Building efficiency in cancer care

A policy blueprint by All.Can International

All.Can

Changing cancer
care together

Contact

All.Can International ASBL
Rue du Luxembourg 22-24, BE-1000 Brussels, Belgium
Tel: +32 2 761 66 73

Email: secretariat@all-can.org
Website: www.all-can.org
Contact: secretariat@all-can.org

@AllCanGroup
@AllCanGroup
All.Can International
All.Can International

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In alignment with its statutes and bylaws, all activities and outputs of All.Can represent consensus of members, who have full editorial control.

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About All.Can

All.Can is a global, non-profit and multi-stakeholder initiative that informs and generates political and public engagement on the need to improve the efficiency of cancer care, by focusing on what really matters to people with cancer and to society as a whole. All.Can seeks to make sure resources are directed towards achieving better health outcomes while contributing to healthcare systems' overall sustainability.

All.Can International brings together cancer patient organisations, healthcare professionals, researchers, industry and decision-makers from around the world. As of February 2022, it comprises 28 members and National Initiatives established in 19 countries (see Appendix 1).

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Executive summary

Efficient cancer care is more important than ever

The All.Can Building Efficiency blueprint offers a broadly applicable framework to support collaborative policy action to improve efficiency in cancer care in ways that are people-centred and equitable.

For All.Can, efficient cancer care delivers the best possible health outcomes using the human, financial, infrastructural and technological resources available, with a focus on what really matters to people with cancer and to society as a whole. Improving efficiency benefits everyone – including patients, carers, healthcare professionals, healthcare system managers, industry, governments, payers and the society at large.

Efficient cancer care has never been more important. Inefficiency wastes healthcare resources, compromises patient outcomes, and costs lives. Improving efficiency is vital to achieve the United Nations Sustainable Development Goals (SDGs) and to meet rising healthcare demands while managing cost pressures and making health systems more equitable and sustainable.

It is now an urgent priority also to mitigate the devastating worldwide impact of the coronavirus (COVID-19) pandemic on people affected by cancer, as well as other patient populations. COVID-19 has delayed diagnoses, compromised treatment and curtailed research – and healthcare systems now face a large backlog of cancer cases. The pandemic has also underscored the vital need to strengthen healthcare systems' resilience through efficiency gains.

Crucially, efficiency is not a means to cut costs: the resources freed through increased efficiency should be re-invested to advance innovation or increase system resilience.

Sustained policy leadership and collaborative actions at international, national, regional and local levels are critical to align policies, practices, technologies, data systems, organisational frameworks and incentives towards building efficiency.

The All.Can Building Efficiency blueprint provides recommendations aimed at decision-makers, for adaptation according to the national or local situation, and showcases examples of good practices from the All.Can Efficiency Hub and elsewhere to encourage their wider adoption.

Building Efficiency blueprint and recommendations

We recommend building efficiency within a holistic paradigm that reflects two overarching critical values: it should be **people-centred** throughout and take a **whole-system perspective**.

Being **people-centred** means aligning all aspects of cancer care and prevention to meet the needs of patients, carers and the general public – in collaboration with people affected. Specifically, it also means involving patients and carers in identifying inefficiencies, and in defining, evaluating and improving efficiency within their own care and within the healthcare system.

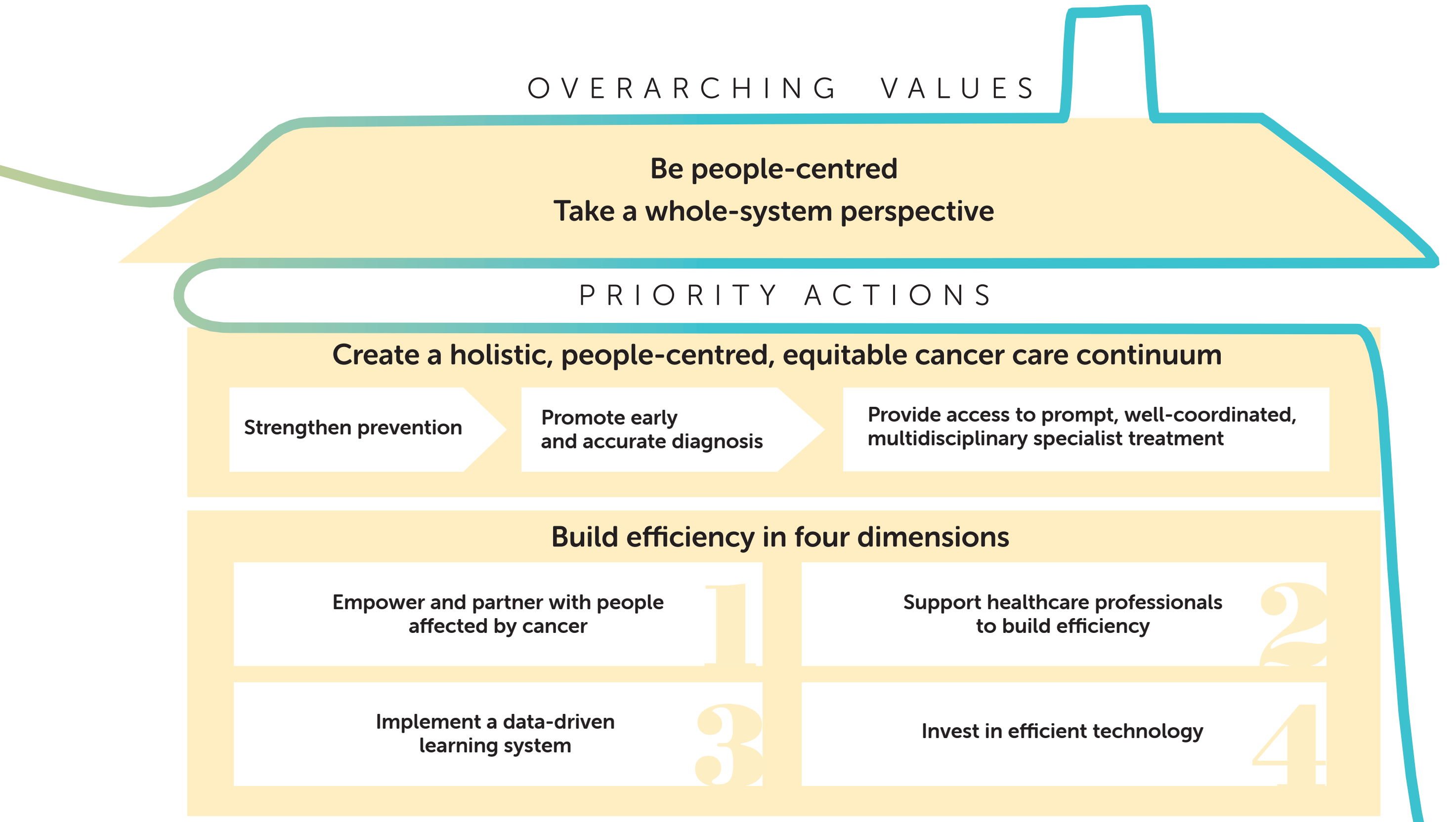
A **whole-system perspective** means treating each patient's care pathway, and the entire cancer care system, as an integrated whole. This involves breaking down the organisational barriers and silos that prevent:

- optimal resource allocation and data sharing between different healthcare providers and professionals (e.g. in primary care, hospitals and specialist centres)
- optimal information sharing between health systems and patients and carers.

Building efficiency throughout the cancer care continuum

Efficiency is best realised by ensuring all people with cancer have access to a **holistic, people-centred and equitable** cancer care continuum.
Efforts to build efficiency should span this continuum, namely by:

- **strengthening cancer prevention:** via policies that address modifiable risk factors, evidence-based public health measures (e.g. vaccination), and improving cancer health literacy
- **ensuring early and accurate diagnosis by:** strengthening evidence-based screening programmes, investing in diagnostic capacities, and adopting precision oncology (based when needed on genomics and other 'omics'), artificial intelligence, and machine learning where appropriate
- **providing all patients with access to prompt and well-coordinated multidisciplinary specialist**



OVERARCHING VALUES

Be people-centred
Take a whole-system perspective

PRIORITY ACTIONS

Create a holistic, people-centred, equitable cancer care continuum

- **Strengthen prevention**
- **Promote early and accurate diagnosis**
- **Provide access to prompt, well-coordinated, multidisciplinary specialist treatment**

Build efficiency in four dimensions

1. **Empower and partner with people affected by cancer**
2. **Support healthcare professionals to build efficiency**
3. **Implement a data-driven learning system**
4. **Invest in efficient technology**

treatment, supportive care and palliative care via: streamlined referral pathways; improved communication and coordination between healthcare professionals and providers (via suitable organisational frameworks, data systems and infrastructures, training and incentives) and between health systems and patients and carers; and adopting evidence-based innovations that improve efficiency.

Personalised therapeutic approaches should be adopted where possible (including precision oncology and treatments that are simpler, more convenient or better tolerated), together with care practices and services shown to improve efficiency (e.g. outpatient care, telemedicine and remote monitoring where appropriate) – keeping equity challenges in mind.

Building efficiency in four dimensions
We recommend concerted actions to build efficiency across four interrelated and mutually supportive dimensions that together underpin the cancer care continuum:

- **Empowering and partnering with people by:** promoting shared decision-making within patient care via measures to improve communication between healthcare professionals, patients and carers; employing patient-reported outcome measures (PROMs) in routine care; harnessing digital health tools; and supporting and promoting patients' and carers' access to patient organisations and support groups.

