A conceptual framework for
cancer care during a pandemic incorporating evidence from
the COVID-19 pandemic

Review and update July 2022

Incorporating evidence review
to June 2021

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Executive summary

### Context

With successive infection waves and spread of more infectious variants of coronavirus SARS-CoV-2, the COVID-19 pandemic continues to have major impacts on healthcare. To achieve best outcomes for cancer patients during a pandemic, efforts to minimise the increased risk of severe pandemic infection must be carefully balanced against unintended adverse impacts of the pandemic on cancer care, with consideration to available health system capacity.

In May 2020, early in the pandemic, Cancer Australia published a conceptual framework for the management of cancer during a pandemic as a thought piece for optimal cancer care during the COVID-19 pandemic.1 It provided a framework for system-wide approaches to cancer management and opportunities for decision-making about modifications to cancer care, in accordance with the principles of the *Optimal Care Pathways*for people with cancer.2

Since the publication of the initial conceptual framework, new variants of SARS-CoV-2 have emerged and the COVID-19 pandemic has undergone successive waves in different countries. This has impacted health system capacity, including capacity for care of non-pandemic diseases, with varying effects on cancer care. In addition, COVID-19 vaccination has become available.

### Purpose

The purpose of this review and update was to investigate evidence on the impact of the COVID-19 pandemic on cancer patients, cancer care, and health system capacity, and on managing the impact of the COVID-19 pandemic, to further develop and update Cancer Australia’s conceptual framework for cancer care during a pandemic (conceptual framework).

The intended audience of the conceptual framework includes health services, health professionals, cancer organisations, and policy-makers. The conceptual framework covers the care of all cancers across the whole cancer care continuum, and is not specific to any tumour site, clinical specialty, or health service. It is intended to be generalisable for pandemics similar to COVID-19 in a global setting and does not include management of the pandemic-related illness, such as COVID-19.

### Methodology

An evidence review was undertaken of the impact of the COVID-19 pandemic on cancer care and health system capacity based on searches up to June 2021. A systematic approach was used to provide an evidence base that was fit-for-purpose. The conceptual framework was updated based on the evidence identified and on current international and national guidance, recommendations, and position statements, broadly similar in principle to a meta-guideline approach.3 This pragmatic approach enabled the timely incorporation of international and national guidance.

The updated conceptual framework incorporates evidence and learnings from the COVID-19 pandemic.

### Evidence and key considerations

The evidence and key considerations underpinning Cancer Australia’s updated conceptual framework for cancer care during a pandemic are that it:

* Incorporates consideration of changes in health system capacity and capacity for cancer care during a pandemic;
* Is informed by evidence on the effects of COVID-19 infection in cancer patients;
* Is informed by evidence on the impacts of the pandemic on cancer care; and
* Is underpinned by principles for optimal cancer care.

**Changes in health system capacity and capacity for cancer care during a pandemic**

Components of health system capacity vary during a pandemic, and capacity relative to pandemic numbers and severity affects the resources available for cancer care delivery.4-9 The challenges of successive pandemic waves and high numbers of pandemic cases necessitate consideration of changing health system capacity in decision-making about cancer care during a pandemic.

Acute and recovery pandemic phases that incorporate both changing health system capacity and the progression of the pandemic10 are used in Cancer Australia’s updated conceptual framework. At each step on the cancer care continuum, decisions on cancer care should include consideration of health system capacity and capacity for cancer care, in relation to the progression of the pandemic. Incorporating this consideration into the conceptual framework for cancer care enables its broad application to different pandemic scenarios, and to different health services and global contexts.

**Evidence on the effects of COVID-19 infection in cancer patients**

Cancer patients are at increased risk of severe COVID-19 infection11 and of worse outcomes from COVID-19, 12-16 so minimising risk of COVID-19 infection must be considered in cancer care. The evidence on the effects of systemic anti-cancer treatment and radiotherapy on the severity and mortality of COVID-19 infection in cancer patients is inconclusive,17-22 which supports the need to consider continuing anti-cancer treatment and individualising treatment decisions.

**Evidence on the impacts of the pandemic on cancer care**

Disruption and delays in cancer screening, diagnosis and treatment during the COVID-19 pandemic have resulted in reduced or delayed cancer diagnoses in the short-term and predicted stage shifts to more advanced disease and increased mortality in the longer-term. 8, 23-30

Evidence on the effects of COVID-19 infection in cancer patients and the direct impacts of the pandemic on cancer care indicate the need to balance the increased risk of pandemic infection and of poorer outcomes for cancer patients against the unintended consequences of delays in screening, diagnosis, and cancer treatment, and backlogs due to service disruptions.

**Principles for optimal cancer care**

The seven key principles underpinning the *Optimal Care Pathways* for people with cancer in Australia are2:

* Patient-centred care
* Safe and quality care
* Multidisciplinary care
* Supportive care
* Care coordination
* Communication
* Research and clinical trials.

The guidance and evidence identified in the current review support the importance and relevance of these principles during a pandemic.31-36

### Conceptual framework for cancer care during a pandemic

Cancer Australia’s updated conceptual framework for cancer care during a pandemic provides guidance on how to continue cancer care across the cancer pathway, in the face of challenges to health systems, while minimising infection risk for cancer patients. The evidence supports the continuation of cancer care wherever possible during a pandemic in order to achieve the best outcomes for cancer patients and the community and to minimise the adverse impacts of the pandemic on cancer care. At each step on the cancer care continuum, decisions on cancer care should be based on consideration of health system capacity and capacity for cancer care delivery, in relation to the progression of the pandemic and on pandemic infection control.

The conceptual framework provides guidance in a matrix structure, across the cancer care continuum (from prevention and early detection through to survivorship and end-of-life care), for each of the different phases of a pandemic (acute and recovery phases). The guidance in the conceptual framework is supported by evidence from the COVID-19 pandemic and on guidance, recommendations, and position statements from peak cancer care organisations on cancer care during the COVID-19 pandemic.32, 34, 36-40

The updated conceptual framework provides an evidence-based ‘toolkit’ for cancer care during the current COVID-19 pandemic and future similar pandemics, that reflects changing health system capacity and is consolidated by consideration of best-practice principles for cancer care. The framework provides a planning resource for multiple stakeholders including health services and policy-makers. Emerging evidence and data will continue to inform the evolution of the framework to guide ongoing cancer care during this and future pandemics.

# Introduction

## Context

In early 2020 when the coronavirus disease 2019 (COVID-19) pandemic began, it was apparent that the pandemic would have a significant impact on all aspects of healthcare and that there would be challenges in cancer care, both at the individual patient level and at the system level.

Throughout the COVID-19 pandemic, Cancer Australia has been actively monitoring emerging international evidence and published clinical guidance on COVID-19 and cancer. In May 2020, Cancer Australia published a conceptual framework for the management of cancer during a pandemic as a thought piece for preparing for, and implementing, optimal cancer care during the COVID-19 pandemic.1 It provided a framework for system-wide approaches to cancer management and opportunities for decision-making about modifications to cancer care, in accordance with the principles of the Australian *Optimal Care Pathways*(OCPs) for people with cancer.2

The scenarios or phases of the pandemic underpinning Cancer Australia’s initial framework were based on acute and recovery phases described by the American College of Surgeons10 across modelled scenarios of COVID-19 cases41 in relation to whether health system capacity limits were being approached or exceeded. The steps of the cancer care pathway (from prevention and early detection, through to survivorship and end-of-life care) were those defined in the OCPs.2 The OCPs map the patient journey across the continuum of care, aiming to foster an understanding of the whole pathway and its distinct components to promote quality cancer care and patient experiences.2

Since the publication of Cancer Australia’s initial conceptual framework, the COVID-19 pandemic has undergone successive waves in different countries, impacting health system capacity and capacity for care of non-pandemic diseases, with varying effects on cancer care. In addition, COVID-19 vaccination has become available.

## Purpose

The purpose of this review and update was to investigate evidence on the impact of the COVID-19 pandemic on cancer patients, cancer care, and health system capacity, and on managing the impact of the COVID-19 pandemic, to further develop and update Cancer Australia’s conceptual framework for the management of cancer during a pandemic.

The intended audience of the conceptual framework includes health services, health professionals, cancer organisations, and policy makers. The conceptual framework covers the care of all cancers across the whole cancer care continuum, and is not specific to any tumour site, clinical specialty, or health service. It is intended to be generalisable for pandemics similar to COVID-19 in a global setting and does not include management of the pandemic-related illness, such as COVID-19.

## Background

A pandemic is defined by the World Health Organization (WHO) as ‘the worldwide spread of a new disease’.42 A pandemic occurs when a new disease, such as COVID-19 caused by infection with the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerges and spreads around the world. In March 2020 the WHO declared COVID-19 a pandemic.

The COVID-19 pandemic is currently continuing worldwide, with successive waves of infection and the spread of new variants of coronavirus SARS-CoV-2, such as the more infective Delta and Omicron variants.9, 43 The COVID-19 pandemic has spread globally and as at early April 2022, there have been over  490 million confirmed COVID-19 cases globally including over 6.1 million deaths reported to WHO, and in Australia, approximately 4.8 million cases and 6,500 deaths.42 The pandemic continues to have major impacts on healthcare including potentially overwhelming health systems, with significant impacts and changes in cancer care.26, 44, 45 Adverse impacts of the pandemic on cancer care may be prolonged and be greater in low- and middle-income countries.45

Cancer patients may be at increased risk of a pandemic infection due to factors such as older age, comorbidities (e.g. cardiovascular disease, diabetes, chronic lung disease), and immunosuppressed state due to the underlying cancer or to anti-cancer treatment.31 Cancer patients may need frequent hospital admissions and visits, and have high levels of interaction with healthcare providers that present another potential risk for pandemic infection. Patients with cancer are a heterogenous population, so individual factors that enable assessment of risk, including the type and stage of cancer and treatment intent, need to be considered.46

Ethical principles and considerations for guiding the management of cancer patients, prioritisation of cancer care if required, and allocation of scarce resources have been proposed from early in the COVID-19 pandemic by others.39, 47, 48 The principle of justice as the prominent principle in a situation of very limited human resources, within a context of respect for the patient’s autonomy, beneficence (doing good for the patient) and non-maleficence (not harming the patient unnecessarily), was identified in the Ontario Health/Cancer Care Ontario (OH/CCO) *Pandemic planning clinical guideline for patients with cancer*.39 Justice was used as the essential principle for a priority classification of cancer patients, with need (severity of symptoms and potential life-threatening nature of the cancer itself) and efficacy of treatment (effectiveness of the treatment in curing the cancer as well as control of life-threatening or unstable situations) as criteria.39 Hanna et al proposed that the precautionary principle that ‘when human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm’ should be applied to system-level approaches to COVID-19 risks and to prioritising systemic and radiotherapy treatments for cancer patients during the pandemic.47

The American Society of Clinical Oncology (ASCO) has outlined ethical principles to support policies at the health system level for allocation of resources in the context of COVID-19 and resource shortages.48 ASCO’s recommendations include48:

* Allocation of scarce resources in a pandemic should be based on maximizing health benefits.
* A fair and consistent prioritization and allocation policy should be developed before allocation becomes necessary.
* Decisions regarding allocation of scarce resources should be separated from bedside decision making. The oncologist caring for a patient should not make scarce resource allocation decisions about that patient.
* Oncologists should work with their institutions on how best to use scarce resources for care and support of patients with cancer.

