RADIOTHERAPY:
seizing the opportunity in cancer care

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MARIE CURIE LEGACY

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The Marie Curie Legacy Campaign, pioneered by the ECF and ESTRO, is a global initiative to raise awareness of the benefits of radiotherapy and optimise the provision of radiotherapy in Europe and beyond.

The ECF was launched by ESTRO in 2012. Its ambition is to ensure that every cancer patient has access to appropriate and personalised cancer care. The ECF's projects are designed to raise awareness and understanding of radiotherapy. It is instrumental in facilitating research and making the resulting scientific data accessible and understandable to everyone. For more information, visit: **www.mariecurielegacy.org**

ESTRO was founded in 1980, as a non-profit and scientific organisation that fosters the role of radiation oncology in order to improve patients' care in the multimodality treatment of cancer. With over 7,300 members in and outside Europe, ESTRO supports all radiation oncology professionals in their daily practice – radiation oncologists, medical physicists, radiobiologists and radiation therapists – and the wider oncology community. 'Radiation oncology. Optimal health for all, together' is the ESTRO vision. ESTRO promotes innovation, research and dissemination of science through its congresses, special meetings, educational courses and publications. For more information, visit: **www.estro.org**

Foreword

The incidence of cancer is increasing, resulting in a rising demand for high-quality cancer care. In 2018, there were close to 4.23 million new cases of cancer in Europe, and this number is predicted to rise by almost a quarter to 5.2 million by 2040.[1] This growing demand poses a major challenge to healthcare systems and highlights the need to ensure all cancer patients have access to high-quality, efficient cancer care.

One critical component of cancer care is too often forgotten in these discussions: radiotherapy. Radiotherapy is recommended as part of treatment for more than 50% of cancer patients.[2,3] However, at least one in four people needing radiotherapy does not receive it.[3]

This report aims to demonstrate the significant role of radiotherapy in achieving high-quality cancer care and highlights what needs to be done to close the current gap in utilisation of radiotherapy across Europe.

We call on all stakeholders, with policymakers at the helm, to help position radiotherapy appropriately within cancer policies and models of care – for the benefit of cancer patients today and tomorrow.

Our five-point plan

1. **Governments and policymakers:** Make radiotherapy a central component of cancer care in policies, planning and budgets

2. **Professional societies working with national and EU-level decision-makers:** Achieve recognition of all radiotherapy professions and harmonise education and training standards across Europe

3. **EU and national research and innovation funds and the research community:** Invest in research and use of data to continuously improve radiotherapy outcomes for patients and maximise the potential of innovation

4. **Multidisciplinary cancer care teams:** Fully integrate radiotherapy into treatment planning and decision-making

5. **Patient groups, media and other stakeholders:** Help improve general awareness and understanding of radiotherapy to ensure it can achieve its full potential for patient care

This plan is endorsed by all authors of this report: Joanna Kazmierska, Núria Jornet Sala, Michelle Leech, Barbara Alicja Jereczek-Fossa, Yolande Lievens and John Yarnold.

Radiotherapy

is a core component of high-quality cancer care

What is radiotherapy?

Today, radiotherapy is a safe and highly effective cancer treatment, using ionising radiation, predominantly high-energy X-rays. Radiotherapy allows cancer specialists to precisely target and destroy tumour cells by delivering the most effective dose possible.

Radiotherapy is recommended as part of treatment for more than 50% of cancer patients.[2 3] It can be used on its own, or to complement or enhance the effects of other treatments, for example to shrink or control a cancer before and after surgery.[4 5]

Radiotherapy is a team effort, delivered by an interdisciplinary team consisting of radiation oncologists, medical physicists, radiation therapists (RTTs), radiobiologists and specialist nurses, among others.[6] Each plays a key part in treatment decisions, as well as administration and follow-up of patients.

Technological advances ensure that modern radiotherapy is carefully shaped to each patient's cancer. All team members work together to ensure that the dose and mode of radiotherapy are optimised to target the tumour accurately and protect surrounding healthy tissue.[5 7]

Radiotherapy saves lives – and alleviates pain and other symptoms.

