Organization and International Agency for Research on Cancer, “European Code against Cancer: 12 Ways to Reduce Your Cancer Risk,” 2021, cancer-code-europe.iarc.fr/index.php/en/.

⁸ World Health Organization and International Labour Organization, *WHO/ILO Joint Estimates of the Work-Related Burden of Disease and Injury, 2000–2016: Global Monitoring Report* (Geneva: World Health Organization and International Labour Organization, 2021), www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---lab_admin/documents/publication/wcms_819788.pdf.

⁹ European Commission, “Report from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Implementation of the Council Recommendation of 2 December 2003 on Cancer Screening (2003/878/Ec) /* Com/2008/0882 Final */,” 2003, eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52008DC0882&from=PL.

¹⁰ European Commission, “A European Green Deal: Striving to Be the First Climate-Neutral Continent,” 2021, ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

¹¹ European Commission, “Farm to Fork Strategy: For a Fair, Healthy and Environmentally-Friendly Food System,” 2021, ec.europa.eu/food/horizontal-topics/farm-fork-strategy_en.

¹² European Commission, “European Health Data Space,” 2021, ec.europa.eu/health/ehealth/dataspace_en.

¹³ European Commission, “Europe's Beating Cancer Plan.”

Optimize Diagnostics and Treatments

Many lives have been saved and the quality of life of patients and survivors has improved because of early diagnosis and better treatments. However, many cancers are still diagnosed at an advanced stage and are very aggressive or resistant to all therapies currently available.

An improved understanding of the etiology, development, and spread of poorly understood cancers could provide new biomarkers for diagnostics and new targets for therapies of all cancers. This approach would include highly lethal and rare cancers as well as cancers occurring in children, adolescents, young adults, and the elderly with distinct age-related biological and clinical characteristics for which currently no effective treatment is available.

The translation from development of breakthrough diagnostic technologies and identification of new targets for treatment into clinical trials is still too long. This process of translation requires further development of improved methodological validations and rapid implementation in cancer care. A mission-driven approach aims to translate research breakthroughs into improved diagnostics and effective treatments, and to support equitable and timely access to optimal cancer diagnosis and treatment for each patient in all Member States.

Support the Quality of Life

Increasing incidence and survival rates will result in many more EU citizens who, in the near future, will need to find ways to live a good life with or after cancer. Therefore, an important part of the Mission's goal is to achieve the best possible quality of life for everyone in the EU who is exposed to cancer in some way and in some phase of their lives.

Supporting the quality of life of people exposed to cancer requires a thorough understanding of their cancer-related problems. For patients and survivors, some issues may be (late) side-effects of cancer treatment, symptoms, comorbidities and functional disability (which will increase with age), mental and reproductive health problems. Many cancer survivors experience difficulties in returning to work because of persistent

side-effects but also due to ignorance, stigma, and hesitation on the part of employers. Obtaining health insurance or other financial products may also be difficult or expensive. This difficulty may also increase for individuals with a known family history of certain (hereditary) cancers or polygenic risks. Special attention should be paid to survivors of childhood cancer as they are particularly vulnerable due to early life disruption. Two thirds of childhood cancer survivors experience adverse effects in adulthood. This situation negatively impacts their career opportunities, income, social relationships, and starting a family. It is important to support caregivers who care for cancer patients with psychosocial help as well as to offer practical and financial assistance when needed.

The Mission on Cancer aims to contribute to a better understanding of (late) treatment side-effects, symptoms, comorbidities, functional disabilities, and psychosocial needs, and to relieve symptoms, improve palliative care, and provide survivorship support. The Mission also aims at improving access to quality of life and survivorship support in all Member States. Besides research and innovation, this approach calls for policy and support actions, adjustments of legal frameworks, and close collaboration with EU citizens, cancer patients and survivors, as well as their caregivers. Fundamental for all actions is that each action be co-designed, co-implemented, and co-evaluated with those who should benefit from these interventions.

Ensure Equitable Access

One of the core values across the European Union is the shared commitment to universal access to high-quality care based on equity and solidarity. Unhindered access to prevention and care is often under pressure within health systems, particularly in the case of cancer, due to widely shared pressures on limited resources. This situation impacts all Mission's areas. Hence, such a challenge should be addressed in order to reach the Mission's goal.

According to recent European Commission reports, Europe is characterized by inequitable access to cancer prevention and timely, high-quality diagnostics and treatment. These inequities depend on geographic

and socio-economic disparities between and within countries, which have a profound impact on cancer incidence and survival. With no assurance of equitable access to preventive measures, new achievements in the field of cancer research and innovation will not be distributed evenly within Europe and among its most vulnerable populations. In particular, equitable access implies access to education to improve citizens' (digital) health literacy, promote the overall cancer expertise (e.g., by training healthcare professionals), and foster research and innovation.

Improving access within Member States requires a better understanding of why some policy tools have not been implemented effectively and what could be done to address inequities in access to prevention, diagnostics, treatments, and quality of life for anyone exposed to cancer. In addition, empowering patients should make it possible for them to gain more control over their care and life and to address high value personal issues.

Major Cancer Problems and Prospects for Prevention: A European Perspective Hence, achieving equitable access calls for: (1) a strong commitment from Member States; (2) availability and optimal use of research and clinical data; (3) strong promotion of research and innovation, supported by establishing at least one Comprehensive Cancer Infrastructure (CCI) in each Member State; and (4) the EU-wide acknowledgment of the urgent need to transform the culture around cancer.