In summary, the COVID-19 pandemic continues to have major impacts on healthcare. The purpose of this review and update was to investigate the evidence of the impact of the COVID-19 pandemic on health system capacity and on cancer care, and to further develop and update Cancer Australia’s conceptual framework for the management of cancer during a pandemic.

# Methods

## Evidence review

An updated evidence review was undertaken on the impact of the COVID-19 pandemic on cancer patients, cancer care and health system capacity during the pandemic, based on searches up to June 2021. A systematic approach was utilised for the review of evidence to provide an evidence base that was robust but pragmatically feasible and fit-for-purpose.

The searches aimed to identify system-wide and high-level approaches to optimal cancer care during a pandemic to update and further develop the conceptual framework*.*

## Research questions and inclusion criteria for the evidence review

The high-level research questions addressed were:

1. What is the most up-to-date, evidence-based guidance for the management of cancer across the care continuum during different phases of a pandemic?

Note: “Guidance” is a broad term and may include Clinical Guidelines, Guides and Policy statements (such as position statements), in addition to findings of systematic reviews, and high-level reviews.

1. Does this most up-to-date evidence align with the detailed conceptual framework and summary conceptual framework?
	1. What modifications need to be made to the detailed conceptual framework and summary conceptual framework to align with the most up-to-date evidence?

While PICO criteria were not directly applicable to the research questions, the following criteria were broadly applied:

* Population: patients with cancer during the COVID-19 pandemic.
* Interventions: management of cancer across the continuum of care, including treatment of cancer. The management of COVID-19/SARS-CoV-2 infection in patients with cancer was excluded.
* Comparator: patients with cancer, not during a pandemic.
* Outcomes: outcomes of cancer and of pandemic infection.

The inclusion criteria for articles and resources for the evidence review were:

* systematic reviews (SRs) and meta-analyses (MAs)
* peer-reviewed original articles (published since relevant SRs or MAs), on prospective or retrospective controlled studies with large sample sizes
* additional high-level evidence or reviews, such as narrative reviews based on systematic approaches or with particular relevance
* existing clinical guidance and recommendations from peak cancer bodies and organisations for cancer care during the COVID-19 pandemic.

Articles were excluded that were: tumour site-specific; that provided national recommendations or guidance, except for Australia; single-site or non-comparative studies, or with small sample sizes.

## Searches

Searches were undertaken up to June 2021 of the PubMed database using search terms including health system capacity, COVID-19, pandemic, cancer and oncology.

The websites of peak cancer bodies and organisations, Australian clinical colleges and databases were searched for clinical guidance that related to cancer and COVID-19. The websites searched included: American College of Surgeons (ACS), American Society for Clinical Oncology (ASCO), European Society for Medical Oncology (ESMO), National Institute for Health and Care Excellence (NICE), National Health Service England (NHS), National Comprehensive Cancer Network (NCCN), Ontario Health/Cancer Care Ontario (OH/CCO), American Society for Radiation Oncology (ASTRO), European Society for Radiotherapy and Oncology (ESTRO), Medical Oncology Group of Australia (MOGA), Royal Australian College of Radiologists (RANZCR), Royal Australasian College of Surgeons (RACS), and the Cochrane Database of systematic reviews. The clinical guidance publications identified from peak cancer organisations that were included in the evidence review are summarised in Appendix A.

Additional targeted searches were undertaken as required and additional relevant articles were identified by Google searches and snowballing techniques.

## Updating the conceptual framework

Abstraction of evidence for the initial conceptual framework was repeated for the updated framework, with input from secondary evidence reviewers. There was extensive internal Cancer Australia review with a consensus approach utilised. The conceptual framework was updated based on the evidence identified and on current international and national guidance, recommendations, and position statements, broadly similar in principle to a meta-guidelines approach.3 This pragmatic approach enabled the incorporation of international and national guidance and up-to-date evidence in a timely manner.

# Health system capacity during a pandemic

Health system capacity, and its relation to health care needs, impacts on strategies and decision-making for the management of other diseases such as cancer during a pandemic, and affects the extent to which cancer care can be provided according to usual best practice.

## Health system capacity

Components of health system capacity relevant to COVID-19 or similar pandemics are listed in Table 1 and include availability of resources such as hospital beds and supplies (including personal protective equipment (PPE), oxygen, medications, blood, etc.), availability of skilled healthcare staff, intensive care unit (ICU) and ventilator capacity, and access to pathology and imaging services.6, 49 Health system capacity components are dynamic and may increase or decrease during a pandemic, as described in Table 1.4-9 These components may vary in an asynchronous manner during a pandemic and some may increase while others decrease.

Table 1 Health system capacity components and potential changes during a pandemic4-9

|  |  |  |
| --- | --- | --- |
| **Component of health system capacity** | **Potential increase during a pandemic** | **Potential decrease during a pandemic** |
| Hospital beds | More hospital beds available due to: cancellation of elective surgery; re-allocation of beds to pandemic infection patients; regional networking of hospitals; field hospitals; use of private hospitals to increase public system capacity; construction of new facilities. | Depleted availability of hospital beds for non-pandemic patients (including cancer patients). |
| ICU beds: beds with equipment for comprehensive critical care and ventilation | More ICU beds available due to: cancellation of elective surgery; regional networking of hospitals; use of private hospitals to increase public system capacity; re-configuring of existing facilities. | Depleted availability of ICU beds for non-pandemic patients (e.g. cancer patients post-surgery). |
| Healthcare staff including: ICU trained staff; pathology testing and laboratory staff; oncology health professionals. | Increase in health care staff due to: surge capacity availability; re-deployment of staff including those with previous relevant training; workforce upskilling and training. | Decrease in healthcare staff due to: staff infected with pandemic infection including nosocomial outbreaks; staff in quarantine or isolation due to exposure; re-deployment of staff (including oncology staff) to meet the demands of the pandemic reduces staff available for cancer care; staff burnout and fatigue; travel restrictions and lockdowns. |
| Ventilators (and extracorporeal membrane oxygenation (ECMO) capacity), including ventilators and ventilator accessories | More ventilators available due to: additional procurement of machines and equipment; redeployment (e.g. by maximising existing supply from local or regional sites); reduced demand, for example by utilising non-invasive oxygenation and ventilation. | Depleted availability for non-pandemic patients. |
| Oxygen | Increased availability of oxygen due to additional procurement and redeployment. | Demand for oxygen for pandemic patients exceeding supply during times of high infection case numbers; supply chain issues; depleted availability for non-pandemic patients. |
| PPE including: masks suitable for pandemic infection control; gowns and gloves | Release of PPE from national stockpiles; additional procurement. | Demand for PPE exceeding supply during times of high pandemic infection case numbers; supply chain issues; depleted availability for non-pandemic patients. |
| Medications including: medications for pandemic infection treatment; oncology treatment. | Additional procurement of medications to meet increased demand. | Demand for pandemic patients exceeding supply during times of high infection case numbers; supply chain issues; depleted availability for non-pandemic patients. |
| Pathology services: for pandemic testing, including testing staff and consumables for taking samples and testing; for cancer testing. | Increased supply or capacity of pathology services (e.g. from the private sector); increased staff recruitment and training; additional procurement of consumables. | Demand for pandemic testing exceeding availability during times of high infection case numbers; supply chain issues; depleted availability for non-pandemic patients. |
| Imaging services for cancer testing |  | Workforce redeployment; depleted availability for non-pandemic patients. |
| Other supplies, such as hand hygiene and cleaning supplies |  Additional procurement of supplies to meet increasing demand. | Demand for pandemic patients exceeding supply during times of high infection case numbers; supply chain issues. |
| Systems and capability for coordination and sharing of resources and planning for surge capacity | Greater capability in response to the demands of the pandemic progression. | Workforce depletion, re-deployment or burnout. |

Capacity may vary during successive waves of infection due to factors such as preparations undertaken between waves and the relative numbers of infected cases, and may vary on a local basis. Measures to maintain or increase health system capacity during a pandemic and mitigate potential shortages include: adapting existing hospital beds and ICU capacity;4, 5, 9 mitigating healthcare staff shortages;9, 50 implementing protocols to reduce the risk of pandemic infection for health care workers including nosocomial transmission;51 maximising supply of ventilators52 and planning logistics for surge capacity to manage sudden increases in patient numbers.53

Changes in health system capacity during a pandemic affect the resources available for cancer care delivery. A pandemic such as COVID-19 has impacts on diseases such as cancer, both through direct health system capacity factors and indirect health system effects (such as effects of lockdowns on diet, exercise and alcohol intake), and the scope and severity of these impacts are likely to continue evolving.54

Health system capacity and impacts of the COVID-19 pandemic vary globally with greater impacts in low- and middle-income countries (LMICs).55 LMICs have lower ratio of hospital beds, ICU, and ventilator capacity relative to the population, compared to higher income countries55 and have reported worse impacts of the pandemic on cancer care capacity, including significantly greater shortages of PPE and medications, and less availability of virtual clinics (telehealth) and remote care.24, 56

## Progression of a pandemic and pandemic phases

Epidemiological curves, based on the evidential progression of the pandemic under different scenarios of pandemic numbers and severity, can be used to predict the effects of mitigation strategies such as quarantine, social distancing, contact tracing and lockdowns in subsequent episodes.4, 41, 55

In Figure 1, the progression of a pandemic is shown as the demand on the health system due to the pandemic infection against time, and indicates pandemic phases where the pandemic demands are within, or exceed, health system capacity.

Figure 1 Pandemic phases in relation to health system capacity



In Figure 1, health system capacity is shown as a band with dashed lines representing its range during a pandemic due to multiple components that could increase or decrease at any time (as detailed in Table 1). The blue line indicates an uncontrolled outbreak with rapidly increasing number where health system capacity may be exceeded. The green line indicates a mitigated scenario with a slower rate of transmission. Acute and recovery phases, incorporating both the pandemic progression and health system capacity, are indicated.

Figure 2 shows the demand on health system capacity during repeat pandemic waves over a period of time.

Figure 2 Pandemic with repeat waves



Figure 2 indicates that health system capacity may be exceeded at different times during repeat pandemic waves. The pandemic curves will also be influenced by rates of vaccination, which may vary locally as well as globally between low- and high-resource countries, and by efficacy of the vaccine.

As health system capacity and the demands due to pandemic infection vary during the different stages and scenarios of a pandemic, so do the resources available for cancer care delivery. At each step on the cancer care continuum, decisions on cancer care should include consideration of health system capacity and capacity for cancer care, in relation to the progression of the pandemic. Incorporating this consideration into the conceptual framework enables its broad application to different pandemic settings, and to different health services and global contexts.