  In addition, patient representatives should be meaningfully involved in wider aspects of decision-making, including in policy, initiatives to improve the efficiency and quality of care, clinical guideline development, research, health technology assessment, and reimbursement decision-making.

  Greater efforts to improve cancer literacy within the general public, as well as among patients and carers, are fundamentally important.

- **Supporting healthcare professionals to build efficiency** by: investing and planning urgently to meet workforce capacity and skill mix needs; enabling and incentivising multidisciplinary care, interdisciplinary coordination and innovative service models; supporting education and training on improving efficiency; and protecting workforce wellbeing and safety.

- **Implementing a data-driven learning system** by: promoting the systematic collection, sharing and reporting of patient-relevant data (including PROMs) between healthcare providers and patients and carers. We provide detailed recommendations to address key challenges related to: data quality, representativeness, and relevance; data silos and interoperability; data governance and patient trust; healthcare professionals' buy-in to data systems; and using data to transform care.

- **Investing in efficient technology** by: employing strategic, value-based healthcare approaches. We recommend that decision-makers should: strategically and systematically disinvest resources away from obsolete and inefficient technologies and practices and reinvest these in efficient ones; implement regulatory and policy frameworks that incentivise and foster efficient technologies; explore outcomes-based reimbursement schemes; break down finance silos; and implement specific measures to support the adoption of innovation in practice, and equitable access for people with cancer to efficient technologies and practices.

Conclusion and call to action

We call on decision-makers to build efficiency in cancer care as a top priority via system-wide changes. Key milestones include:

- *suitable consultation and collaboration with all stakeholders, including patients and carers, as outlined in this blueprint*
- *identification, adoption, sharing and scaling-up of efficient innovations in technology and care practices – disinvesting from inefficient and wasteful ones*
- *implementation of organisational frameworks, data systems, policies and incentives aligned towards efficient care for all people with cancer*
- *appropriate resourcing of actions to build efficiency, reflecting the impact of cancer on society.*

All.Can stands ready to further support policy initiatives to improve cancer care efficiency by generating new evidence, and facilitating the exchange of knowledge and best practices, enhancing cross-country collaboration, and building new partnerships around the world.

1. Introduction

For All.Can, efficient cancer care delivers the best possible health outcomes using the human, financial, infrastructural and technological resources available, with a focus on what really matters to people with cancer and society as a whole.

While this may appear simple and intuitive, systematically ensuring that all these resources are used efficiently is a challenge. It requires alignment across many policies, practices, technologies, data systems, organisational frameworks, and incentives.[1]

The **All.Can Building Efficiency blueprint** offers a broadly applicable framework for policy action to help achieve efficiency in cancer care in ways that are people-centred and equitable, with recommendations for decision-makers.

First of all, it is important to recognise why building efficiency in cancer care is so essential.

1.1. Efficiency benefits everyone in society

Everyone benefits from efficient cancer care, as we define it. For example:

- For **people with cancer**, early diagnosis and prompt, effective treatment – key aspects of efficient care – may mean a cure, extended survival, a better quality of life, or a combination of these benefits. Greater efficiency can also improve patients' experience of care, for example by improving convenience, reducing time and financial losses, and avoiding unnecessary out-of-pocket expenses. Efficiency in healthcare can also reduce the burden placed on **families and carers**.

  Importantly, efficiency should be defined, pursued and evaluated according to what matters most to people affected by cancer – outcomes that are not necessarily the same as those measured by health systems (Sections 4.1 and 4.3).

- For **healthcare professionals, healthcare system managers and industry**, greater efficiency maximises the health outcomes they can achieve for patients through the services or technologies they provide. Healthcare professionals and managers also gain from streamlined working practices and resource use.
- **Governments, payers and societies at large** benefit because efficiency maximises the health outcomes achieved across society from public spending on health (i.e. the 'return on investment'). For example, cancer prevention and early diagnosis and treatment reduces both the direct medical costs of care and the 'indirect' socioeconomic costs of lost economic productivity among patients and carers. One recent international estimate suggests that each Euro increase in cancer spending between 2020 and 2030 would yield 12 Euros in return.[2]

The concept of efficiency is closely tied to **value-based healthcare**,[3–5] where value is defined in terms of the health outcomes achieved by the cost incurred throughout a cycle of care.

Crucially, efficiency is not a means to cut costs: the resources freed through increased efficiency should be re-invested to advance innovation (Section 4.4) towards further efficiency gains, equity and healthcare system resilience.

> *'Careful evidence-based investments in cancer interventions will deliver meaningful social and economic returns, with increased productivity and equity.'*
>
> Tedros Adhanom Ghebreyesus, Director-General, WHO
>
> *WHO Report on Cancer 2020*[6]

1.2 Healthcare systems cannot afford waste

Improving efficiency in cancer care has never been more important, not only to optimise patient outcomes, but also to ensure the long-term sustainability and resilience of healthcare systems.

Wastage costs lives

Between 20% and 40% of health spending is wasted through inefficiency.[7,8] Addressing the inefficiencies in healthcare systems could almost halve the number of avoidable deaths, extend average lifespans, and reduce by 0.5% the annual growth rate of public health expenditure.[9]

Greater efficiency will become ever more important to help meet rising demand for increasingly complex healthcare while managing cost pressures and making healthcare systems more equitable and sustainable.[10–12]

It is also key to attaining the United Nations Sustainable Development Goal 3, to ensure healthy lives and promote wellbeing for all at all ages. Specifically, greater efficiency is necessary to reach the target to reduce by one third premature mortality from non-communicable diseases by 2030, and to achieve universal health coverage.

Efficiency in action: worldwide perspectives

Throughout 2021, All.Can partnered with SPCC (Sharing Progress in Cancer Care) and the SDA Bocconi School of Management in a series of webinars and associated reports on efficiency projects in different geographical parts of the world.

Addressing inefficiency specifically in cancer care is crucial because:

- Cancer is a leading and increasing cause of mortality and morbidity worldwide.[6,13,14] Globally, cancer caused around 10 million deaths in 2020[14] and it is the first or second leading cause of death in many countries.[6]
- Cancer accounts for substantial healthcare usage and costs, and enormous socioeconomic costs from lost productivity, premature death and informal care.[15,16]
- The impact of cancer is increasing owing to ageing populations (since the incidence of cancer rises with age) and exposure to risk factors. Globally, the number of new cancer cases is projected to increase by around 50% over the next 20 years[14] and overall cancer-related mortality continues to rise.[17]
- Important disparities exist between and within countries in cancer care access and outcomes.[6]

COVID-19: new impetus to build efficiency

Improving efficiency is now even more important to help overcome the lasting impact of the COVID-19 pandemic, and to make healthcare systems more resilient in future. Not only has COVID-19 caused disproportionately high rates of severe illness, complications and death among people with cancer, it has also had immense collateral effects on cancer care across the world.[18–25] Key effects include:

- **Missed diagnoses** owing to disruptions to screening programmes, diagnostic testing and referral pathways. The European Cancer Organisation (ECO) estimates that almost 1 million cancer cases could go undiagnosed across Europe.[27]
- **Compromised treatment** owing to cancellations, delays or reduced intensity of therapy (and the associated outpatient visits and hospitalisations), and disruptions to supportive and palliative care. For example, almost 8 out of 10 paediatric oncology providers surveyed worldwide reported that COVID-19 had reduced their capacity to care for children with cancer.[22] Other global surveys reported estimates from care providers that more than one third of patients were exposed to potential harms owing to care disruptions,[18] and that during full lockdowns, 1 in 7 patients did not receive their planned operation for pandemic-related reasons.[24] COVID-19 had the greatest impact on cancer care in lower- and middle-income countries.
- **Curtailed research and innovation**, owing to the cancellation, halting or postponement of many clinical trials, and disruption to laboratory research.[28]

As a result, the pandemic has worsened patients' health outcomes, caused distress and anxiety among patients and carers, and incurred unanticipated out-of-pocket costs.[19,29,30] There is a risk of a second healthcare crisis as health systems struggle to cope with a backlog of cancer cases,[25] including many patients with advanced disease needing more intensive management and having worse outcomes. Significant increases in avoidable, cancer-related mortality are already projected.[31,32]

Achieving greater efficiency in cancer care is imperative to help mitigate this damage. Indeed, responses to COVID-19 have already demonstrated the potential for efficiency gains, for example using digital health measures (such as telemedicine and remote care where appropriate) and data systems.[33] However, so far patients have had variable access to these measures.[34]

Efficiency in action: responding to COVID-19

International – *Rapid responses to the COVID-19 pandemic*

Equity, resilience and efficiency are complementary

COVID-19 has exposed pre-existing weaknesses in healthcare systems, including inequities and disparities in health determinants, health service access and health outcomes – both between and within countries.[6,35] Many of these could be mitigated by efficiency gains that drive improved outcomes and care standards for all patients, while reducing wastage and freeing up resources that could be reinvested into ensuring equitable access to more efficient practices or technologies. Therefore, building greater resilience, equity* and efficiency are not contradictory aims, but rather interlinked priorities for cancer care systems worldwide.

We recognise that patient outcomes are not determined by the cancer healthcare system alone. **Building efficiency in cancer care also involves addressing the social and environmental determinants that drive the incidence of cancer and worsen patient outcomes**. This report encompasses primary prevention but focuses primarily on efficiency in cancer care.