Radiotherapy cures many cancers.[8] There is evidence that 40% of all cancers cured are eliminated by radiotherapy, either alone or acting in combination with other types of treatment.[9] Post-operative radiotherapy for breast cancer patients, for example, has been shown to halve the rate of recurrence compared with surgery alone.[10]

If, by 2035, every cancer patient who needs radiotherapy has access to it, **almost one million more lives will be saved every year worldwide.**[4]

Radiotherapy also has a major role in alleviating symptoms and improving quality of life. For example, it is the gold standard to relieve bone pain caused by the spread of cancer,[11] where it brings significant improvements in up to three out of four patients who receive it.[12] [13]

Radiotherapy

is a rapidly evolving type of treatment

Both the technology and delivery of radiotherapy have rapidly advanced over the past few decades, driven by technological innovation and clinical and health-services research.[5 7 14] For example:

- **Precisely-shaped radiation beams allow delivery of higher doses to the cancer, resulting in more effective local tumour control while sparing surrounding organs.**[7 15] For patients with head and neck cancer, for example, this reduces side effects such as swallowing problems and dryness in the mouth, which have a significant impact on daily life.[16]
- **Shortening treatment time reduces the disruption to patients' lives.** For example, the average radiotherapy course for breast or prostate cancer has almost been halved in the past two decades by exploiting the benefits of fewer, slightly larger daily doses of radiation over a shorter period of time (hypofractionation).[17-21]
- **More patients can benefit from effective treatment.** For example, radiotherapy can now be offered as an alternative with similar effectiveness to surgery or chemotherapy for many cancers.[22-25]
- **Radiotherapy can be combined with other treatments such as immunotherapy** to further improve outcomes for patients.[26-28]

How data are contributing to better clinical care with radiotherapy

Advanced uses of data are changing the landscape of radiotherapy. For example, big data analysis using algorithms powered by artificial intelligence can be used to predict overall survival, treatment response and toxicity. This information can help guide clinical decision-making about how to use radiotherapy and further personalise treatment.[4 29 30]

Investment

in radiotherapy makes economic sense

> 'There is strong evidence that radiotherapy is a sound investment for healthcare systems. If we used radiotherapy to match demand, there would be a return of up to €5 for every €1 invested by 2035, depending on the model of care being adopted.'
>
> **Yolande Lievens,**
> **Ghent University Hospital, Belgium**

Radiotherapy is an inexpensive treatment option. While it requires a well-planned initial investment in equipment, infrastructure and training, the long-term costs are low.[4] Even where radiotherapy is a major component of cancer care, it only accounts for a small proportion of the cancer budget; in Sweden and England, for example, this figure is just 5%.[9 31]

As technology advances, there are huge opportunities to reduce both treatment costs and broader societal costs even further.[4 32] In breast cancer, for example, shorter radiotherapy treatment delivering a lower total dose has already reduced healthcare costs while achieving comparable health effects.[32 33] Greater use of automation is likely to further reduce costs by achieving more efficient treatment planning and quality control.[4]

Current use

of radiotherapy represents a missed opportunity

> 'Approximately half of all cancer patients should be given radiotherapy. However, at least a quarter of those who need it do not receive it. Clearly, this represents such a missed opportunity as we strive to optimise outcomes for cancer patients.'
>
> **Lydia Makaroff, European Cancer Patient Coalition**

Currently, there is a large gap between actual and optimal utilisation of radiotherapy, with huge variation across Europe.[3] Many patients do not benefit from optimal treatment because they are not offered radiotherapy as part of their care.

This gap is due to multiple factors, which all lead to underinvestment in radiotherapy.