Acute and recovery pandemic phases that incorporate both changing health system capacity and the progression of the pandemic10 are used in Cancer Australia’s conceptual framework:

* Acute phase I: Semi-urgent setting. Few pandemic infection patients and numbers not rapidly escalating, demand within health system capacity; hospital supplies and healthcare staff resources are not exhausted; hospitals still have ICU capacity.
* Acute phase II: Urgent setting. Rapidly escalating numbers of pandemic infection patients, approaching limits of health system capacity; hospital supplies and healthcare staff resources are limited due to factors such as redeployment to pandemic-related activities; ICU capacity increasingly limited.
* Acute phase III: Emergency setting. High numbers of pandemic infection patients, health system capacity exceeded; hospital supplies and healthcare staff resources are overwhelmed or exhausted by pandemic-related activities with no spare capacity; no spare ICU capacity.
* Recovery phases. Past the peak of pandemic infection with fewer new daily cases, health system capacity not exceeded; hospital supplies and healthcare staff resources are more available, including hospital and ICU beds, healthy staff, PPE, and critical testing.

Within these phases there may be transitions, such as from a preparatory phase with low numbers to a phase with more rapidly increasing numbers during Acute phase I. These phases may be repeated during successive waves of infection and with new pandemic variants.

In summary, components of health system capacity vary during a pandemic, and capacity relative to pandemic numbers and severity affects resources available for cancer care delivery.4-9 The challenges of successive pandemic waves and high numbers of pandemic cases necessitate consideration of changing health system capacity in decision-making about cancer care during a pandemic. Acute and recovery pandemic phases that incorporate both changing health system capacity and the progression of the pandemic10 are used in Cancer Australia’s conceptual framework. At each step on the cancer care continuum, decisions on cancer care should include consideration of health system capacity and capacity for cancer care, in relation to the progression of the pandemic.

# Evidence of effects of COVID-19 infection in cancer patients

Evidence on the effects of the COVID-19 pandemic on cancer patients helps to inform the conceptual framework on how best to provide cancer care during a pandemic.

## Risk of COVID-19 infection in patients with cancer

Early reports and a US retrospective case-control study of over 73 million electronic health records have indicated that patients with cancer may have increased risk of COVID-19 infection.11, 19, 57 While the large case-control study had limitations, such as those inherent to electronic health records and testing differences between groups, patients with cancer, especially those diagnosed within the last year, were at significantly increased risk of COVID-19 infection compared to those who have never had cancer, with adjusted odds ratio (aOR) of 7.14 (95% CI, 6.91-7.39; P < .001), adjusted for age and common comorbidities considered risk factors for COVID-19.11 The associations were strongest for those patients with recently diagnosed leukaemia: aOR = 12.16 (95% CI, 11.03-13.40; P < .001), non–Hodgkin lymphoma: aOR = 8.54 (95% CI, 7.80-9.36; P < .001), and lung cancer: aOR = 7.66 (95% CI, 7.07-8.29).11

## Severity and complications of COVID-19 infection in cancer patients

The Centres for Disease Control and Prevention (CDC) in the United States of America (US) has identified that cancer is one of the underlying medical conditions that increase a person’s risk of severe illness from COVID-19, supported by evidence from meta-analyses and systematic reviews.58 Several meta-analyses have reported that the risk of severe complications from COVID-19 is higher in patients who have cancer compared with patients without cancer and the increased risks reported include: pooled relative risk (RR) for ICU admission, RR = 1.56 (95%CI: 1.31-1.87, 26 studies, 15,375 patients)12; odds ratio (OR) = 2.32 (95%CI: 1.63-3.32) for the risk of severe complications from COVID-19 14; OR = 2.20 (95% CI: 1.53-3.17, 17 studies) for severe cases defined by clinical symptoms and ICU experience15; and pooled RR = 1.76 (95% CI: 1.39-2.23, six studies, 22,046 patients) for severe COVID-19 disease.13 A large retrospective case-control study from the US reported patients with cancer and COVID-19 infection had significantly worse outcomes for hospitalisation compared with COVID-19 patients without cancer: 47.46% vs 24.26%.11

Patients with haematological malignancies (leukaemia, lymphoma and myeloma) had more severe COVID-19 illness compared to patients with solid organ tumours, OR = 1.57 (95%CI: 1.15-2.15) in a prospective cohort study of 1044 patients with cancer and COVID-19 infection from the UK Coronavirus Cancer Monitoring Project.59 Increased severity of COVID-19 illness has also been reported for patients with lung cancer compared to other cancers, OR = 2.0 (95%CI: 1.2-3.3)60 and OR = 2.24 (95%CI: 1.08-4.74)61 and in a systematic review by Peravali et al.62

## Mortality due to COVID-19 in cancer patients

Meta-analyses have indicated consistent statistically significant odds ratios for increased risk of death in COVID-19 patients with cancer compared to those without cancer ranging from 1.66 – 2.97, including meta-analyses by Yang et al: RR = 1.8 (95%CI: 1.38-2.35, 10 studies, 55,448 patients)16; Tian et al: OR = 2.97 (95%CI: 1.48-5.96, 17 studies) 15; and Giannakoulis et al: RR = 1.66 (95%CI: 1.33-2.07, 8 studies, 37,807 patients).12

Evidence from large cohort studies indicate increased mortality rates in cancer patients with COVID-19 compared to those without cancer. A large retrospective case-control study from the US reported that patients with cancer and COVID-19 infection had significantly worse mortality compared with COVID-19 patients without cancer: 14.93% vs 5.26%.11. The COVID-19 and Cancer Consortium reported 14% mortality in a retrospective cohort of 4966 patients with cancer and COVID-19.20 Increased all-cause mortality was significantly associated with COVID-19 infection in cancer patients, HR = 1.20 (95%CI: 1.15-1.24) in a US cohort of 398,579 cancer patients, 63,413 (16%) with COVID-19, from the National COVID Cohort Collaborative.21 Among cancer patients with COVID-19, factors associated with increased mortality included age ≥ 65 years, male gender and comorbidities.21

Mortality rates have been reported to be higher for COVID-19 infected patients with haematological malignancies compared to other cancers.18, 21, 59, 63 The pooled risk of death among adult patients with haematological malignancies and COVID-19 was 34% (95%CI: 28%-39%, 34 studies with 3,240 patients) in a meta-analysis by Vijendthira et al.64 For patients with COVID-19 and lung cancer, mortality of 33% has been reported from the international TERAVOLT cohort study65 and in meta-analyses, overall case fatality rates of 32.9% (95% CI: 27.9%-38%)18 and of 32.4% (95%CI: 26.5% - 39.6%, 1,135 patients).66 The mortality rate in patients with COVID-19 and lung cancer was greater compared with other cancers, OR = 1.62 (95%CI: 1.06-2.48, 12 studies, 185 patients with lung cancer and 932 patients with other cancer) in a meta-analysis by Peravali et al.62

## Severity of COVID-19 infection or risk of mortality in cancer patients with COVID-19 who are receiving/have recently received systemic anti-cancer treatment or radiation therapy

The effect of recent or prior anti-cancer treatments on outcomes for patients with cancer and COVID-19 infection, is relevant for guidance on the use of anti-cancer treatments for cancer patients during the COVID-19 pandemic.

There is mixed evidence on the effects of systemic treatments and radiotherapy for cancer on the severity of COVID-19 infection and death in cancer patients.17 In some studies, receipt of cancer therapy before COVID-19 infection was associated with worse outcomes,67-69 whereas in other studies recent cancer therapy was not associated with increased severity of disease or mortality.60, 70-72

A rapid evidence review: *The effects of systemic anticancer treatment (SACT) or radiotherapy on risk of severe illness or death in patients with cancer and COVID-19* published in February 2021 by NICE found variation in the findings on the impact of anti-cancer therapies on patients with cancer and COVID-19.17 The evidence was limited as all the studies were observational with some degree of bias and confounding, and there was a high degree of heterogeneity in the studies.17 The review indicated that there was, on balance, no difference in all-cause mortality for patients with cancer and COVID-19 with any of the systemic anti-cancer treatments (chemotherapy, targeted therapy, immunotherapy or hormone therapy) received.17 The expert panel did not feel it was possible to draw definite conclusions for specific systemic regimens based on current evidence and indicated that the evidence supported the recommendation that COVID-19 alone is a not reason to withhold radiotherapy. 17 ASCO has noted the lack of direct evidence to guide decisions on changing or withholding immunosuppressive therapy in patients with cancer and that: ‘The balance of potential harms that may result from delaying or interrupting treatment versus the potential benefits of possibly preventing or delaying COVID-19 infection is very uncertain’.73

In meta-analyses by Zhang et al (15 studies, 3,019 patients) and Lin et al (26 studies, 5,571 patients), chemotherapy, surgery or other anti-cancer treatments were not associated with increased risk of disease severity or deaths in cancer patients with COVID-19.18, 19

For specific systemic treatments, a cohort study from the COVID-19 and cancer consortium (4966 patients with cancer and COVID-19) indicated that the following anti-cancer therapies (treatment within 3 months of COVID-19 diagnosis) were associated with high 30-day all-cause mortality: R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine and prednisone); platinum combined with etoposide; and DNA methyltransferase inhibitors.20 The US National COVID Cohort Collaborative (63,413 patients with cancer and COVID-19) reported that recent (within 30 days) cytotoxic therapy was associated with increased risk of all-cause mortality, HR = 1.5 (95%CI: 1.1-2.1), whereas mortality risk was not increased for patients who had received recent immunotherapies or targeted therapies.21

For therapy with immune checkpoint inhibitors (ICIs) for cancer patients with COVID-19 infection, there is also conflicting evidence.34, 40, 73 Some studies have reported worse outcomes for cancer patients with COVID-19 infection treated with ICIs,72, 74 whereas other studies have reported that ICI treatment was not associated with worse outcomes.20, 65, 75, 76 In a meta-analysis (11 studies, 2826 cancer patients with COVID-19 infection), prior ICI treatment was not associated with higher mortality risk (OR = 0.70, 95%CI: 0.40-1.23) or with disease severity (OR = 1.62, 95%CI: 0.48-5.43), however concomitant use of ICI and chemotherapy may be linked to higher COVID-19 severity (OR = 8.19, 95%CI: 2.67-25.08, with small sample size).22

In summary, evidence from the COVID-19 pandemic (Table 2) indicates the increased risk that COVID-19 infection poses to cancer patients. The evidence on the effects of anti-cancer treatments on the severity and mortality of COVID-19 infection in cancer patients is inconclusive, which supports the need to consider continuing anti-cancer treatment and individualising treatment decisions.