1.3 Objectives

Urgent and sustained policy leadership and collaborative actions at international, national, regional, and local levels are critical to align policies, practices, technologies, data systems, organisational frameworks and incentives toward building efficiency.

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* According to the World Health Organization, equity is the absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g. sex, gender, ethnicity, disability, or sexual orientation). Health equity is achieved when everyone can attain their full potential for health and well-being.[36]

Best practices shown to improve efficiency need to be shared and expanded.

This policy paper complements our inaugural 2017 policy report[1] and recent publications.[37,38] We offer it as an international, multistakeholder contribution to:

- **highlight key areas of inefficiency** in cancer care according to All.Can members' perspectives and taking COVID-19 into account
- **present the All.Can Building Efficiency blueprint, with broadly applicable recommendations** aimed at decision-makers for adaptation according to the national or local situation
- **showcase examples of good practices** from the All.Can Efficiency Hub and elsewhere to encourage their wider adoption – these are highlighted in 'Efficiency in action' panels throughout this publication.

Methodology

This publication was developed by All.Can International based on the 2018 All.Can International Patient Survey (involving nearly 4,000 patients and carers largely from 10 countries;[37] other cited publications by All.Can International and various national All.Can initiatives; a structured consultation involving All.Can national initiatives and members in 14 countries (August 2021; see Appendix 2); a review of peer-reviewed and grey published literature; and input from external advisors.

2. All.Can Building Efficiency blueprint: an overview

Building efficiency in cancer care is a complex challenge requiring close collaboration among all stakeholders at all levels. The Building Efficiency blueprint offers a broadly applicable framework for collaborative policy action to this end.

Overarching principles

We recommend building efficiency within a holistic paradigm that reflects two overarching critical values: it must be **people-centred** throughout, and it should take a **whole-system perspective** on efficiency.

Being **people-centred** means aligning all aspects of cancer care to meet the needs of patients and carers (for example with respect to early diagnosis and prompt, high-quality treatment) and the public (with respect to prevention and screening, where this is possible) – in collaboration with people affected.

Specifically in this context, it also means actively involving patients and carers in identifying inefficiencies, and in defining, evaluating and improving efficiency within their own care and within the health system.

A **whole-system perspective** means viewing each patient's care pathway, and the entire cancer care system, as an integrated whole. This involves breaking down the organisational barriers and silos that prevent:

- optimal information sharing and resource allocation between different healthcare providers and professionals (e.g. in primary care, hospitals and specialist centres)
- optimal information sharing between health systems and patients and carers.

This is essential to best allow best practices, innovations and strategic investments in one aspect of cancer care to realise efficiency gains over the long-term and across the whole health and social care system. This is also important to help all healthcare professionals and providers to work in collaborative, coordinated and people-centred ways, and to help empower patients to navigate their care pathway.

Building efficiency throughout the cancer care continuum

Firstly, efficiency is best realised by ensuring all people with cancer, everywhere, are treated within a **holistic, people-centred and equitable** cancer care continuum. Efforts to build efficiency should span this continuum, namely by:

- strengthening cancer prevention
- ensuring early and accurate diagnosis
- providing all patients with access to prompt, well-coordinated multidisciplinary specialist treatment, supportive care and palliative care.

Personalised diagnostic and therapeutic approaches (including precision oncology) should be adopted where possible, together with care practices and services shown to improve efficiency.

> *'Governments must commit themselves to policies that promote an integrated, holistic continuum of care for building strong primary health care systems. Health systems must ensure … a people-centred health system that provides high-quality care to all people at all times'*
> UHC2030 Report[39]

Building efficiency in four dimensions

We recommend concerted actions to build efficiency across four interrelated and mutually supportive aspects or 'dimensions' that together underpin an efficient cancer care continuum – namely by:

- empowering and partnering with people affected by cancer
- supporting healthcare professionals to build efficiency
- implementing a data-driven learning system
- investing in efficient technology.

The following sections explore all these aspects in more detail, with **recommendations** and practice examples from across the All.Can network.

The Building Efficiency blueprint encompasses all the health system building blocks defined by the World Health Organization (WHO), namely: service delivery; health workforce; information systems; medical products; vaccines and technologies; financing; and leadership and governance.[40]

OVERARCHING VALUES

Be people-centred

Align all aspects of cancer care and prevention to meet the needs of patients, carers and the public – in collaboration with people affected

Take a whole-system perspective

Break down information and finance silos
across all aspects of cancer care

PRIORITY ACTIONS

Create a holistic, people-centred, equitable cancer care continuum

Strengthen prevention

- Invest in evidence-based primary prevention measures

Promote early and accurate diagnosis

- Strengthen evidence-based screening programmes
- Invest in diagnostic capacities
- Adopt precision oncology and other innovations

Provide access to prompt, well-coordinated, multidisciplinary specialist treatment

- Streamline referral systems
- Harness innovative treatments and practices that improve efficiency
- Ensure access to holistic supportive and palliative care

Build efficiency in four dimensions

Empower and partner with people

- Promote shared decision-making: better communication, using PROMs, digital health tools, supporting patient organisation access
- Improve health literacy

1

Support healthcare professionals to build efficiency

- Meet capacity and skill-mix needs
- Enable multidisciplinarity and interdisciplinarity
- Support education and training
- Protect workforce wellbeing and safety

2

Implement a data-driven learning system

- Promote patient-relevant data collection, sharing and reporting including PROMs
- Ensure quality, representativeness, interoperability, governance, trust, and healthcare professional buy-in
- Draw insights to transform care

3

Invest in efficient technology

- Employ strategic, value-based healthcare approaches
- Implement regulatory and policy frameworks that incentivise and foster efficiency
- Explore outcomes-based reimbursement
- Break down finance silos
- Support adoption and equitable access in practice

4

PROMs = patient-reported outcome measures.

3. Efficiency throughout the cancer care continuum

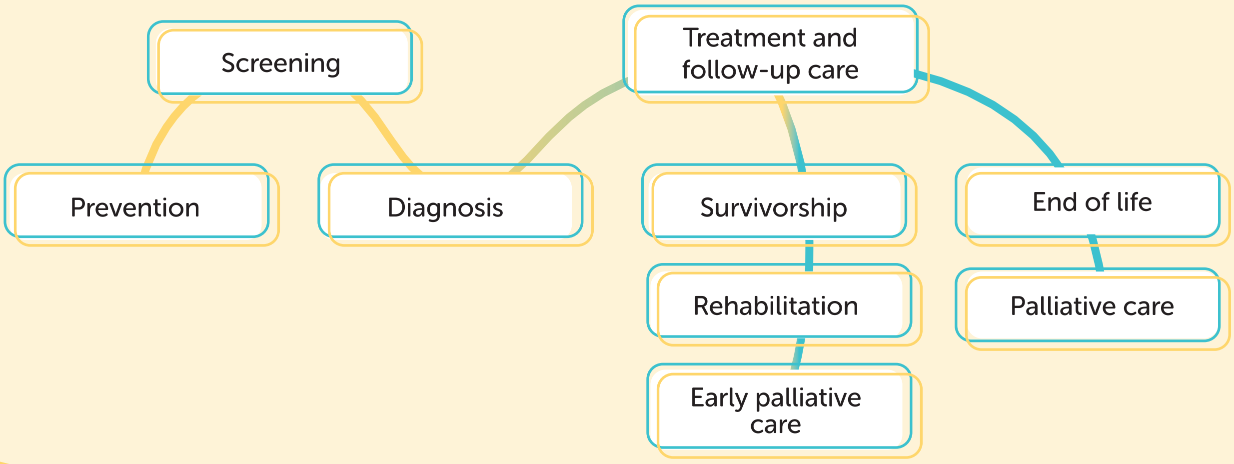
Introduction

Cancer care is challenging. Cancer is not a single disease, but hundreds of different, complex diseases that together affect vast numbers of people of all ages. People with cancer typically need various types of healthcare and supportive care from many different specialists, often for prolonged periods.

Efficient cancer care is best achieved by providing all patients, everywhere, with a holistic, people-centred and equitable care continuum (Panel 1). A **holistic, people-centric** approach is essential to focus resources on the needs and preferences of individuals, and to empower them as partners in their own care. A **continuum** approach is essential to promote coordination and to ensure efficiency gains are realised throughout each patient's care pathway.

In this section we identify priority areas for action to build efficiency throughout this continuum.

Panel 1. The cancer care continuum



3.1 Strengthen cancer prevention

Around four in 10 cancer cases are preventable,[41–43] being caused by known, modifiable risk factors such as:

- lifestyle-related factors (e.g. smoking, excess body weight and overconsumption of alcohol)
- environmental risk factors, such as pollution and radiation
- oncogenic viruses, notably human papillomavirus (HPV) and hepatitis B virus (HBV)
- occupational factors, such as exposure to asbestos
- other medical or reproductive factors.

Investing in primary prevention of cancer is the most efficient long-term cancer control strategy. It avoids the far higher 'downstream' costs associated with the diagnosis, treatment and socioeconomic impact of cancer, as well as the impact on patients and families themselves. Preventing cancer often has the added benefit of preventing other non-communicable chronic diseases through addressing common risk factors.