Lack of strategic attention to radiotherapy at the policy level

Radiotherapy appears to be left on the sidelines of health policy agendas. Globally, more than 40% of high-income countries do not address radiotherapy in their national cancer or non-communicable disease plans.[34]

More investment needed in research

Despite a significant increase in impactful research on radiotherapy, gaps remain.[14] In particular, funding for pre-clinical research is crucial to advance the understanding of new radiotherapy approaches, along with the need for more emphasis on clinical trials, health services research and research focusing on quality of life.[14] As trial data may take a long time to mature, real-world data are also needed to evaluate the use of promising innovations in radiotherapy in practice.[35]

Shortages of high-quality equipment

The numbers of radiotherapy facilities and equipment are often inadequate, even in high-income countries.[6 36 37] This lack of resources for radiotherapy can compromise patient outcomes.[38]

Even countries with apparently acceptable levels of radiotherapy facilities may have equipment that is outdated.[37 39] This can undermine the effectiveness of radiotherapy and cause adverse effects for patients.[40]

Limited availability of trained personnel

The delivery of radiotherapy is a team effort – and the availability of necessary health professionals varies greatly between countries.[6 37] For example, the European Society for Radiotherapy and Oncology Health Economics in Radiation Oncology (ESTRO–HERO) survey found that 11 countries in Europe still fell below internationally recommended staffing levels for radiation oncologists.[6]

Variable education and training for radiotherapy professionals across Europe

Despite efforts to create common standards and curricula for education and training of all professionals involved in delivering radiotherapy, many countries have not yet implemented these standards.[41] Some qualifications cannot easily be transferred from one country to another as they are not recognised in all countries.[41] Furthermore, the provision of appropriate training for health professionals working in radiation oncology varies widely depending on the role and country. For example, the educational background and level of responsibility of RTTs are inconsistent across Europe[42] – and this is also true of other disciplines.

This failure to implement shared standards for education potentially jeopardises the safe delivery of treatment and hinders the introduction of innovative techniques, as professionals may not be adequately prepared for the demands of modern radiotherapy.[6 43 44]

> 'If we want to make sure all citizens have access to the same high-quality radiotherapy care across Europe, we must ensure that education and training standards are harmonised – not just for radiation oncologists but for radiation therapists and medical physicists as well.'
>
> **Michelle Leech,**
> **Trinity College Dublin, Ireland**

Gaps in knowledge about radiotherapy among the wider cancer care team

Limited understanding among healthcare professionals of the role of radiotherapy may contribute to its underuse. In many European countries, radiation oncology is not covered in the general oncology curriculum.[45] If general practitioners (GPs), oncologists or other specialists underestimate the benefits of its use, they may not think to refer patients to radiotherapy, or make evidence-based decisions on the best treatment options available for each patient.[38 46]

Prevailing misconceptions about radiotherapy

Patients' main source of information is their physician – and gaps in the medical profession's knowledge of radiotherapy widen gaps in public awareness. Many patients do not understand the potential role of radiotherapy in their care, or recognise it as a modern, safe and effective treatment option.[47]

Capturing the potential of radiotherapy for better cancer care: a five-point action plan

As the demand for high-quality cancer care continues to grow, we need to ensure that we are focusing care on what offers the greatest benefit to patients. Radiotherapy is a key part of this solution.

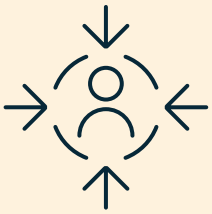
The vision of the European Society for Radiotherapy and Oncology (ESTRO) is: 'Radiation oncology. Optimal health for all, together.' At least a quarter of people in Europe who should be receiving radiotherapy currently do not. And at the same time, the demand for radiotherapy is expected to grow by 16% by 2025.[48] Clearly, greater investment in radiotherapy is needed – as this investment will not only result in more lives saved but also a return on investment over time.

This gap cannot be filled by the radiation oncology community alone. It requires governments, patients and their representatives, all healthcare professionals and the research community to improve understanding of radiotherapy and its position within comprehensive cancer care.

To ensure that all patients who need it have access to high-quality radiotherapy as part of their care, we call on all stakeholders to become active radiotherapy ambassadors by endorsing our **five-point plan** to boost uptake of radiotherapy and close the gap in utilisation across Europe. We believe all cancer patients deserve equal access to radiotherapy – whoever they are and wherever they live.