Table 2 Summary of the evidence on the effects of COVID-19 infection on cancer patients

|  |  |
| --- | --- |
| **Cancer care area** | **Effect of COVID-10 pandemic** |
| Risk of COVID-19 infection in cancer patients | Increased risk of severe COVID-19 infection in patients with cancer compared to patients without cancer, with strongest associations for patients with recently diagnosed leukaemia, non–Hodgkin lymphoma, and lung cancer.11 |
| Severity and complications of COVID-19 infection in cancer patients  | Approximately 2-fold increased risk of severe complications from COVID-19 or ICU admission for COVID-19 patients who have cancer compared with patients without cancer.12-15 Increased risk of severity of COVID-19 infection for patients specifically with haematological malignancies,59 and for lung cancer.60-62 |
| Mortality due to COVID-19 in cancer patients  | Increased risk of death for COVID-19 patients with cancer compared to patients without cancer (ORs 1.66 – 2.97 from meta-analyses).12, 15, 16 Higher mortality rates for COVID-19 infected cancer patients for haematological malignancies and lung cancer, compared to other cancers.18, 21, 59, 62, 64, 66 |
| Severity of COVID-19 infection or risk of mortality in cancer patients with COVID-19 who are receiving/have recently received systemic anti-cancer treatment or radiation therapy | Effect of systemic anti-cancer treatment and radiotherapy on the severity and mortality of COVID-19 infection in cancer patients is inconclusive due to mixed evidence.17-22 |

# Evidence on the impacts of the COVID-19 pandemic on cancer care

## Delays in screening and in diagnosis and treatment of cancer patients during the COVID-19 pandemic

Delays and disruptions to cancer care reported during the COVID-19 pandemic have included: decreases in screening rates; delays in diagnosis; reduction in number of cancer surgeries; delay in radiotherapy or use of other regimens; alternate systemic regimens; and delay, rescheduling, or cancellation of outpatient visits.8, 23-25

Cancer screening programs, such as screening for breast, cervical and colorectal cancers, have been disrupted to varying degrees during the COVID-19 pandemic and some screening programs such as breast screening were suspended during peaks of pandemic infection in some countries.25, 77, 78 The disruptions to cancer screening during the COVID-19 pandemic and strategies for maintaining or resuming cancer screening are affected by health system capacity and whether it is exceeded during the varying phases of a pandemic.79, 80

In 2020 during the COVID-19 pandemic in Australia, cancer-related diagnostic procedures for 14 cancer types[[1]](#footnote-2) were approximately 8% lower than expected (over 160,000 fewer services) and therapeutic procedures were approximately 9% lower (over 14,000 fewer services).26 There was a reduction of 10% in cancer pathology notifications in the state of Victoria, Australia during the COVID-19 pandemic in 2020, where it was estimated that about 2,530 cancer diagnoses were either delayed or missed.81 In the US, reductions of 46% in the total weekly number of newly diagnosed breast, colorectal, lung, pancreatic, gastric and oesophageal cancers (in the period 1 March to 18 April 2020) were reported.82 There was a reduction in South East London of 18% in new cancers diagnosed and a 4% increase in advanced stage presentation during March – September 2020,83 and in Paris, a reduction in new cancer cases of 33% during lockdown (March – May 2020) and of 19% after lockdown (June – September 2020).84

Interruption in cancer treatment was reported by up to 77.5% of patients responding to surveys in a systematic review of 62 studies from Europe, USA, Asia and the Middle East.8 In another systematic review (87 studies from North and South America, Europe, Asia, Middle East and Africa), delays or deferrals across all treatment modalities (surgery: 50%; ST: 55.8% and radiotherapy: 56.7% of articles) and reductions in outpatients visits (26.4% of articles) were commonly reported.24 In a global cross-sectional, questionnaire-based study (356 oncology centres from 54 countries), 88% of centres reported reduction in their usual level of cancer care (including reduced surgery, systemic therapy, radiotherapy and palliative care). 56

## Impacts on cancer outcomes of delays in cancer screening, testing and treatment during the COVID-19 pandemic

The impacts of disruptions to cancer screening due to the COVID-19 pandemic have been estimated by modelling studies for different countries with different screening programs.27-29 Disruption of breast cancer screening programs has been estimated to have varying short- and long-term outcomes, including increased tumour size, stage shifts to higher stage cancer, increased mortality and increased public health burden.27 In the Netherlands, suspension of the breast cancer screening program and a later restart at reduced capacity resulted in a reduction of screen-detected breast cancers by 67% during February to August 2020, which equated to an estimated 2000 delayed screen-detected cancers.77 It has been estimated that cervical cancer screening disruption in high income countries will increase cervical cancer cases (2020-2030) by up to 5 – 6%, with the greatest impact among women aged less than 50 years in 2020.28 Disruptions in colorectal cancer screening were estimated to result in additional colorectal cancer deaths long-term (e.g. for 6 months disruption without catch-up screening, 1961 additional deaths 2020-2050 in Australia, 678-881 in the Netherlands and 1319 in Canada).29 However the impact would be minimised by catch-up screening,29 and in Australia there was no suspension of the National Bowel Cancer Screening Program.78

Delays in in diagnosis due to pandemic lockdown measures have been estimated to result in substantial additional cancer deaths in England.85 Across breast, colorectal, lung and oesophageal cancer, 3291-3621 additional deaths within 5 years were estimated following diagnostic delays from March 2020 over 12 months, with increased deaths ranging from 4.8% for lung cancer to 16.6% for colorectal cancer.85

A consistent effect of delay in cancer treatment on increased mortality has been estimated in a meta-analysis of 34 studies (all retrospective comparative observational studies) published from 2000-2020 on seven major cancer types (bladder, breast, colon, head and neck, nasopharyngeal, cervical, and non-small cell lung cancer) and surgery, systemic treatment and radiotherapy treatments.30 Mortality risk for each four-week delay for surgery was HR = 1.06 - 1.08 (6-8% increased chance of death for each four-week delay in treatment) and for systemic treatment was HR = 1.01 - 1.28. For radiotherapy, data was limited, but supported a mortality impact due to delay in adjuvant radiotherapy for head and neck cancers and for cervical cancer.30

Interruptions to cancer treatment during the COVID-19 pandemic were further impacted by the kinetics of rapid shutting-down followed by slower ramping up later, for example in Canada, where an immediate 60% decrease in mean surgical volume was followed by a slow 6% weekly increase,86 and may result in large backlogs of cases. Treatment delays and modifications may be prolonged and negatively impact patient care and outcomes, as it will take considerable time for cancer care to resume capacity and adjust models in response to the pandemic.24

In a global study of the impact of the COVID-19 pandemic on cancer care (356 centres from 54 countries), the magnitude of the impact on reduction or disruption of cancer care and reported estimates of harm to patients, were more pronounced in lower-resource countries (stratified by the World Bank country income classification),56 for example, impacts of the pandemic on cancer surgery reduction have been greater in lower-income countries.87 A review of impacts of the COVID-19 pandemic on cancer delivery treatment also reported significant reductions in cancer care in LMICs and noted that while they stand to benefit the most from remote care delivery due to high prevalence of COVID-19, these countries may lack the technology and infrastructure to deliver care remotely.24

Modelling has been used to develop tools such as OncCOVID that enables clinicians to estimate the net impact of delayed cancer treatment for an individual patient.88 The model is based on estimates of survival from the Survival, Epidemiology and End Results (SEER) database, data on the impact of treatment from the US National Cancer Database and data on COVID-19 mortality rates. The online tool estimates risk based on up to 47 variables including type and stage of cancer, comorbidities, patient age and local community COVID-19 prevalence and reproduction number.88

## Impacts of the COVID-19 pandemic on follow-up and supportive care for cancer patients

The impacts on follow-up care for cancer patients during the COVID-19 pandemic include: delays or cancellations of follow-up appointments; modifications of follow-up plans (e.g. suspension or postponement of supportive care, including exercise programs, and of cancer surveillance including imaging and physical examinations); and increased use of telehealth for follow-up appointments, reported in an international survey (38 health professionals from the Asia-Pacific, Europe, North America and South America) by the Multinational Association of Supportive Care in Cancer (MASCC)89 and in a systematic review.90 While telehealth has replaced many face-to-face appointments,44 barriers have been identified to telehealth adoption in the clinical setting including variable access to technology, and concerns about increased anxiety and distress in cancer patients related to the use of telehealth.89, 90 Suggestions for future practice development have included considering alternative models of care such as shared care, nurse-led or GP-led care.44, 89, 91

Breast cancer patients in Australia have reported that delays or changes in follow-up care, including delays in appointments with allied health and psychological services, were more common than delays or changes in treatment.92 Common concerns reported were around missing social supports from family and friends, lack of access to social support services and hospital restrictions on visitors during treatment.92 It has been suggested that closer consideration should be given during the COVID-19 pandemic to maintaining inclusion of caregivers, who are an integral component of a patient’s care team, in appointments and hospital visits.93

## Impacts of the COVID-19 pandemic on oncology health professionals

Negative impacts of the COVID-19 pandemic on oncology professionals have been reported in an international survey by the ESMO Resilience Task Force in April/May 2020 (1520 participants from 101 countries) and in July/August (272 participants, who completed both surveys).94 In the first survey (April/May 2020), 25% of participants indicated being at risk of distress, 38% reported feeling burnout and 66% reported not being able to perform their job compared with the pre-COVID-19 period.  Higher job performance since COVID-19 was associated with better well-being and not feeling burnout. Consistent predictors of well-being, burnout, and job performance since COVID-19 were psychological resilience and changes to work hours.94 The second survey (July/August 2020) indicated that while job performance since COVID-19 had improved, well-being and burnout worsened over a 3-month period during the COVID-19 pandemic.94 The study suggested taking action on factors associated with more favourable outcomes, including working hour issues, concerns with regard to the impact of COVID-19 on training or career and clinical trials, and improving staff resilience to change.94

In other international surveys, negative impacts of the pandemic on mental health and well-being were reported by approximately 50% of oncologists (surveys from the Middle East, North Africa, Brazil and the Philippines95 and from Europe, Australasia and Asia96). Negative impact of the pandemic was reported by 27.8% of participants on their relations with family, by 15.8% on relations with co-workers, by 34.3% on research productivity and by 52.3% on financial income in the survey by Jazieh et al of 1,100 oncologists.95 Psychological distress, fatigue and disrupted practice have also been experienced by cancer care clinicians in Australia.97 Burnout during the COVID-19 pandemic has been reported in a national survey of medical oncologists from Argentina.98

Burnout and fatigue experienced by oncology health professionals due to the COVID-19 pandemic can lead to decreased healthcare staff capacity (refer Table 1).

Interventions to support resilience and mental health of frontline health and social care professionals during and after a pandemic, have been examined in a Cochrane systematic review.99 Such interventions include work-based interventions, such as changing routines or improving equipment, and psychological support interventions such as counselling.99 While no evidence was found on the effectiveness of these interventions, facilitators to intervention identified included: having interventions that could be adapted locally; effective communication within an organisation; and having positive, safe and supportive learning environments for frontline healthcare professionals.99

Cancer organisations have provided guidance to support oncology health care professionals and address burnout, including recommendations from ASCO to address the goal to ‘recognise and address threats to clinician, provider and patient well-being’: reimbursement for professional behavioural health support/clinical psychology, support groups or psychiatric care should be increased; and providers should also have access to professional behavioural health support/clinical psychology, support groups, or psychiatric care.100 Strategies to support staff and assist cancer clinicians to cope include: maintaining the health of oncology health professionals and having clear pathways if significant number of expert staff are ill; redeployment of staff from non-essential cancer services, such as cancer genetics; and monitoring staff for signs of fatigue, distress and depression, and workload.34 A toolkit for oncology health care professionals for self-care and stress management during the COVID-19 pandemic has been developed by NCCN.101

## Changes in elements of cancer care during the COVID-19 pandemic

Cancer Australia has identified 12 elements of cancer care which have changed during the COVID-19 pandemic, and described the impacts of these changes and targeted strategies (at the system-level, service-level, practitioner-level, and patient-level) to retain, enhance, and embed high-value changes into practice.44, 102

The twelve elements of cancer care identified by Cancer Australia that changed during the COVID-19 pandemic are44, 102:

* Expanded use of telehealth
* Changes to prevention and early detection
* Virtual multidisciplinary team meetings
* Modifications to treatment schedules
* Hypofractionated radiotherapy
* Oncology hospital in the home
* Responsive patient support
* Innovative care and hospital infrastructure models
* Shared follow‐up and survivorship care
* Supportive and palliative care
* Cancer research and clinical trials
* Collaboration in the oncology sector and data sharing

Ten similar themes of positive change have also been identified by key opinion leaders from 14 countries103:

* value in cancer care (e.g. treatments that have the greatest magnitude of benefit, honest conversations in palliative care)
* digital communication (e.g. less travel for unnecessary visits, collaboration between multidisciplinary teams and researchers)
* convenience (e.g. international collaboration, family involvement)
* inclusivity and co-operation (e.g. team work across professional groups)
* decentralisation of cancer care (e.g. shift to general practitioner/nurse led follow-up, community engagement in palliative care)
* acceleration of policy change (e.g. use of digital technology in health)
* human interactions (e.g. easier consolidation of global collaborations)
* hygiene practices (more handwashing, better adherence to cleaning)
* health awareness and promotion (e.g. increased exposure of false medical propaganda and increased trust in health experts)
* systems improvement (e.g. increased attention to waiting times/appointments, increased attention to patient throughput in hospitals).