The WHO,[6] Organisation for Economic Co-operation and Development,[44] European Union institutions[43,45] and other institutional bodies emphasise the importance of primary prevention as a key priority. It requires significant and sustained political commitment and must aim to reach everyone in society.

Recommended priority actions[6,43,46] include:

- policies that address **known modifiable risk factors** within the population
- implementation of evidence-based **public health measures**, such as **vaccination** against cancer-causing viruses
- improving **cancer health literacy** among the general public (see Section 4.1).

Efficiency in action: Prevention

***El Salvador** – [CAPE programme: cost-effective prevention of cervical cancer in El Salvador]*

***International** – Excellent public information initiatives exist – e.g. "[Seven Steps to Prevent Cancer]" (Prevent Cancer Foundation, USA) and the [prevention website] by Cancer Council Victoria (Australia)*

3.2 Promote early and accurate diagnosis

Around a quarter of **All.Can survey respondents singled out initial diagnosis as the area of cancer care where they experienced most inefficiency** (Panel 2).[37] Approximately one third (32%) of All.Can survey respondents whose cancer was detected outside a screening programme reported that it was first misdiagnosed as something else. Recent initiatives by All.Can Argentina[47,48] and All.Can Canada[49] have underscored the importance of addressing barriers to cancer diagnosis, especially in primary care.

Late diagnosis and misdiagnosis can delay or limit treatment, causing poorer outcomes, a lower likelihood of survival, and higher care costs.[50–52] A delay in diagnosis as short as 4 weeks increases mortality from various common cancers, with longer delays being increasingly detrimental.[52] Rare forms of cancer are particularly likely to be diagnosed late, or misdiagnosed.[53]

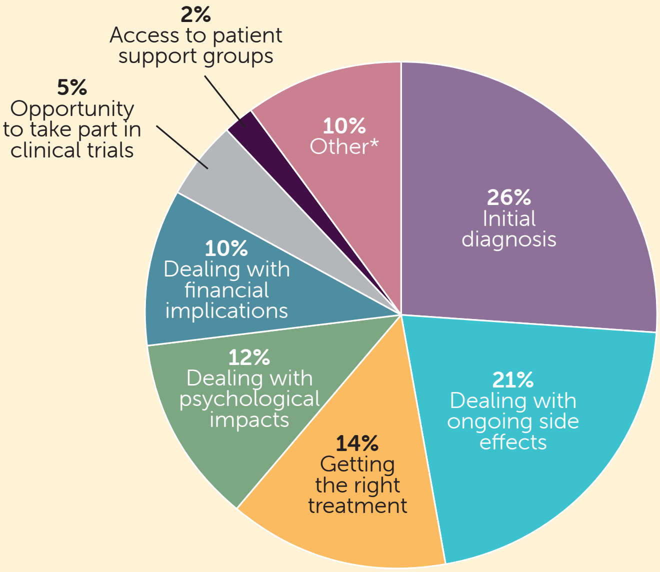
> *'Early diagnosis ... can be one of the most efficient investments in cancer control and must be linked to access to prompt, affordable, high-quality treatment.'*
> WHO Report on Cancer 2020[6]

Prompt and accurate diagnosis is therefore pivotal to efficiency, and we recommend that decision-makers focus in particular on:

- **Strengthening evidence-based screening programmes:** these play a vital role in the early detection of some cancers, especially cervical cancer, breast cancer and colorectal cancer. However, people's access to these measures varies and COVID-19 has disrupted many programmes.[25] Screening policies must be based on evidence of benefit (including on mortality) and cost-effectiveness. Further research is needed on early detection for many cancers, together with risk and prognostic factors to help better tailor screening programmes.

All.Can International supports wider implementation of lung cancer screening, as called for by the European Respiratory Society,[54,55] given the major impact of late diagnosis and misdiagnosis and the evidence of benefit.[25] In 2020, Croatia became the first European Union member state to implement a national, targeted lung cancer screening programme.[56]

Panel 2. Key areas of inefficiency reported by respondents in the All.Can patient survey.[37] Patients (n=3981) in 10 countries were asked: 'During the whole of your cancer care and treatment, where do you feel there was most inefficiency?' (Respondents were asked to select one option only.)



*Other sources of inefficiency included coordination between different elements of the healthcare system, inefficiency around organising appointments, general delays, follow-up care, and getting the right information and communication.

- **Investing in diagnostic capacities**, including relevant primary care services, tests, imaging, laboratories and staff.[6,51]
- **Adopting precision oncology approaches**: precision oncology offers important promise by identifying the underlying genomic mutations and other 'omic' changes causing an individual's cancer.[57,58] This allows targeted screening programmes to identify individuals at high risk of developing cancer, and personalised genomic diagnosis, prognostic information and treatment pathways. As more therapies become available to target specific genetic causes of cancer, multi-biomarker testing approaches are expected to become increasingly beneficial[59–62]

  It is crucial therefore to build evidence-based frameworks to support the further development, evaluation and adoption of precision oncology approaches, keeping in mind the associated equity challenges. The costs of diagnostic testing must be considered as part of the entire patient pathway, not in isolation.

  Other innovative approaches that offer promise include the use of artificial intelligence and machine learning to improve the early detection of various cancers, including those of lung, breast, colon and skin.[63]

Improving **cancer health literacy** among patients, carers and the general public is also important (see Section 4.1). Ultimately, decision-makers must also **address socioeconomic factors** that can contribute to late diagnosis (e.g. through out-of-pocket costs), though this is beyond the scope of this report.

Efficiency in action: fast-tracked diagnosis and referral

Denmark *– Cancer Patient Pathways: fast-tracked cancer referral and diagnosis*

Canada *– Dedicated cancer centres and Diagnostic Assessment Programs (DAPs): a single entry point into the cancer care system allowing prompt, efficient diagnosis and care and improving the patient experience*

3.3 Well-coordinated, multidisciplinary specialist care

Early, accurate diagnosis must be complemented by streamlined referral pathways that ensure all people with cancer have access to prompt specialist care.

Cancer care typically combines many different forms of evaluation and treatment provided by different specialist and sub-specialist healthcare professionals. People with cancer should be cared for by a full team of specialists according to their needs, taking account of any complications of their cancer and other co-existing conditions.[6,64] The ECO Essential Requirements for Quality Cancer Care explain the elements needed to provide high-quality care throughout the patient journey for many cancers.[65]

Care coordination

Inefficiency can occur when patients lack access to particular specialists and therefore experience inadequate care and poor outcomes. It also occurs when care is 'fragmented' owing to poor coordination between different professionals and providers.[6,66] This can cause delays, omissions and shortfalls in treatment, or in unnecessary overuse and wastage of resources. All.Can surveys have highlighted poor communication between healthcare professionals – especially primary care physicians and specialists – as a source of inefficiency.[37]

More broadly, fragmentation and a lack of comprehensive health-system wide approaches spanning all disease areas have been highlighted as a key barrier both to efficiency and the achievement of universal health coverage.[39]

We recommend that decision-makers implement suitable organisational frameworks, data systems and infrastructures, training and incentives to improve communication and coordination between healthcare professionals and providers involved in cancer care.

Better communication between the healthcare system and patients and carers is also vital to help patients navigate their care pathway.

> *'Enhancing care coordination and using care pathways can improve outcomes and gain efficiency.'*
> WHO World Cancer Report 2020[6]

Efficiency in action: access to specialist and multidisciplinary care

Australia *– All.Can Australia: integrated pan-cancer navigation model to help all patients navigate the health system*

Italy *– Oncology orientation cancer centres: coordinating cancer care*

Paraguay *– National Childhood Cancer Care Network: improving access to cancer diagnosis and specialist treatment*

Organisation of European Cancer Institutes (OECI) *Accreditation and Designation (A&D) Programme – driving improvements in cancer and research in European cancer centres*

Innovative treatments

We recommend that decision-makers harness evidence-based innovations in all aspects of cancer care where these improve the efficiency of therapy – keeping equity challenges in mind. Improvements may result from better outcomes, reduced toxicity (avoiding unnecessary use of resources to manage adverse effects), or greater ease of use by healthcare professionals and patients.

These include new ways to personalise treatment, such as:

- **Precision oncology treatments** (also see Section 3.3) that can offer efficiency gains by ensuring that the right patient receives the right medicine at the right time.[1] This can improve outcomes and limit the adverse effects of treatment, while optimising the return on investment in innovative therapies.[67,68]. The associated collection of real-world data can help to improve care.[62]
- **Targeted and hypofractionated radiotherapy methods** are also associated with improved outcomes and lower toxicity.[69–71]
- **Imaging modalities** that provide greater accuracy to help optimise therapy, e.g. via magnetic resonance imaging and positron emission tomography.[72,73]
- **Treatments that are simpler, more convenient to administer or better tolerated** by patients. For example, substituting oral or subcutaneous delivery for time- and labour-consuming intravenous infusions[74] may help ease capacity issues within hospitals and clinics and reduce costs, while improving patients' experience of care.

Innovative care practices

We recommend that decision-makers identify, assess and adopt other innovations in how care is organised and delivered, for example by practices such as:

- using outpatient care services that increasingly allow some cancer treatments to be provided in community settings or patients' own homes.[75–78]
- employing **telemedicine and remote patient monitoring measures** equitably where they are appropriate, i.e. where these improve efficiency while also delivering high-quality care that meets patients' needs.[79] The COVID-19 pandemic has shown how telemedicine services can be useful, allowing patients to access care without visiting the clinic. However, patients often value face-to-face consultations – and hence telemedicine should not routinely replace all of these.