We ask that:

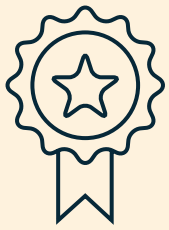
1



Governments and policymakers make radiotherapy a central component of cancer care in policies, planning and budgets

- Ensure radiotherapy is positioned appropriately in national cancer control plans and cancer policies.
- Build and maintain capacity across Europe in technology and skilled personnel to ensure all patients who need it have access to high-quality radiotherapy.
- Embed national audits and use data on service utilisation to improve future capacity planning and mitigate the impact of low resources on patients (e.g. long waiting times).

2



Professional societies working with EU-level and national decision-makers achieve recognition of all radiotherapy professions and harmonise education and training standards across Europe

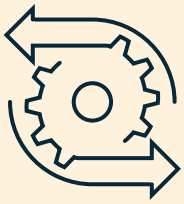
- Ensure the roles of all radiotherapy professionals, along with the required qualifications, are appropriately recognised at national level.
- Mandate shared standards for education and training across Europe for all radiotherapy professionals to ensure employability and mobility of professionals between countries.
- Promote consistent training for all professionals, using the ESTRO core curricula,[49] to ensure all professionals deliver evidence-based, best-practice care.

3

EU and national research and innovation funds and the research community invest in research and use of data to continuously improve radiotherapy outcomes for patients and maximise the potential of innovation

- Include radiotherapy in European and national research agendas, focusing on outcomes important to patients (both curative and palliative), as well as improvements in service delivery.
- Foster international research collaborations to facilitate scaling of clinical trials and obtain meaningful evidence of the clinical and economic impact of new treatment approaches in a range of settings and populations.
- Expand the use of real-world data and big data analysis to enable timely health technology assessment for innovative radiotherapy technologies.

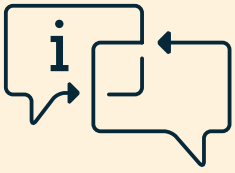
4



Multidisciplinary cancer care teams fully integrate radiotherapy into treatment planning and decision-making

- Implement cross-disciplinary training programmes throughout the care team to help them understand the role of radiotherapy and ensure it is fully integrated into decision-making.

5



Patient groups, media and other stakeholders help improve general understanding of radiotherapy to ensure it can achieve its full potential for patient care

- Communicate relevant information to patients about radiotherapy, to help dispel myths and enhance their understanding of what to expect from treatment.
- Disseminate the **10 facts about radiotherapy** to help achieve this goal.

10 facts about radiotherapy

1

At least a quarter of patients who need radiotherapy **DO NOT** receive it.[3]

2

The demand for radiotherapy will increase by **16%** by 2025[48 50] but current capacity is insufficient to meet this demand.[48]

3

By 2035, if every cancer patient who needs radiotherapy has access to it, almost **ONE MILLION** more lives will be saved every year worldwide.[4]

4

Radiotherapy **SAVES LIVES** – and is a key part of curative treatment for many types of cancer.[5 48]

5

Radiotherapy alleviates cancer symptoms, such as pain, and **IMPROVES** patients' quality of life.[4 12 13 51]

6

Radiotherapy is **NOT INVASIVE** – many patients receiving radiotherapy can still go to work and carry on with day-to-day life.[5]

7

State-of-the-art radiotherapy can specifically match the shape of the tumour it is **TARGETING** – thus limiting damage to nearby healthy organs and tissue.[7 15]

8

Continuous improvements in delivery of radiotherapy have allowed treatment times to be reduced; for example, the time for an average radiotherapy course for breast or prostate cancer has **HALVED** in the past two decades.[17-21]

9

Advances in radiotherapy mean **MORE** patients than ever can access treatment – for example, in cases of cancer that are not eligible for surgery.[22-24]

10

There is significant **VARIATION** across Europe in access to radiotherapy treatment, services and trained staff.[3 6 37]

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