## COVID-19 vaccination for cancer patients

Vaccination for COVID-19 has become available and cancer organisations have provided guidance that supports offering vaccination against COVID-19 to patients with cancer, with consideration of any contraindications and factors such as the type of cancer, type of treatment and timing, and counselling about effectiveness and ongoing prevention measures.104-106

ASCO has provided guidance that patients with cancer including those undergoing treatment, may be offered vaccination against COVID-19 as long as components of that vaccine are not contraindicated. ASCO also refers to the [Centers for Disease Control and Prevention (CDC) interim clinical guidance](https://www.cdc.gov/vaccines/covid-19/info-by-product/clinical-considerations.html) that states: “Immunocompromised individuals may still receive COVID-19 vaccination if they have no contraindications to vaccination. However, they should be counseled about the unknown vaccine safety profile and effectiveness in immunocompromised populations, as well as the potential for reduced immune responses and the need to continue to follow all current guidance to protect themselves against COVID-19.” ASCO notes that for patients undergoing treatment, strategies such as providing the vaccine in between cycles of therapy and after appropriate waiting periods for patients receiving stem cell transplants and immune globulin treatment can be used to reduce the risks while maintaining the efficacy of vaccination.104

ESMO statements on vaccination against COVID-19 in patients with cancer include: ‘Patients with cancer have an increased risk of severe COVID-19 (i.e. haematological malignancy requiring chemotherapy or active, advanced solid tumour or history of solid tumour <5 years ago) and should be vaccinated against SARS-CoV-2 regardless of any other indications (i.e. age) and positioned at high prioritisation. Patients who have received B cell depletion in the past 6 months may derive reduced protection. The time-point for vaccination after allogeneic stem cell transplantation should follow general recommendations – usually, in the absence of graft-versus-host disease (GvHD), the vaccine can be applied 6 months post stem cell transplantation. Patients in clinical trials, e.g. immunotherapy, should not be deprived of COVID-19 vaccination; therefore, efforts should be made for clinical trial protocols to allow concurrent COVID-19 vaccines.’105 While acknowledging the need to generate data from trials and registries, ESMO proposes a four-step process to refine the risk/benefit profile and prioritise subgroups of cancer patients for vaccination: 1) Consider the phase of malignant disease and therapy: active cancer on treatment, chronic disease after treatment or survivorship; 2) Consider age, fitness/ performance status and medical comorbidities as general risk factors; specifically, anaphylactic history, obesity, diabetes mellitus, hypertension, respiratory, cardiac and renal disorders, hypercoagulability; 3) Consider vaccine-related interactions on the tumour and on the treatment efficacy; and 4) Secure informed consent and improve shared decision making.105

Cancer Australia has developed frequently asked questions about COVID-19 for people affected by cancer.107 The guidance provided includes: ‘For people with cancer, the decision about when to receive a COVID-19 vaccine should be made on an individual basis by the person affected by cancer in consultation with their healthcare team. Factors to consider include:

* The type of cancer the person has/had
* The type of treatment they are receiving/received
* The timing of their treatment
* The type(s) of vaccine(s) available
* How their immune system is working.

For example, some cancer treatments (like chemotherapy, radiation therapy, or immunotherapy) can affect the immune system, which might make the vaccine less effective in some people.’107 Recommendations from the Medical Oncology Group of Australia include: ‘People with cancer should receive COVID-19 vaccination in the absence of contraindications such as anaphylaxis to vaccine components’ and ‘Anti-cancer therapy including cytotoxic chemotherapy, immune checkpoint inhibitor therapy and targeted therapy should not inhibit vaccination: these patient should also be vaccinated’.108

# Principles underpinning optimal cancer care during a pandemic

Seven key principles underpin the *Optimal Care Pathways* for people with cancer in Australia: Patient-centred care; Safe and quality care; Multidisciplinary care; Supportive care; Care coordination; Communication; and Research and clinical trials. 2

The guidance and evidence identified in the current review support the importance and relevance of these principles during a pandemic, as described in Table 3. Provision of safe and quality care by minimising the risk of pandemic infection for cancer patients and healthcare staff32, 35 is highly relevant and a key consideration for optimal cancer care during a pandemic. Similarly, during a pandemic, patient-centred and multidisciplinary care are of great importance for individualised treatment and treatment decisions,31, 32 and care coordination and communication are essential especially for changes in cancer treatment and treatment planning.32, 34 Supportive care can assist with the psychosocial impacts of a pandemic.34, 109 New opportunities for research and clinical trials, such those based on large registries, have become available during the COVID-19 pandemic.110

Table 3 Application of the Principles of optimal cancer care (from the *Optimal Care Pathways*2) in a pandemic

|  |  |
| --- | --- |
| **Principle of the optimal care pathway (from *Optimal Care Pathways*)2** | **Application of the Principle in a pandemic** |
| **Principle 1: Patient-centred care**Patient-centred care informs and involves patients in their care and respects and responds to the preferences, needs and values of patients, families, and carers. | In a pandemic, treatment should be individualised and treatment decisions made on a case-by-case basis, with input from both patients and the multidisciplinary team (MDT).31 The risks and benefits of any changes to treatment plans should be discussed with patients, their families and carers, and a shared decision reached.32 If required, prioritisation decisions should be made as part of a MDT and each patient should be considered on an individual basis, with the reasoning behind every decision documented and clearly communicated to patients, families and carers.31, 32 |
| **Principle 2: Safe and quality care**Hospitals and health professionals are responsible for providing safe and quality care. | During a pandemic, a key consideration is that care should be provided in the safest way possible35 and that delays in diagnosis and treatment are minimised as much as possible given other considerations. Strategies for providing safe care include optimising telehealth services when available and appropriate to minimise the need for in-person services, and following government recommended infection control practices.35 32, 36 Infection control practices to prevent transmission of infectious agents include screening all patients for signs and symptoms of the pandemic infection, universal source control (e.g. use of masks by everyone in a healthcare facility), and infection control practices specific to the pandemic infection and specific to particular settings. 35 Clear information and communication on infection control practices should be provided to patients and health care staff.111  |
| **Principle 3: Multidisciplinary care**Multidisciplinary care is an integrated team approach that involves all relevanthealth professionals discussing all relevant treatment options and making joint recommendations about treatment and supportive care plans, taking into account the personal preferences of patients. | In a pandemic, multidisciplinary planning which may be accomplished by virtual meetings, is of paramount importance.33, 112 31 Treatment planning can be affected by delays or limited availability of diagnostic and therapeutic procedures, and surgeries. Multidisciplinary discussions to guide treatment planning, starting from the time of diagnosis, are key to adjusting to changes and coordinating treatment, such as the timing and sequence of systemic therapy, radiation therapy and surgery, as well as supportive care.33, 112 In circumstances of limited access to resources such as surgery and normal pathways of care not being possible, early multidisciplinary discussion can tailor multimodal therapy to mitigate the risk of tumour progression.33  |
| **Principle 4: Supportive care**Supportive care is a vital part of any cancer treatment program. Supportive care deals with issues that emerge for patients, families and carers from the effects of the cancer diagnosis and its treatment. It is made up of all the services, information and resources patients may need to meet their physical, psychological, social, information and spiritual needs from the time of diagnosis. | Evidence from the COVID-19 pandemic indicates that patients with cancer may experience psychosocial impacts during a pandemic, including increased distress, depression and anxiety, and unmet information needs. 109, 113 Strategies to address supportive care needs for cancer patients during a pandemic include: increased psychosocial support; extra vigilance to screen for the presence of anxiety and/or depression symptoms, especially in those with a history of mental health concerns; improved communication of changes to cancer care plans; provision of timely information and guidance, including links to telephone and online support ; and improved communication of virus control measures operationalised in healthcare settings.34, 109 It is important to recognise increased levels of distress that cancer patients and their families may face during a pandemic, over and above that in relation to their cancer diagnosis and treatment, and to have supports in place in cancer programs to assess the level of distress and intervene appropriately.39 |
| **Principle 5: Care coordination**Care coordination is the responsibility of every professional, both clinical and non-clinical, who works with patients, their families and carers. | In a pandemic, coordinated care with clear documentation is especially important for cancer treatment and treatment planning in circumstances such as: limited access to resources; adjusting to any changes in cancer treatment; change in the patient’s usual health professional; or change in location where care is delivered. 32, 33 Increased use of telehealth also necessitates robust note-keeping and consideration of privacy and security.34 |
| **Principle 6: Communication**Everyone employed in the healthcare system is responsible for ensuring the communication needs of patients, their families and carers are met. | In a pandemic, truthful, compassionate and honest communication is essential and clinicians need to communicate directly with patients and families about patients’ values and goals of care at all stages of cancer treatment.48 Information regarding the pandemic infection and cancer treatment should be readily available and communication should be rapid and effective. 34 There should be communication and discussion with patients on any changes in their cancer treatment that includes the benefits and risks, and individual factors such as patient preferences.32, 36  |
| **Principle 7: Research and clinical trials**Research and clinical trials play an important role in establishing the efficacy and safety of diagnostic, prognostic and therapeutic interventions, as well as establishing the role of psychological, supportive care and palliative care interventions. | There are challenges to research and clinical trials during a pandemic such as the risk of infection, shortage of clinical care resources, management of participants with COVID-19 and protocol violations, that have resulted in suspension or disruption of many trials.110 Guidance on the conduct of research and clinical trials during the COVID-19 pandemic from the Australian Government Department of Health includes the following principles: ‘The conduct of research related to COVID-19 is a significant priority; however, the initiation and continuation of other ongoing and proposed research may also be critical for the well-being of patients, participants, communities and the research sector.’ ‘Compliance with or adherence to regulations, guidelines, codes, policies and other standards remains necessary. However, interpretation of research responsibilities in the context of a crisis such as COVID-19 should be informed by flexibility, consultation and good sense so as to retain the focus on the safety and well-being of those most at risk in our institutions and communities.’114 Guidance on clinical trials for cancer patients has been provided by ASCO37 and ESMO.115 |

# The conceptual framework for cancer care during a pandemic

Evidence on health system capacity and capacity for delivery of cancer care during a pandemic, and on the impact of the COVID-19 pandemic on cancer care, has informed the updating of the content of the conceptual framework. Key areas where the framework was updated included: further consideration of health system capacity components and changes during a pandemic, consideration of continuing anti-cancer treatments and individualising treatment decisions, supportive care, health professional burnout, and vaccination against pandemic infection.