The COVID-19 Global Pandemic and Cancer

In 2020 and 2021, the COVID-19 crisis has negatively affected cancer care at an unprecedented speed. The aftermath of this crisis poses significant threats to prevention and treatment, as well as to research and innovation, which are critical to facilitate improvements. In this exceptional situation, the Mission on Cancer—together with other European efforts—offers an excellent opportunity to address these threats. The ambitious Mission on Cancer aims to improve cancer prevention, diagnostics, treatments, and quality of life of people exposed to cancer by relying on a new level of research and innovation. Such engagement will also provide an important

stimulus to the whole European healthcare system and its economy and thereby contribute to societal recovery from the COVID-19 crisis. The Mission on Cancer is an essential and fundamental element in providing a coherent vision and detailed instruments for action to achieve the ambitious goals of the Europe's Beating Cancer Plan.

COVID-19 has demonstrated, beyond doubt, the critical importance of health for any society. The recent pandemic clearly shows that the absence of health leads to severe economic, political, and societal consequences for Europe. COVID-19 has also laid bare critical insufficiencies in healthcare system preparedness, adaptability, and resilience. While the COVID-19 pandemic is unprecedented in terms of incidence and mortality, it is foreseeable that—with determination, political will, and rapid scientific and technological advances—the world will be able to manage the pandemic. Unfortunately, this will not be the case with cancer, which will remain one of the major killers in Europe.

Conclusion

The Mission on Cancer will be a major driving force to apply the lessons learned from the current COVID-19 crisis to find solutions to the cancer challenge and beyond. We have seen an unprecedented willingness in technology adaptation, collaboration across sectors and borders—including extensive data sharing—genuine communication and alignment between healthcare and research, remarkably shortening the implementation of research findings and the ability to mobilize and allocate considerable funding resources at short notice.

The Mission on Cancer has been developed in an age of distrust in science and scientists, facts and evidence. Anti-science ideology is gaining ground and health research is being weaponized in politics, particularly by the far right. Citizens often do not see the benefit of research and question the benefits of research programs.

The missions under Horizon Europe recognize this context and have been developed with the aim of improving society and the lives of EU

citizens and residents.¹⁴ Moreover, the word “citizen” is key: just as the food and soil mission is not just for farmers¹⁵ and the oceans mission is not just for fishermen,¹⁶ the cancer mission is not just for cancer patients.

Missions are one of the main novelties of Horizon Europe. By addressing important societal challenges, such as cancer and climate change, through ambitious but realistic research and innovation activities, they will make clear to citizens how the EU can make a real difference in their lives and in society as a whole. They boost the impact of EU-funded research and innovation by mobilising investment and EU wide efforts around measurable and time-bound goals around issues that affect citizens’ daily lives.¹⁷

Much thought has been given to the involvement of citizens in the missions by their creator, Prof. Mariana Mazzucato. As she writes in the introduction to her report, “Governing Missions in the EU”:

Citizen movements have always been central to achieving social change—including labour movements which brought us one of the greatest social innovations of our time: the weekend! Today there is a growing green movement—including the youngest school children—bringing the climate emergency right to the top of public priorities. We must harness this drive for change across

¹⁴ European Commission, “Horizon Europe.”

¹⁵ European Commission, “EU Mission: A Soil Deal for Europe,” 2021, ec.europa.eu/info/research-and-innovation/funding/fundingopportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe/soil-health-and-food_en.

¹⁶ See European Commission, “EU Mission: Restore Our Ocean and Waters,” 2021, ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe/healthy-oceans-seas-coastal-and-inlandwaters_en.

¹⁷ EuroCities, “Eurocities Secretary General among the Top Experts Selected to Define Horizon Europe Mission,” July 31, 2019, eurocities.eu/latest/eurocities-secretary-general-among-the-top-experts-selected-to-define-horizon-europe-mission/.

different parts of our population to allow R&I [Research and Innovation] across Europe to tackle the greatest challenges of our time. And if we allow it to change how we ‘do’ on the ground, it will become the key source of our future competitiveness. The opportunity is too great to miss.¹⁸

Moreover, she continues:

Mission-oriented innovation cannot be top-down. It must inspire and harness the full creativity of citizens to tackle problems as urgent as climate change, rising inequality or the challenge to establish more caring societies. In order to inspire society at large, missions need to have widespread legitimacy and acceptance. This means, among other things, that mission setting must find its way to the centre of the political priority-making process and involve citizens in a serious way.

In this context, it is critical to develop a sound and transparent process to select missions, frame them, and to assess missions along the way so that they have the right checks and balances. This requires a strong level of public trust.

Ensuring public trust must start with acknowledging that research and innovation are not separate to society, only populated by academics and policy experts.¹⁹

The overall intention is that the missions should help develop and embed citizen engagement and consultation in European policy making, thus making the missions a key policy instrument to secure the future and success of the European project. The cancer mission is not just about cancer: it is also about democracy, and we assume our responsibility and obligation to consult citizens seriously and meaningfully.

¹⁸ Mazzucato, “Governing Missions in the European Union,” 3.

¹⁹ Mazzucato, “Governing Missions in the European Union,” 6.

Walter Ricciardi, MD, MPH, MSc, is President of the World Federation of Public Health Associations. He graduated in medicine and earned a doctorate in public health medicine from the University of Naples, Italy. He currently holds the title of Professor of Hygiene and Public Health at the Università Cattolica del Sacro Cuore in Rome, where he is also Director of the Department of Public Health and Deputy Head of the Faculty of Medicine. He is the editor of the *European Journal of Public Health* and the *Oxford Handbook of Public Health Practice*, and founding editor of the *Italian Journal of Public Health*.