Simple and inexpensive changes to care delivery can sometimes deliver important benefits for patients and carers. These include measures to make scans and radiotherapy less frightening for children and even serving meals on brightly coloured plates to help improve appetite among people with dementia.

Importantly, innovative cancer treatments and care delivery models must be evaluated according to measures that matter to people with cancer (Sections 4.1 and 4.3).

Efficiency in action: improving care delivery

Denmark – *Delivering mobile chemotherapy using an infusion pump backpack.*

France *– PROCHE: efficient delivery of chemotherapy through better use of patient data*

UK and USA *– making scans and radiotherapy more child-friendly*

USA *– the National Comprehensive Cancer Network Infusion Toolkit: reducing inefficiencies in chemotherapy in the USA*

International (European Union) *– the EPIC project: empowering pharmacists to improve adherence to oral anticancer agents*

3.4 Supportive and palliative care

Patients with cancer often have co-existing conditions, such as hypertension or diabetes.[80] Many patients also experience disease-related complications during and beyond their cancer care, including mental health problems, malnutrition and pain.[6] Insufficient attention to these aspects leads to care that is suboptimal and inefficient, since these conditions can worsen patient outcomes and increase healthcare use. Almost a quarter of All.Can survey respondents (24%) said they did not have access to support from allied healthcare professionals.[37]

Therefore, we recommend that decision-makers work with relevant stakeholders to ensure all patients have access to holistic, integrated supportive care according to their needs. The needs of carers must also be considered.

Psychological support

Mental health conditions worsen quality of life and survival and increase healthcare utilisation and costs among cancer patients.[81–83] Despite the benefits of integrated programmes,[84] patients' access to psychological support and care is often limited and variable.[85–87] More than two-thirds (69%) of All.Can survey respondents said they needed psychological support during or after their cancer care, yet one third of these respondents lacked access to this support.[37]

A 2020 All.Can UK report highlighted the mental health impact of cancer, and the barriers patients face in accessing support. The report called on decision-makers, the National Health Service, patient organisations and industry to work together to place psychological wellbeing on an equal footing with physical health, and highlighted good practice examples.[88]

Nutritional care

Up to 70% of people with some cancers can be malnourished, the risk being particularly high in those with gastrointestinal tract, head and neck, liver and lung cancers.[89] In one large study, 43% of people with various cancers were at risk of malnutrition at their very first medical oncology clinic visit.[90] Malnutrition can affect how patients tolerate anticancer treatment, impair their quality of life, worsen their prognosis and increase their use of healthcare.[90]

However, cancer-associated malnutrition remains seriously under-recognised and undertreated.[89,90] Only 30–60% of patients at risk receive nutritional support, often only during end-of-life care.[89,91,92] Nutritional care should be an integral part of efficient, multimodal cancer care. Regular nutritional screening and nutritional support (including – if necessary – enteral or parenteral nutrition) should be undertaken routinely from early stages onwards.[93]

Efficiency in action: supportive care

***France** – Moovcare®: providing web-based follow-up care for lung cancer patients*

***Italy** – Supportive care services: extending support beyond active treatment for people with cancer*

***Norway** – All.Can Norway: collaborating with Cancer Compass on a book providing insights and advice to patients following a cancer diagnosis*

***Sweden** – Centre for Cancer Rehabilitation: providing extensive person-centred support for cancer survivors in Sweden*

***UK** – WesFit prehabilitation programme: shortening recovery after surgery for cancer*

***International** – AV1 telepresence robot: helping children and young people with cancer and other long-term illnesses to participate in school life*

Palliative care

Palliative care improves the quality of life of people with cancer facing life-threatening illness and can reduce the burden experienced by caregivers and families.[94,95] It includes, but is not limited to, end-of-life care. Although sometimes overlooked, early and effective palliative care is an essential component of high-quality, efficient cancer care that can improve patient outcomes while reducing unnecessary hospital admissions and the use of other costly health services.[96] It can also help people with cancer live as actively as possible until death.

Therefore, multidisciplinary palliative care should be fully implemented within the care continuum based on guidelines.[6,65,95–98]

Efficiency in action: palliative care

***Norway** – the Orkdal model: integrating cancer and palliative care*

***USA** – early introduction of palliative care: improving patient outcomes and reducing costs*

4. Building efficiency in four dimensions

Introduction

We have identified priority areas for action to build efficiency at each stage within the cancer care continuum (Section 3).

In this section we recommend actions within four interrelated and mutually supportive aspects or 'dimensions' that together underpin an efficient cancer care continuum, namely:

1) empowering and partnering with people affected by cancer
2) supporting healthcare professionals to build efficiency
3) implementing a data-driven learning system
4) Investing in efficient technology.

4.1 Empower and partner with people

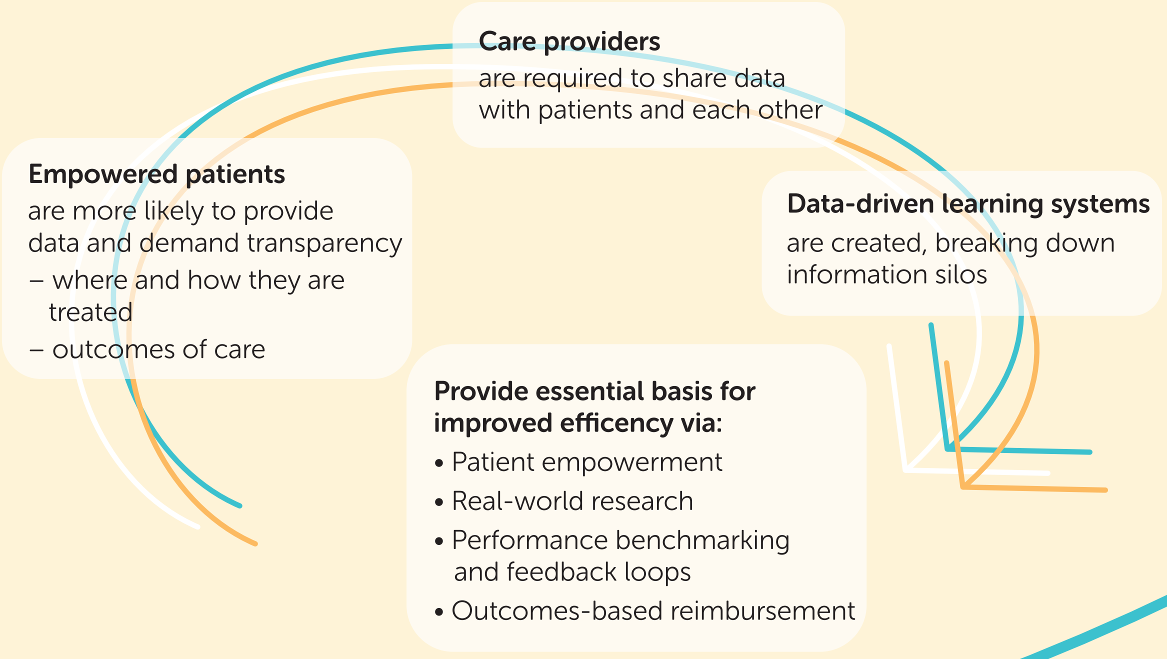
The efficiency of cancer care is compromised if patients do not understand their diagnosis, prognosis or treatment. These problems can limit patients' ability to make well-informed decisions, undermine their adherence to treatment, and prevent them from navigating the health system effectively. Ultimately, this can worsen outcomes, waste resources, and incur out-of-pocket expenses for people with cancer.

For All.Can, efficient cancer care delivers the best possible health outcomes using the resources available – *focusing on what really matters to patients*. Therefore, efficiency is also compromised if patients' preferences, expectations and priorities about their care differ from those of the healthcare professionals treating them, and if communication between patient and healthcare professionals is not optimal.[6,99–101]

Therefore, we believe that building efficiency involves empowering patients, carers and the public and partnering with them collaboratively in the governance of their own care and in decision-making about cancer care more broadly. Indeed, empowering patients is the key to driving change towards greater efficiency (Panel 3).

Importantly, healthcare providers and systems should remain accountable for the outcomes of healthcare.

Panel 3. Patient empowerment: the key driver of change



Care providers
are required to share data with patients and each other

Data-driven learning systems
are created, breaking down information silos

Provide essential basis for improved efficency via:
- Patient empowerment
- Real-world research
- Performance benchmarking and feedback loops
- Outcomes-based reimbursement

Empowered patients
are more likely to provide data and demand transparency
– where and how they are treated
– outcomes of care

Communication deficits: insights from the All.Can Survey

Nearly one third (31%) of All.Can survey respondents felt they were not always given enough information about their treatment and care.[37]

- Almost half did not feel sufficiently involved in decisions about treatment options
- 39% felt they had inadequate support to deal with ongoing symptoms and side effects
- 31% felt that they lacked adequate information and care for dealing with pain
- 35% felt inadequately informed about how to recognise whether their cancer might be returning or getting worse.

Shared decision-making

Shared decision-making can be defined as an interactive process whereby patients, their families and carers, in collaboration with healthcare professionals, make choices about care based on an informed analysis of the options, and on their values and preferences.[102] It is increasingly seen as an important aspect of good-quality cancer care, as highlighted within the European Code of Cancer Practice.[103]

Shared decision making can improve efficiency by helping people with cancer feel in control of their disease, fostering realistic expectations, and empowering them as agents in their own care – thereby helping to improve treatment adherence and outcomes.[104–107]

In short, decisions should be made, and care delivered, **with** patients, **not** to them.