The evidence and rationale underpinning the conceptual framework are summarised in Box 1.

Box 1 Summary of evidence and rationale underpinning the conceptual framework

|  |
| --- |
| * Cancer patients are at increased risk of severe COVID-19 infection and worse outcomes, so minimising risk of COVID-19 infection must be considered in cancer care.
 |
| * Health system capacity and its components change during a pandemic, and capacity relative to pandemic numbers and severity affects resources available for cancer care delivery.
 |
| * At each step on the cancer care continuum, decisions on cancer care should include consideration of health system capacity and capacity for cancer care, in relation to the progression of the pandemic.
 |
| * Continuing anti-cancer treatments and individualising treatment decisions should be considered, as evidence is inconclusive on the effects of systemic anti-cancer treatment and radiotherapy on the severity and mortality of COVID-19 infection in cancer patients.
 |
| * Disruption and delays in cancer screening, diagnosis, and treatment during the COVID-19 pandemic have resulted in reduced or delayed cancer diagnoses in the short-term and predicted stage shifts to more advanced disease and increased mortality in the longer-term.
 |
| * Increased risk of pandemic infection and of poorer outcomes of the infection for cancer patients needs to be balanced against the unintended consequences of delays in screening, diagnosis, and cancer treatment, impacts on supportive care and backlogs due to the kinetics of service changes.
 |
| * Current guidance and evidence support the importance and relevance of seven key principles underpinning optimal cancer care during a pandemic.
 |

The evidence supports the continuation of cancer care wherever possible during a pandemic in order to achieve the best outcomes for cancer patients and the community and to minimise the adverse impacts of the pandemic on cancer care. At each step on the cancer care continuum, decisions on cancer care should be based on consideration of health system capacity and capacity for cancer care delivery, in relation to the progression of the pandemic and on pandemic infection control.

Cancer Australia’s conceptual framework, underpinned by principles for optimal cancer care, provides guidance on how to continue cancer care during a pandemic. The framework is a matrix structure with guidance across the cancer care continuum, from prevention and early detection through to end-of-life care, for the different acute (I, II and III) and recovery phases of a pandemic. These phases incorporate changing health system capacity and capacity for cancer care delivery, and the pandemic progression.

The guidance in the conceptual framework is supported by evidence from the COVID-19 pandemic and on guidance, recommendations and position statements from peak cancer care organisations on cancer care during the COVID-19 pandemic.32, 34, 36-40 Many of the guidance and recommendations from peak organisations were expert- and/or consensus- based. A rapid evidence review17 informed NICE guidelines on systemic anticancer treatment and radiotherapy for patients with cancer during the COVID-19 pandemic.32, 38 Emerging evidence will continue to inform the conceptual framework to guide cancer care during the current pandemic, while longer-term evidence and data will inform decisions when faced with another pandemic.

A detailed framework is provided for the acute and recovery pandemic phases in Table 4 and a summary framework is provided in the following section.

Table 4 Detailed conceptual framework: Cancer care during the acute and recovery phases of a pandemic

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Phase** | **Prevention and early detection** | **Presentation, initial investigations and referral** | **Diagnosis, staging and treatment planning** | **Treatment** | **Care after initial treatment and recovery** | **Managing recurrent, residual or metastatic disease** | **End-of-life care** |
|  | Vaccination, if vaccination against the pandemic pathogen is available, should be offered to cancer patients, with consideration of any vaccine contraindications, type of cancer, type and timing of treatment and level of immunocompromise.104-107 |
| **Acute** **Phase I****Semi-urgent setting.** Few pandemic infection patients and numbers not rapidly escalating, demand is within health system capacity; hospital supplies and healthcare staff resources are not exhausted; hospitals still have ICU and ventilator capacity. | * Continue population-based cancer screening35, 79
* Continue human papillomavirus (HPV) vaccination if available
* Consider social distancing in planning screening appointments37, 79
* Follow up abnormal screening results identified in patients already screened, prioritising those suspicious for cancer39
 | * Encourage community members to continue to present to GP with ‘red flag’ symptoms of cancer
* Utilise telehealth where possible\*, to assess patients with symptoms suspicious for cancer
* Appropriately investigate and refer patients with symptoms suspicious for cancer to a specialist linked to a multidisciplinary team33
 | * Prioritise diagnostic procedures for patients with symptoms and test results suspicious for cancer33, 39, including colonoscopy for positive bowel cancer screening
 | **Surgery*** Consider delaying surgery for patients not predicted to have a negative outcome if surgery is delayed for three months10
* Testing for the pandemic infection should be undertaken if feasible for cancer patients requiring admission to hospital or prior to invasive procedures regardless of symptoms, if considered at high risk of mortality from the infection40, 115
* Reduce patient visitors or support persons in hospitals

**Radiation therapy*** Reduce radiation therapy fractions (hypofractionation) where appropriate38, 116
* Prioritise patients who have commenced a course of radiation therapy, and support these patients in completing their treatments38

**Systemic treatments*** Minimise face-to-face visits including monitoring, treatment administration, with shift to telehealth where possible\* and community-based care where available32, 34
* Defer non-essential investigations and routine follow-up or shift follow-up visits from face-to-face to telehealth where possible\*32, 34
* Use oral anticancer agents where possible, but weigh any different toxicities with convenience32, 34
* Supportive care interventions should be provided for chemotherapy complications such as anaemia, febrile neutropenia, thrombocytopenia-related complications, thromboembolic events, chemotherapy-induced nausea and vomiting, to minimise patients’ risk of infection and need for hospitalisation117, 118
* Consider using alternate systemic anticancer therapy regimens with fewer visits, less frequent IV administration and of shorter duration, when there are acceptable alternatives32, 34
* Consider postponing/omitting supportive care treatments that are not time-critical (e.g. zoledronic acid for bone metastases) or switching to oral options to avoid hospital visits34, 117
* Testing for the pandemic infection should be undertaken if feasible for cancer patients requiring admission to hospital regardless of symptoms if considered at high risk of mortality from the infection, or prior to starting immunosuppressive therapy (e.g. cytotoxic chemotherapy, stem cell transplantation, biologic therapy), or invasive procedures37, 40, 115
* Reduce patient visitors or support persons in hospitals
 | * Delay face-to-face follow-up appointments (as well as any hospital imaging and/or blood tests) for patients where feasible32
* Maximise the number of reviews done by telehealth where possible\*32, 34, 115, 119
* Consider innovative models of care e.g. shared follow-up care with GP
* Consider arranging for blood tests and scans to be done locally rather than at hospital facilities, especially for patients being reviewed by telehealth\*32, 34
* Healthcare providers should be vigilant in psychosocial screening for signs of anxiety, depression and distress, and should ensure that psychosocial support is provided34
* Provide education to patients about their specific level of immune suppression on various long-term adjuvant therapies and after chemotherapy34 including specific symptoms to be aware of (e.g. dysphagia, haematuria)
 | * Consider delaying commencement of IV treatment for patients with refractory/resistant disease or palliative regimens with a low likelihood of response/benefit
* Minimise commencement of palliative regimens with high risk of complications requiring admission
* Consider treatment breaks for patients with low-volume and/or stable metastatic disease34
* Use short-course radiation therapy schedules for symptom control120
 | * Maximise communication by telehealth where possible\*120
* Consider early referral and communication with community palliative care services34
* Empower patients and carers to manage symptoms at home, e.g., provide access to subcutaneous treatments120
* Enhance provision of supportive and palliative care through innovative models of care
* Prioritise management of patients with urgent symptomatic need39, 120
* Advance care planning and goals of care should be discussed with patients and appropriately documented (e.g. by using an Advanced Care Directive)34, 73
 |
|  | **Prevention and early detection** | **Presentation, initial investigations and referral** | **Diagnosis, staging and treatment planning** | **Treatment** | **Care after initial treatment and recovery** | **Managing recurrent, residual or metastatic disease** | **End-of-life care** |
|  | Vaccination, if vaccination against the pandemic pathogen is available, should be offered to cancer patients, with consideration of any vaccine contraindications, type of cancer, type and timing of treatment and level of immunocompromise.104-107 |
| **Acute** **Phase II****Urgent setting**Rapidly escalating numbers of pandemic infection patients, demand is approaching limits of health system capacity; hospital supplies and healthcare staff resources are limited due to factors such as redeployment to pandemic-related activities; ICU and ventilator capacity is increasingly limited. | * Consider reduction of routine population-based cancer screening if resource availability is limited (e.g. staff deployed elsewhere)35, 39, 79, but for the least possible time during prolonged acute phases
* Follow up abnormal screening results identified in patients already screened, prioritising those highly suspicious for cancer39
 | * Encourage community members to continue to present to GP with ‘red flag’ symptoms of cancer
* Utilise telehealth where possible\*, to assess patients with symptoms suspicious for cancer
* Appropriately investigate and refer patients with symptoms suspicious for cancer to a specialist linked to a multidisciplinary team33
 | * Prioritise diagnostic procedures for patients with symptoms and test results suspicious for cancer33, 39
 | **Surgery*** Prioritise surgery for patients for whom surgery within 4 weeks is expected to save life or prevent progression of disease beyond operability31, 39
* Testing for the pandemic infection should be undertaken if feasible for cancer patients requiring admission to hospital or prior to invasive procedures regardless of symptoms, if considered at high risk of mortality from the infection40, 115
* Non-surgical options such as neoadjuvant treatment may be considered if appropriate, with input from a multidisciplinary team, if the outcomes are similar31, 73
* Limit patient visitors or support persons in hospitals (except at end-of-life)

**Radiation therapy*** Consider delay in commencement of treatment where survival or morbidity is not compromised38, 119, if radiation services are limited
* Where possible, use hypofractionation for adjuvant and radical treatments to reduce the number of treatment slots required31, 38, 116
* Treat all emergency and urgent patients where alternative management to radiotherapy is not possible; prioritise patients with rapidly progressing, potentially curable tumours, and patients already on treatment38, 39
* When modifying an individual patient’s radiotherapy treatment plans, take their clinical circumstances into account, involve the multidisciplinary team and record the reasoning behind each decision38

**Systemic treatments*** Transition patients from intravenous (IV) treatments to subcutaneous or oral chemotherapeutic medications if there are acceptable alternatives32, 36,73
* Consider ways of reducing exposure for patients as a consequence of treatment32
* Consider ceasing treatment for patients where the goals of treatment are limited73; defer IV/ intraperitoneal (IP) treatments for patients with refractory/ resistant disease
* Consider postponing/omitting supportive care treatments that are not time critical, e.g., zoledronic acid for bone metastases, or switching to oral options to avoid hospital visits34, 117
* Delay concurrent chemoradiation or adjuvant chemotherapy unless proven survival benefit for the addition of chemotherapy
* Consider less toxic regimen where efficacy advantage is minimal/unproven. Consider using less frequent immunotherapy regimens and consider the potential harms and benefits of therapy for each patient32, 73
* Testing for the pandemic infection should be undertaken if feasible for cancer patients requiring admission to hospital regardless of symptoms if considered at high risk of mortality from the infection, or prior to starting immunosuppressive therapy (e.g., cytotoxic chemotherapy, stem cell transplantation, biologic therapy), or invasive procedures 37, 40, 115
* Supportive care interventions should be provided for chemotherapy complications such as anaemia, febrile neutropenia, thrombocytopenia-related complications, thromboembolic events, chemotherapy-induced nausea and vomiting, to minimise patients’ risk of infection and need for hospitalisation117, 118
* Limit patient visitors or support persons in hospitals (except at end-of-life)
 | * Delay face-to-face follow-up appointments (as well as any hospital imaging and/or blood tests) for patients where feasible32
* Maximise the number of reviews done by telehealth where possible\*32, 34, 115, 119
* Consider arranging for blood tests and scans to be done locally rather than at hospital facilities, especially for patients being reviewed by telehealth\*32, 34
* Consider innovative models of care e.g. shared follow-up care with GP
* Healthcare providers should be vigilant in psychosocial screening for signs of anxiety, depression and distress, and should ensure that psychosocial support is provided34
* Provide education to patients about their specific level of immune suppression on various long-term adjuvant therapies and after chemotherapy34 including specific symptoms to be aware of, e.g. dysphagia, haematuria
 | * Minimise commencement of IV treatment for patients with refractory/resistant disease or palliative regimens with a low likelihood of response/ benefit
* Consider deferring palliative radiation therapy treatments119, except where these are for life-threatening or urgent conditions (such as haemorrhage, superior vena cava obstruction, or malignant spinal cord compresssion38)
* Use short-course radiation therapy schedules for symptom control120
* Consider deferring commencement of palliative treatments with high risk of complications requiring admission
* Limit patient visitors or support persons in hospitals (except at end-of-life)
 | * Maximise communication by telehealth where possible\*120
* Consider early referral and communication with community palliative care services34
* Empower patients and carers to manage symptoms at home, e.g. provide access to subcutaneous treatments120
* Enhance provision of supportive and palliative care through innovative models of care, e.g., virtual hospitals delivering care in the home34
* Prioritise management of patients with urgent symptomatic need39, 120
* Advance care planning and goals of care should be discussed with patients and appropriately documented (e.g. by using an Advanced Care Directive)34, 73
 |
|  | **Prevention and early detection** | **Presentation, initial investigations and referral** | **Diagnosis, staging and treatment planning** | **Treatment** | **Care after initial treatment and recovery** | **Managing recurrent, residual or metastatic disease** | **End-of-life care** |
|  | Vaccination, if vaccination against the pandemic pathogen is available, should be offered to cancer patients, with consideration of any vaccine contraindications, type of cancer, type and timing of treatment and level of immunocompromise.104-107 |
| **Acute** **Phase III****Emergency setting**High numbers of pandemic infection patients, health system capacity exceeded; hospital supplies and healthcare staff resources are overwhelmed or exhausted by pandemic-related activities with no spare capacity; there is no spare ventilator or ICU capacity. | * Consider reduction or deferral of routine population-based cancer screening 35, 39, 79, but for the least possible time during prolonged acute phases.
* Follow up abnormal screening results identified in patients that are highly suspicious for cancer39
 | * Encourage community members to continue to present to GP with ‘red flag’ symptoms of cancer
* Utilise telehealth where possible\*, to assess patients with symptoms suspicious for cancer
* Appropriately investigate and refer patients with symptoms suspicious for cancer to a specialist linked to a multidisciplinary team33
 | * Prioritise diagnostic procedures for patients with symptoms and test results highly suspicious for cancer33, 39
 | **Surgery*** Prioritise urgent/emergency surgery for life-threatening conditions such as bowel obstruction, bleeding and regional and/or localised infection, and permanent injury/clinical harm from progression of conditions such as spinal cord compression31, 39
* Testing for the pandemic infection should be undertaken if feasible for cancer patients requiring admission to hospital or prior to invasive procedures regardless of symptoms, if considered at high risk of mortality from the infection40, 115
* Non-surgical options such as neoadjuvant treatment may be considered if appropriate, with input from a multidisciplinary team if the outcomes are similar31, 73
* Limit patient visitors or support persons in hospitals (except at end-of-life)

**Radiation therapy*** Defer radiotherapy if clinically appropriate and avoid radiotherapy if the evidence suggest there may be little to no benefit, or if an alternative treatment is available. If radiotherapy is unavoidable, use the shortest safe form of treatment38, 116
* Treat all emergency and urgent patients where alternative management to radiotherapy is not possible; prioritise patients with rapidly progressing, potentially curable tumours, and patients already on treatment38, 39
* Discuss the risks and benefits of changing treatment schedules or interrupting treatment, with patients, their families and carers, and record the reasoning behind the decision38
* When modifying individual patient’s radiotherapy treatment plans, take their clinical circumstances into account, involve the multidisciplinary team and record the reasoning behind each decision38

**Systemic treatments*** Discuss the risks and benefits of starting, continuing or deferring systemic treatment, including discussion of risk factors for serious pandemic infection, any uncertainty about effect of systemic treatments and goals of treatment, with patients, their families and carers, and reach a shared decision, documenting the reasoning behind the decision17, 32
* If systemic treatments need to be prioritised, make prioritisation decisions as part of a multidisciplinary team on an individual basis and communicate clearly with patients, documenting the reasoning behind the decision17, 32
* Consider using less frequent immunotherapy regimens and consider the potential harms and benefits of therapy for each patient32, 73
* Consider deferring commencement of regimens associated with high risk of needing admission34
* Consider starting with a less toxic regimen, reducing use of combination immunotherapy agents that, although can have survival advantages, have a much higher risk of toxicity (including pneumonitis) requiring hospital admission34, 73
* Testing for the pandemic infection should be undertaken if feasible for cancer patients requiring admission to hospital regardless of symptoms if considered at high risk of mortality from the infection, or prior to starting immunosuppressive therapy (e.g., cytotoxic chemotherapy, stem cell transplantation, biologic therapy), or invasive procedures37, 40, 115
* Supportive care interventions should be provided for chemotherapy complications such as anaemia, febrile neutropenia, thrombocytopenia-related complications, thromboembolic events, chemotherapy-induced nausea and vomiting, to minimise patients’ risk of infection and need for hospitalisation117, 118
* Limit patient visitors or support persons in hospitals (except at end-of-life)
 | * Delay face-to-face follow-up appointments (as well as any hospital imaging and/or blood tests) and utilise telehealth for patients where possible\*32
* Consider innovative models of care e.g. shared follow-up care with GP
* Healthcare providers should be vigilant in psychosocial screening for signs of anxiety, depression and distress, and should ensure that psychosocial support is provided34
 | * Minimise commencement of IV treatment for patients with refractory/resistant disease or palliative regimens with a low likelihood of response/benefit
* Limit patient visitors or support persons in hospitals (except at end-of-life)
* If radiotherapy is needed for symptom control, use the shortest safe form of treatment38, 120
 | * Consider ceasing palliative treatments that have minimal chance of substantial benefit
* Prioritise management of patients with urgent symptomatic need39, 120
* Enhance provision of supportive and palliative care through innovative models of care, e.g. virtual hospitals delivering care in the home34
* Advance care planning and goals of care should be discussed with patients and appropriately documented (e.g. by using an Advanced Care Directive)34, 73
 |
|  | **Prevention and early detection** | **Presentation, initial investigations and referral** | **Diagnosis, staging and treatment planning** | **Treatment** | **Care after initial treatment and recovery** | **Managing recurrent, residual or metastatic disease** | **End-of-life care** |
| **Recovery** **Phase** | Considerations for reintroduction of services should include the local levels of pandemic infection transmission, the local or regional health system capacity and availability of resources. These considerations may change over time and vary by service type and setting.35, 39Gradually reintroduce standard of care according to perceived risk, prioritising patients at high risk (such as those most at-risk for complications from delayed care, or those with high risk of cancer progression or recurrence) with consideration of each individual patient's risk of exposure to the pandemic infection due to the resumption of care.35, 121Vaccination, if vaccination against the pandemic pathogen is available, should be offered to cancer patients, with consideration of any vaccine contraindications, type of cancer, type and timing of treatment and level of immunocompromise.104-107 |
| Past the peak of pandemic infection with fewer new daily cases, health system capacity not exceeded; hospital supplies and healthcare staff resources are more available, including hospital and ICU beds, ventilators, blood, healthy staff, PPE and critical testing. | * Gradual reintroduction of routine population-based cancer screening with consideration of local conditions and resource availability35, 39
* Prioritise delayed or high-risk patients35
* Consider social distancing in planning screening appointments and delivering screening interventions37, 79
 | * Encourage community to continue to present to GP with ‘red flag’ symptoms of cancer
* Appropriately investigate and refer patients with symptoms suspicious for cancer to a specialist linked to a multidisciplinary team33
 | * Prioritise diagnostic procedures for patients with symptoms and test results suspicious for cancer33, including colonoscopy for positive bowel cancer screening, and utilise telehealth where possible\*39
 | **Surgery*** Gradual re-introduction of routine surgery, up to limit of capacity/resources, according to jurisdictional guidelines
* Non-surgical options such as neoadjuvant treatment may be considered if appropriate, with input from a multidisciplinary team if the outcomes are similar31, 73
* Prioritise high-risk patients and patients whose surgery was delayed due to the pandemic39

**Radiation therapy*** Continue hypofractionation where appropriate31, 119; gradual reintroduction of more appropriate/cost-effective fractionation

**Systemic treatments*** Commence or re-start as appropriate, adjuvant treatment that was deferred or interrupted
 | * Prioritise follow-up appointments (as well as any hospital imaging and/or blood tests) for high-risk patients and patients whose appointments were delayed during acute phases35
 | * Gradual reintroduction of standard of care according to perceived risk; prioritising high-risk patients, depending on the environmental circumstances and each individual patient's risk of exposure to the pandemic infection due to the resumption of care35, 121
 | * Gradual reintroduction of face-to-face care according to perceived risk; prioritising high-risk patients, depending on the environmental circumstances and each individual patient's risk of exposure to the pandemic infection due to the resumption of care35, 121
 |

\* For telehealth services, videoconferencing is the preferred substitute for a face-to-face consultation.122, 123