Therefore, we recommend that shared decision-making should be promoted within patient care via measures to:

- **Improve communication between healthcare professionals, patients and carers.** This involves sharing accessible, evidence-based information and strongly considering patients' goals and preferences.[108] Patients' information needs and preferences vary and can change during an individual's care pathway. Too much information at once can be overwhelming, especially at diagnosis.[37,109] Information should therefore be tailored, also taking account of cultural factors and patients' level of knowledge about cancer care.

  Importantly, the interaction between healthcare professionals and patients is not only about *what* information is transferred, but also about *how* it is shared and *in which direction*. A patient's experience of care depends on empathy, the feeling of being seen as an individual human being, and the resulting trust that develops between them and their healthcare professionals. Some people with cancer may not want to know all the details about their disease or treatment, but all need to feel that someone they trust is taking care of them. With respect to the direction: information sharing is a two-way street with health professionals needing to receive information as well as provide it.
- **Employ patient-reported outcome measures** (Section 4.2) routinely in clinical care to empower patients to assess healthcare services according to what matters to them – a key example of how information sharing needs to be a two-way process
- **Harness digital health tools,** including smartphone applications and data access platforms – these offer enormous promise, subject to appropriate governance, security and privacy measures
- **Support and promote patients' and carers' access to patient organisations and support groups** – patients and carers can benefit greatly from opportunities to learn from, and share experience with, others in their position and hence patient groups are key to empowerment.

Shared decision-making should also be promoted in wider aspects of decision-making to ensure that cancer care efficiently delivers what really matters to patients. This includes involving patient and carer representatives meaningfully in:

- cancer policy-making, including national initiatives, strategies and action plans
- initiatives to improve the efficiency and quality of cancer care (e.g. in outcomes used to measure these)
- clinical guideline development
- research – as epitomised in the 'Principles of successful patient involvement in cancer research' developed in 2020 during the German Presidency of the Council of the European Union[110]
- health technology assessment
- negotiations regarding pricing and reimbursement of cancer medicines.

Health literacy within the general public

We recommend greater efforts to improve cancer health literacy within the general public, as well as among people with cancer and their carers.

Health literacy refers to people having the appropriate skills, knowledge, understanding and confidence to access, understand, evaluate, use and navigate healthcare information and services.[111] Almost half of adults may have insufficient or problematic levels of health literacy.[111,112]

Improving cancer health literacy is fundamental to building efficiency in cancer care. Potential benefits include:

- encouraging positive lifestyle change and hence cancer prevention
- fostering early detection (through better awareness of cancer signs and symptoms) and promoting uptake of screening
- empowering people to effectively manage their disease and navigate the health system.

We therefore welcome attention given to this aspect by the European Commission and WHO.[6,45,113]

Health literacy initiatives must reach all parts of society, including people at high risk of cancer and groups who are often underserved and may face vulnerable situations, for instance the elderly and marginalised groups such as undocumented migrants.

Efficiency in action: using digital tools to empower and support patients

Australia *– My Journey: Breast Cancer Network Australia's online support tool*

EU *– Eurocarers cancer toolkit: supporting informal carers for people with cancer*

France *– The 'right to be forgotten': improving access to loans and insurance for cancer survivors*

Netherlands *– oPuce: supporting employment of people living with and beyond cancer*

Spain *– ICOnnecta't: an online support tool for women with breast cancer*

UK *– No decision about me, without me: promoting shared decision-making in the National Health Service*

International *– My Cancer Navigator: providing personalised and accessible information to people with cancer*

4.2 Support healthcare professionals to build efficiency

A high-quality, high-performing and diverse workforce is a foundation of efficient cancer care.[6] Decision-makers must devote specific attention to supporting the workforce within all efforts to build efficiency.

Pressures facing cancer workforces

Globally, one in five medical oncologists report low job satisfaction, largely owing to system-level pressures resulting in less time for good-quality patient care and personal resilience.[114] Studies have consistently reported high rates of exhaustion, low satisfaction and burnout among oncology doctors and nurses.[115–117]

COVID-19 has recently exacerbated the strain on cancer healthcare workforces. International surveys by the European Society for Medical Oncology (ESMO) have revealed various negative effects of the pandemic, including on job performance, wellbeing, burnout and training.[118,119] The ECO has issued recommendations with respect to addressing key cancer workforce challenges post-COVID-19.[120]

Supporting workforces toward efficiency

Cancer care should be multidisciplinary, and all cancer care professionals have important roles in improving the efficiency of care.[121]

We recommend that decision-makers should support the cancer care workforce to build efficiency by:

- **Investing and planning urgently to meet workforce capacity and skill mix needs**, based on projections of demand and linked to job creation and economic growth.[6] Decision-makers may consider role optimisation strategies, i.e. where tasks are shifted to make the most efficient use of the available human resources.
- **Enabling and incentivising multidisciplinary care, interdisciplinary coordination and innovative service models** via suitable organisational frameworks, systems and incentives.
- **Supporting undergraduate education and continuous professional education and training** on improving patient-centred efficiency. This includes:
  - empowering staff to deliver new models of cancer care, such as nurse-led chemotherapy delivery closer to patients' homes[122]
  - integrated, holistic treatment and supportive care
  - skills necessary to implement shared decision-making with patients and carers
  - efficient healthcare technologies, digital health technologies and data systems.
- **Protecting the wellbeing and safety of the cancer workforce**. Improvements in staff wellbeing link to better patient care, and hence support wider efficiency gains. Only 51% of ESMO survey respondents reported having access to wellbeing support services.[118] Counselling and psychological support services may be helpful, together with workshops and courses on wellbeing, burnout, and coping strategies, and flexible working hours.[123]

Efficiency in action: supporting workforces to build efficiency

***France** – incentivising doctors to implement electronic health records*[124]

***UK** – Macmillan Cancer Decision Support Tool: supporting earlier detection of cancer in primary care*

***UK** – Christie NHS Foundation Trust: community-based prostate cancer clinics led by specialist nurses*

***USA** – Choosing Wisely®: clinician and patient guidelines for reducing unnecessary and low-value care*

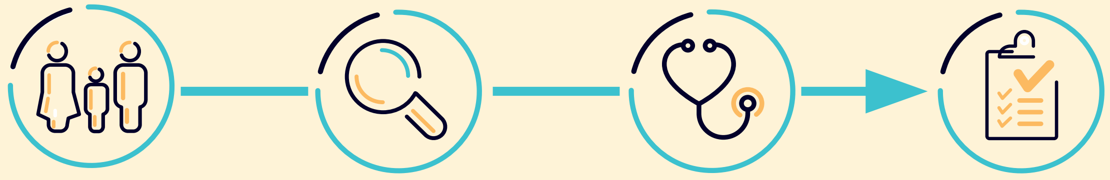
4.3 Implement data-driven learning systems

Building efficiency in cancer care will require health systems to be data-driven learning systems. This means harnessing data to measure efficiency throughout the system to identify and remedy inefficiencies, and to improve health outcomes for all cancer patients (Panel 4). This requires the systematic collection, sharing and reporting of patient-relevant data between healthcare providers and patients and carers.

Many healthcare systems are already using data to advance cancer care, as documented in our 2021 report ***'Harnessing data for better cancer care'***.[38] For example, mobile applications and smart devices now enable health data to be collected in new ways that bring tremendous value to patients through more accurate diagnosis, personalised treatment and follow-up care. It also helps healthcare professionals to better understand their patients' needs and adapt care accordingly. At a system level, it can help to improve care and identify which aspects of care benefit patients and healthcare system efficiency the most. Advances in data analytics, facilitated by artificial intelligence, machine learning and improvements in data processing, are helping to solve complex challenges at a scale and speed that were previously impossible.

The COVID-19 pandemic proved the critical importance of digital health solutions. Healthcare systems around

Panel 4. Overview of the roles of data in driving efficiency.[38]



Screening

- Genomic data can improve screening by better defining and stratifying high-risk populations most likely to benefit from screening
- AI can optimise accuracy of screening findings based on analysis of imaging data
- Linking screening data sets with registry data can help monitor the impact of screening on patient outcomes

Diagnosis

- Genomic (and other 'omics') data can enable a more precise and earlier diagnosis
- AI can improve the speed and accuracy of diagnosis by identifying previously unrecognised imaging or genomic patterns associated with cancer
- Linking data sets such as cancer registry data with other data sources can help identify optimal pathways to diagnosis
- Data-sharing hubs can foster sharing of diagnostic information between providers, reducing the need for duplicative tests

Treatment and care

- Electronic health records can improve coordination of care
- Educational alerts in electronic health records and decision-support tools can improve provider adherence to guidelines
- Patient-reported outcomes data collection can ensure care plans are adapted to patient symptoms in real time
- AI can help optimise care processes by supporting treatment planning, scheduling and other administrative tasks
- Genomic (and other 'omics') data can enable more individualised and effective treatment

Follow-up and survivorship

- Remote patient monitoring – using PROMs data and wearables – can ensure continuity of care for patients after the active phase of treatment is over, and help signpost people to services they need

AI, artificial intelligence; PROMs, patient-reported outcome measures.

the world rapidly deployed and expanded telemedicine and remote monitoring systems to ensure continuity of care, and accelerated the use of data to reconfigure cancer services, improve patient monitoring and fast-track decisions on regulation, reimbursement and funding. Harnessing health data is key to ensuring both the future resilience and sustainability of cancer care systems, by allowing them to identify, monitor and adapt to challenges.

Therefore, data systems should be seen as an investment in making efficient, high-quality care a reality for everyone affected by cancer – they **are as important to the future of cancer care as therapeutic innovation**.

> *'Investments in information systems are important for setting accurate priorities, optimizing programme effectiveness and ensuring efficient expenditure.'*
> WHO Report on Cancer 2020[6]

Wider use of PROMs and PREMs

Healthcare systems and regulatory agencies conventionally assess healthcare primarily according to mortality and survival and administrative outcomes such as length of stay in hospital. While these are relevant to patients, **we recommend a greater use of patient-reported outcome measures (PROMs) in routine clinical care.** PROMs are standardised surveys that collect information directly from patients on their own perception of their health status, including health-related quality of life. They can be used for real time monitoring, informing and facilitating communication and shared decision-making between healthcare professional and patients (Section 4.1), and enabling self-care. They may benefit efficiency by improving health outcomes and reducing hospitalisations or emergency room visits.[125–127] Aggregated PROM data can help drive improvements in efficiency and quality at the healthcare providers and system level.[38] Patient-reported experience measures (PREMs) are also important to assess cancer service delivery.[128]

The International Consortium for Health Outcomes Management (www.ichom.org) has published standard sets of recommended outcomes that matter most to people with various cancers.

While PROMs and PREMs are often used for research purposes, they are only used to a limited extent in the routine clinical care of individual patients or by healthcare systems to improve care. Various barriers must be addressed to promote their wider use, including time constraints, language barriers, educational needs, and suitable infrastructures and tools.[126,129,130]

Efficiency in action: using outcomes that matter to patients

***Germany** – Martini-Klinik: collecting patient-centred outcomes data to improve prostate cancer care*

***International** – OECD's Patient-Reported Indicators Surveys (PaRIS) initiative: helping countries work together to develop, standardise and implement indicators that matter most to people*

Overcoming challenges in harnessing data

We are only on the cusp of exploiting the full potential of data and we continue to be held back by longstanding challenges.[1,38] Suitable systems are needed to collect, analyse and transparently report high-quality data on cancer care practices and outcomes. These data need to be used to draw insights, and to allow benchmarking and feedback loops to drive improvement and accountability. Inclusivity and diversity must be considered to ensure the data collected are representative of all patients.

Our 2021 report '*Harnessing Data for Better Cancer Care*'[38] provides detailed analysis and recommendations to help decision-makers address key challenges related to: the quality, representativeness and relevance of data; data silos and interoperability; data governance and patient trust; healthcare professionals' buy-in to data systems; and using data to transform care – as summarised in Panel 5.

Efficiency in action: overcoming challenges in harnessing data

***Australia** – All.Can Australia: implementing the National Gynae-Oncology Registry (NGOR) to capture data on gynaecological cancers to improve care and foster best practice*[131]

***Belgium** – ATHENA (Augmenting Therapeutic Effectiveness through Novel Analytics) project: using artificial intelligence and machine learning to improve cancer care*

***Finland** – unlocking the power of health data based on trust, via a national e-health strategy, legislative framework, interoperable infrastructure, and Health Data Permit Authority (FINDATA)*

***USA** – CancerLinQ®: harnessing real-world data from electronic health records to improve cancer care*

Panel 5. All.Can recommendations on 'Harnessing Data for Better Cancer Care'.[38]

Challenge	All.Can recommendations
Data quality Low quality and unreliable data often limit the ability to inform and enhance decision-making in cancer care and damage the trust of stakeholders	• *Create national cancer data quality standards and build them into regular, mandatory auditing of cancer care* • *Implement technological solutions for automatic data entry, minimising the risk of human error and administrative burden on care teams*
Data representativeness Data not representative of entire populations result in inequities, hampering access to timely diagnosis and high-quality treatment.	• *Promote collection of equitable and representative data – key to ensuring that all patient populations benefit equally from healthcare improvement efforts. This should involve patient representatives in the data collection design stage* • *Demand greater equity in cancer research and care by ensuring appropriate representation of people of different races and ethnicities, sex and cancer types in cancer data sets* • *Hold institutions accountable for providing equitable cancer care by capturing performance on key quality indicators according to patients' race, ethnicity, sex and socioeconomic status in accreditation systems* • *Ensure proportionate allocation of funds towards specialist cancer registries to collect data on populations of cancer patients for whom data are less available*
Data relevance Data collected in our healthcare systems are often not patient-centred nor aligned with patient values	• *Encourage systematic and standardised collection of patient-generated health data, such as PROMs and PREMs, in key national health data sets* • *Include these data in regular monitoring and performance evaluations of cancer care to guide improvements to care most relevant to patients*
Data silos and interoperability Data silos and poor interoperability of datasets hinder the measuring of healthcare services performance, and the linking of health data across the care pathway for secondary uses	• *Develop common data standards, specifications and processes to improve the national and international interoperability of data sets* • *Scale-up existing national and international initiatives on data standardisation and interoperability*

PREMs, patient-reported experience measures; PROMs, patient-reported outcome measures.

Challenge

All.Can recommendations

Data governance
Countries remain slow in adapting approaches to harness big data in health, due to governance-related barriers such as gaps in funding, leadership and technical expertise, and competing priorities within the health systems

- *Build harmonised data governance legislation to facilitate health data linking and sharing between providers, and ideally between countries*
- *Enable the creation of federated data networks when national and international data linkages are not possible*
- *Invest in creating national health data codes of conduct to facilitate the safe use of health data, limiting barriers to data sharing while protecting patient privacy*

Patient trust
Lack of trust and transparency coupled with burdensome data collection systems disincentivise sharing of data

- *Create public awareness and education campaigns to convey the power of meaningful data to better manage cancer care*
- *Involve patient representatives in the data collection design in the principles of data usage*
- *Engage with patients to discuss how data are being used, and address misconceptions around the nefarious use of health data*
- *Continuously adapt legislation and tools to give citizens appropriate control over their own health data, so they may act as their own data 'gatekeepers'*

Healthcare professional buy-in
Cooperation from healthcare professionals is key to continuous collection, use and sharing of clinical data

- *Build in positive incentives for data collection and use across the cancer care pathway, to foster a culture of value-based healthcare*
- *Embed data-analytic solutions into care processes to enable rapid processing and feedback of data insights to clinical teams to guide decision-making*
- *Provide appropriate funding and resourcing to train and upskill the healthcare workforce so that they keep pace with innovations in data collection and use*

Drawing insights from data
There remains an unmet need to create a better link between health information systems and big data analytics that can transform healthcare by helping to extract insights from vast amounts of data

- *Apply appropriate regulatory standards to fundamentally protect citizens' rights and values by ensuring that:*
  - *data sets from which insights are drawn are adequate, equitable and sufficiently representative to train artificial intelligence algorithms while minimising potential biases*
  - *the analytics used (including artificial intelligence algorithms) are standardised, transparent and subject to rigorous evaluations of clinical safety and effectiveness*
  - *the insights drawn from data analysis are of high quality*

4.4 Invest in efficient technology

Efficiency should not be a means to contain or cut healthcare spending, and nor should it impede innovation. Indeed, building efficiency involves driving innovation.

All.Can believes that health spending represents an investment, and health systems need to invest more in cancer services – including in innovative technologies, services and care models. In many cases cancer care funding does not reflect the impact of the disease on people with cancer and society as a whole,[132,133] nor the value that it can bring. At the same time, improved efficiency is vital to maximise the benefit realised from this investment. The common thread between increased investment, increased efficiency and innovation is a focus on improving outcomes according to what matters to people with cancer and society as a whole.[1]

The Pan-European Commission on Health and Sustainable Development recently called for a clearer distinction between *consumed* health expenditure that directly and contemporaneously impacts on health and *investment* – in order to incentivise countries to invest in preventive services and 'much-needed innovation that improves the efficiency of care'.[134]

Strategic, value-based approaches

Various preventative, diagnostic and therapeutic technologies offer the potential to build greater efficiency throughout the cancer care continuum (Section 3), for example by improving patient outcomes, reducing toxicity, improving adherence and/or saving costs by reducing healthcare utilisation.

To harness these for system-wide benefit, we recommend that decision-makers should take the following actions:

Strategically and systematically disinvest resources away from obsolete and inefficient technologies and practices (for example those than All.Can[1] and others[135] have identified), and divert these into innovative alternatives according to people-centred, value-based healthcare approaches.[3–5] Reinvestment of the resulting gains into efficient technologies and practices will maximise the return on investment through a positive feedback loop, creating a 'virtuous circle' that incentivises further innovation in efficient technologies.

Implement regulatory and policy frameworks that incentivise and foster efficient technologies.

- Systems should be implemented and/or strengthened to continuously identify, assess and adopt diagnostic, therapeutic and digital technologies that improve health outcomes and efficiency.[1,136]
- Regulatory, health technology assessment and reimbursement agencies should create collaborative frameworks (including expert patient advocacy representatives) for evaluating and incentivising efficient innovation. The COVID-19 pandemic prompted greater alignment and flexible working between such organisations – the opportunity should be taken to extend this to help build efficiency within regulatory, appraisal and policy processes to support investment in innovation, and patients' access to it.
- Efficiency can also be improved by optimising the use of generic and biosimilar medicines, as well as novel, innovative treatments. A generic medicine is an interchangeable version of an authorised, innovative medicine that can be introduced once the patent protection on the innovative medicine has expired. A biosimilar is an 'off-patent' version of a biological medicine (i.e. a medicine developed from living cells or organisms – examples include monoclonal antibodies). The use of generics and biosimilars can help lower cancer care costs,[137] improving efficiency and equity by facilitating patient access to high-value treatments while freeing up resources that can be reinvested in more efficient ways.[138,139]

Explore outcomes-based reimbursement schemes. Approaches whereby health technologies are paid for according to the outcomes they achieve for patients, and the value they achieve for health systems, is important to encourage the development of technologies that improve efficiency and to facilitate patient access to approved treatments. This approach is important for health services in general, not only for technologies. The wider use of outcomes-based payments depends on the collection and harnessing of data on healthcare resources and outcomes (Section 4.3).

Break down financing silos. To harness technology properly, we must move away from short-term investment decisions, siloed budgets and artificial segregations between different parts of the healthcare system. Instead, financing silos should be broken down to allow strategic investment into technologies and innovations that realise system-wide efficiency gains over the long-term, across the whole continuum, and across the health and social/welfare systems.

Implement measures to actively support technology adoption and equitable access in practice. For example, depending on the situation, these may include: appropriate care pathways, clinical guidelines, specialist expert centres, data systems, biomarker testing systems, and workforce education and training.

Equitable patient access must be supported through the provision of patient information about innovative treatments and practices, and assistance to access expert centres. Patient organisations often play important roles here and should be supported in this regard.

Efficiency in action: supporting strategic value-based approaches

***Australia** – The Metro North Hospital and Health Service in Queensland has produced a video explaining how value in healthcare helps deliver what matters to patients*

***Belgium and Netherlands** – implementation of value-based healthcare for lung and breast cancer*

***Europe** – European Alliance for Value-based Healthcare: Health systems after COVID-19 – Building resilience through a value-based approach*

***Spain** – Departament de Salut, Catalunya: People-centred integrated healthcare, social and communities services*

***USA** – Harnessing artificial intelligence (AI)-enabled, integrated cloud-based tools to help oncology practices balance clinical and financial decision-making in value-based cancer care*

5. Conclusions and call to action

We call on decision-makers to build efficiency in cancer care as a top priority. This is imperative to deliver outcomes that matters most to people with cancer while managing rising demands for healthcare and associated managing cost pressures, making healthcare systems more equitable, sustainable and resilient – and dealing with the collateral damage caused by the COVID-19 pandemic.

Focused and sustained political will at international, national and local levels is critical to implementing the system-wide changes necessary. Key milestones include:

- *Suitable consultation and collaboration with all stakeholders, including people with cancer and their carers, as outlined in this blueprint*
- *identification, adoption, sharing and scaling up of efficient cancer practices, technologies, data systems and other forms of innovation – disinvesting from inefficient and wasteful ones*
- *implementation of organisational frameworks, data systems, policies and incentives aligned towards efficient care for all people with cancer*
- *appropriate resourcing of actions to build efficiency, reflecting the impact of cancer on society.*

All.Can stands ready to further support policy initiatives to improve cancer care efficiency, by generating new evidence and facilitating the exchange of knowledge and best practices, enhancing cross-country collaboration, and building new partnerships around the world.

Appendix 1. All.Can members and national initiatives

All.Can International members

Active Citizenship Network

Antwerp University Hospital

Baxter

Bristol Myers Squibb

CareAcross

Clinique de Genolier, Switzerland

Digestive Cancers Europe

European Cancer Organisation

European Cancer Patient Coalition

FOKUS Patient

Goings-On

GVG-Committee on Health Goals

The Health Value Alliance

Helpsy

Illumina

International Brain Tumour Alliance

Johnson & Johnson

Marivek Healthcare Consulting, UK

MSD

Pancreatic Cancer Europe

Polish Cancer Patient Coalition

Qatar Cancer Society

Roche

Save Your Skin Foundation

Vital Options International

World Bladder Cancer Patient Coalition

Individual Members

Dr Susannah Morris, Breast Cancer Network, Australia

Prof. Christobel Saunders, University of Melbourne

Dr Thomas Szucs, University of Basel

Prof. Tit Albrecht, International Institute of Public Health, Slovenia

All.Can National Initiatives

All.Can Argentina

All.Can Australia

All.Can Austria

All.Can Belgium

All.Can Canada

All.Can Colombia

All.Can Denmark

All.Can Germany

All.Can Greece

All.Can Israel

All.Can Italy

All.Can Korea

All.Can Mexico

All.Can Norway

All.Can Poland

All.Can Spain

All.Can Sweden

All.Can Switzerland

All.Can UK

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Appendix 2. Consultation responses

The following table summarises responses from All.Can National Initiatives and members with respect to efficiency challenges and barriers, and COVID-19 learnings, during a consultation exercise in August–September 2021.*

Challenges and barriers to efficiency in cancer care	COVID-19 learnings for efficiency
• General underfunding across healthcare system • Insufficient prevention and screening • Missed and delayed diagnosis in primary care • Limited patient-centredness in cancer care – including – Fragmentation/poor coordination among providers – Poor communication and information provision to patients – Lack of navigation and logistical support – Lack of supportive care access • Data limitations, including registries and real-world data • Wasteful spending • Variation in quality and access (e.g. rural vs urban) • Slow adoption or limited funding of significant innovation/technology • Lack of national cancer action plans in some countries	• General lack of preparedness and resilience in cancer care (e.g. including staff shortages) • Insufficient consideration of cancer care during lockdown and impact of reduced screening/tests, clinic visits, etc. • Optimised roles for: – Telemedicine (including limitations) and other digital health measures – Primary care – Homecare

*Input received from All.Can national initiatives and members in Argentina, Australia, Austria, Canada, Colombia, Germany, Greece, Italy, South Korea, Norway, Poland, Spain, Switzerland and UK.

Glossary

The definitions of terms used in this report are either those widely adopted (referenced as appropriate) or All.Can's internal definitions.

Artificial intelligence (AI) The capability of a computer program to perform tasks or reasoning processes that we usually associate with intelligence in a human being. AI is used in healthcare to manage large data sets, gain insights and extract patterns from vast amounts of data.[140,141]

Big data In healthcare, big data describes large healthcare databases or networks of interconnected healthcare databases coming from multiple organisations.[142]

Digital health The field of knowledge and practice associated with the development and use of digital technologies to improve health. Digital health expands the concept of eHealth to include digital consumers, with a wider range of smart-devices and connected equipment. It also encompasses other uses of digital technologies for health such as the Internet of things, AI, big data and robotics.[143]

Efficiency For All.Can, efficient cancer care delivers the best possible health outcomes using the human, financial, infrastructural and technological resources available, with a focus on what really matters to people with cancer and society as a whole.

Equity The absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g. sex, gender, ethnicity, disability, or sexual orientation).[36]

Health literacy The appropriate skills, knowledge, understanding and confidence people need to access, understand, evaluate, use and navigate healthcare information and services.[111]

Machine learning A branch of AI that focuses on the development of computer programmes and mathematical algorithms that can process data and use them to learn for themselves over time without being programmed to do so.[141]

Multidisciplinary Multidisciplinary teams are an alliance of all medical and healthcare professionals related to a specific tumour disease whose approach to cancer care is guided by their willingness to agree on evidence-based clinical decisions and to coordinate the delivery of care at all stages of the process, encouraging patients in turn to take an active role in their care.[64] Multidisciplinary cancer care should include medical oncology, surgery, radiation oncology, pathology, palliative care, psycho-oncology, oncology nursing, nutrition and rehabilitation, as appropriate.[6]

Patient-reported experience measures (PREMs) Tools that measure a patient's view and experience while receiving care. They are designed to look at aspects of the care process and how it impacts the patient experience.[144]

Patient-reported outcome measures (PROMs) Tools used to measure patient-reported outcomes. They collect information on how a patient sees their own health or the impact on their health of a given intervention.[127,144]

People-centred This blueprint recommends a people-centred approach whereby all aspects of cancer care are aligned to meet the needs of people affected by cancer (patients, carers and the public), in collaboration with these people.

Personalised medicine The characterisation of individuals' phenotypes (observable characteristics and traits) and genotypes (e.g. molecular profiling). It can be used to tailor a therapeutic strategy to the person, determine the person's predisposition to disease or deliver timely and targeted prevention.[145]

Precision oncology A cancer care model in which patient management is customised based on patient-specific analytics, including genomic mutations causing an individual's cancer.[57]

Shared decision-making An interactive process whereby patients, their families and carers, in collaboration with healthcare professionals, make choices about care based on an informed analysis of the options, and on their values and preferences.[102]

Survivorship Focuses on health and the physical, psychological, social and economic issues affecting people after their primary treatment for cancer is over.[146]

Telemedicine. The delivery of healthcare services by all healthcare professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and the continuing education of healthcare workers, with the aim of advancing the health of individuals and communities.[143]

Value Value in healthcare is defined in terms of the health outcomes achieved by the total cost incurred throughout the full cycle of care for the patient's medical condition.[3]

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