# Summary conceptual framework for cancer care during a pandemic

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|  **Principles underpinning optimal cancer care**Patient-centred care, Safe and quality care, Multidisciplinary care, Supportive care, Care coordination, Communication, Research and clinical trials |
| **Pandemic phase** incorporating changing health system capacity and pandemic progression | **Steps of the cancer care continuum** |
| **Prevention and early detection** | **Presentation, initial investigations and referral** | **Diagnosis, staging and treatment planning** | **Treatment** | **Care after initial treatment and recovery** | **Managing recurrent, residual or metastatic disease** | **End-of-life care** |
| **Acute Phase I**Semi-urgent setting. Few pandemic infection patients and numbers not rapidly escalating, demand within health system capacity. | Continue population-based cancer screening, with appropriate social distancing. 35, 37, 79 | Continue initial investigations with use of telehealth where possible[[2]](#footnote-3); encourage community members to present to GP with ‘red flag’ symptoms of cancer. | Prioritise diagnostic procedures for patients with symptoms and test results suspicious for cancer and utilise telehealth where possible\*.33, 39 | Determine if surgery is elective (can be delayed without a predicted negative outcome);10 consider modifications to radiotherapy (e.g. hypofractionation) 38, 116 and to systemic treatments (e.g. oral, shorter regimens). 32, 34 | Consider shared follow-up care, utilising telehealth where possible\*; 32, 115 screen patients for distress and provide psychosocial support.34 | Consider modifying treatments for patients with refractory/ resistant disease; or treatment breaks for patients with low-volume and/or stable metastatic disease.34 | Consider utilising telehealth120 and community palliative care services34 where possible\*; discuss goals of care and advance care planning.34, 73 |
| **Acute Phase II**Urgent setting.Rapidly escalating numbers of pandemic infection patients, approaching limits of health system capacity. | Consider reduction of routine population-based cancer screening according to resource availability35, 39, 79, but for the least possible time during prolonged acute phases.Follow up abnormal screening results in patients already screened, prioritising those highly suspicious for cancer.39 | Continue initial investigations with use of telehealth where possible\*; encourage community members to present to GP with ‘red flag’ symptoms of cancer. | Prioritise diagnostic procedures for patients with symptoms and test results suspicious for cancer and utilise telehealth where possible\*. 33, 39 | Prioritise surgery patients by urgency;31, 39 consider delay in commencement of radiotherapy unless urgent;38, 39 modify systemic treatment as feasible (e.g. oral or less toxic regimens).32, 36,34, 73 Limit patient visitors or support persons in hospitals (except at end-of-life). | Delay face-to-face follow-up appointments and utilise telehealth where possible\*;32 consider innovative models of care e.g. shared follow-up care with GP; screen patients for distress and provide psychosocial support. 34 | Minimise commencement of IV treatment for patients with refractory/ resistant disease; consider deferring palliative radiation therapy treatments119, except where these are for life-threatening or urgent conditions.38 Limit patient visitors or support persons in hospitals (except at end-of-life). | Consider utilising telehealth120 and community palliative care services34 where possible\*; discuss goals of care and advance care planning.34, 73 |
| **Acute Phase III**Emergency setting. High numbers of pandemic infection patients, health system capacity exceeded. | Consider reduction or deferral of routine population-based cancer screening 35, 39, 79, but for the least possible time during prolonged acute phases.Follow up abnormal screening results in patients already screened, prioritising those highly suspicious for cancer.39 | Appropriately investigate and refer patients with symptoms, with use of telehealth where possible\*; encourage community members to present to GP with ‘red flag’ symptoms of cancer. | Prioritise diagnostic procedures for patients with test results highly suspicious for cancer and utilise telehealth where possible\*.33, 39 | Prioritise surgery for life-threatening conditions;31, 39 defer or avoid radiotherapy if clinically appropriate and use shortest safe regimen;38, 39, 116 discuss risks and benefits of starting or changing systemic treatment and reach a shared decision.17,32 Limit patient visitors or support persons in hospitals (except at end-of-life). | Delay face-to-face follow-up appointments and utilise telehealth where possible\*;32 consider innovative models of care e.g. shared follow-up care with GP; screen patients for distress and provide psychosocial support.34 | Minimise commencement of IV treatment for patients with refractory/ resistant disease or palliative regimens with a low likelihood of response/benefit; if radiotherapy is needed for symptom control, use the shortest safe form of treatment.38, 120 Limit patient visitors or support persons in hospitals (except at end-of-life). | Consider ceasing palliative treatments that have minimal chance of substantial benefit; prioritise management of patients with urgent symptomatic need;39, 120 discuss goals of care and advance care planning.34, 73 |
| **Recovery Phase**Past the peak of pandemic infection with fewer new daily cases, health system capacity not exceeded. | Considerations for reintroduction of services should include the local levels of pandemic infection transmission, the local or regional health system capacity and availability of resources. These considerations may change over time and vary by service type and setting.35, 39Gradually reintroduce the standard of care according to perceived risk, prioritising patients at high risk (such as those most at-risk for complications from delayed care, or those with high risk of cancer progression or recurrence) with consideration of each individual patient’s risk of exposure to the pandemic infection due to the resumption of care. 35, 121 |
| Gradually reintroduce routine population-based cancer screening with consideration of local conditions and resource availability.35, 39 Prioritise appointments for participants whose screening appointment was delayed or for high-risk patients.35 | Appropriately investigate and refer patients with symptoms; encourage community members to present to GP with ‘red flag’ symptoms of cancer. | Prioritise diagnostic procedures for patients with test results highly suspicious for cancer and utilise telehealth where possible\*.33, 39 | Gradually reintroduce routine surgery up to capacity limits and prioritise high-risk patients and patients whose surgery was delayed due to the pandemic;39 continue hypofractionation where appropriate;31, 119 commence or re-start as appropriate, adjuvant treatment that was deferred or interrupted. | Prioritise follow-up appointments (as well as any hospital imaging and/or blood tests) for high-risk patients and patients whose appointments were delayed during acute pandemic phases.35 | Gradually reintroduce standard of care according to perceived risk, prioritising high-risk patients, depending on the environmental circumstances and each individual patient's risk of exposure to the pandemic infection due to the resumption of care.35, 121 | Gradually reintroduce standard of care according to perceived risk, prioritising high-risk patients, depending on the environmental circumstances and each individual patient's risk of exposure to the pandemic infection due to the resumption of care.35, 121 |
| *Vaccination, if vaccination against the pandemic pathogen is available, should be offered to cancer patients with consideration of any vaccine contraindications, type of cancer, type and timing of treatment and level of immunocompromise.104-107* |

# Conclusion

The COVID-19 pandemic has impacted cancer care due to reduced health system resources available for cancer care and the need to minimise the risk of COVID-19 infection in cancer patients. The ongoing progression of the pandemic has provided an opportunity to examine the evidence base and reflect on learnings from the COVID-19 pandemic in the context of the rationale and content of the conceptual framework for cancer care, developed early in the current pandemic.

The importance of preventing COVID-19 infection in cancer patients is predicated by the evidence showing the increased impact of the pandemic infection among cancer patients compared to patients without cancer. However, the implications of reducing or delaying cancer care across the care continuum, including the impact of rapid shut-down and slow ramping-up of services on patient backlogs, are substantial and significant.

Evidence from the COVID-19 pandemic supports the continuation of cancer care wherever possible during a similar pandemic, to achieve the best outcomes for cancer patients and the community, and minimise the adverse impacts of the pandemic on cancer care. Underpinned by principles for optimal cancer care and informed by the evidence on cancer care during the COVID-19 pandemic, Cancer Australia’s conceptual framework provides detailed guidance on critical considerations for cancer care during a pandemic.

The updated conceptual framework provides an evidence-based ‘toolkit’ for cancer care during the current COVID-19 pandemic and future similar pandemics. It reflects changing health system capacity and capacity for cancer care, enabling its broad applicability to different global contexts and is consolidated by consideration of best-practice principles for cancer care. The framework provides a planning resource for multiple stakeholders including health services and policy makers. Emerging evidence and data will continue to inform the evolution of the framework to guide ongoing cancer care during this and future pandemics.

Appendix A Summary extraction table of guidance from peak cancer organisations on cancer care during a pandemic

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| **Organisation/ author and title/****Link****Date** | **Scope/area covered by Guidance** | **Main points in guidance** |
| **ASCO**Pennel et al[American Society of Clinical Oncology Road to Recovery Report: Learning From the COVID-19 Experience to Improve Clinical Research and Cancer Care | Journal of Clinical Oncology (ascopubs.org)](https://ascopubs.org/doi/10.1200/JCO.20.02953)December 2020 | ‘American Society of Clinical Oncology’s (ASCO’s) evaluation of the adaptations in care delivery, research operations, and regulatory oversight made in response to the coronavirus pandemic and presents recommendations for moving forward as the pandemic recedes.’Encompasses recommendations for:* clinical research (under 5 goals)
* cancer care delivery (under 5 goals)
 | Specific recommendations are included under 5 goal areas for clinical research and cancer care delivery.**Clinical research:**Goal 1. ensure that clinical research is accessible, affordable, and equitableGoal 2. design more pragmatic and efficient clinical trialsGoal 3. minimize administrative and regulatory burdens on research sitesGoal 4. recruit, retain, and support a well-trained clinical research workforceGoal 5. promote appropriate oversight and review of clinical trial conduct and results. **Cancer care delivery:** Goal 1. promote and protect equitable access to high-quality cancer careGoal 2. support safe delivery of high-quality cancer careGoal 3. advance policies to ensure oncology providers have sufficient resources to provide high-quality patient careGoal 4. recognize and address threats to clinician, provider, and patient well-beingGoal 5. improve patient access to high-quality cancer care via telemedicine. |
| [ASCO SPECIAL REPORT:](https://www.asco.org/sites/new-www.asco.org/files/content-files/2020-ASCO-Guide-Cancer-COVID19.pdf) [ASCO Special Report: A Guide to Cancer Care Delivery During the COVID-19 Pandemic](https://www.asco.org/sites/new-www.asco.org/files/content-files/2020-ASCO-Guide-Cancer-COVID19.pdf)(Updated December 2020) | Report ‘describes immediate and short-term steps oncology practices can take to protect the safety of patients and healthcare staff as the pandemic response continues’ and ‘represents a narrative review of available agency guidance, published information and clinical examples from ASCO members, government agencies, and professional organisations.’ | ‘The ASCO special report summarizes a wide range of policies and practices developed by cancer facilities, as well as guidance provided by government agencies and other medical societies, including:* Best practices for triaging/screening patients before appointments to reduce infection risk
* Guidance for providing cancer care to patients who are COVID-19-positive or being monitored for COVID-19
* Considerations for communicating with staff and patients about new protocols to protect patient health and safety
* Suggested policies and protocols for limiting infection spread by health care personnel through screening, testing, modified sick leave, work-from-home policies, and other measures
* Guidance for establishing physical distancing policies in clinical, administrative, and non-patient care areas of cancer facilities.

The ASCO guide also addresses best practices for prioritizing and scheduling telemedicine visits, and it provides suggestions for when and how to re-establish cancer screenings and other critical cancer care, including medical oncology, radiation oncology, surgery, and ancillary services.’ |
| ASCOMarron et al [Ethics and Resource Scarcity: ASCO Recommendations for the Oncology Community During the COVID-19 Pandemic | Journal of Clinical Oncology (ascopubs.org)](https://ascopubs.org/doi/pdf/10.1200/JCO.20.00960)April 2020 | ‘ASCO’s intentions with this document are: to recommend practical, actionable, and ethically sound policies at the health-system level for allocation of resources, especially critical care resources; to promote the involvement of oncologists in the implementation and, when possible, the development of these policies to account for the needs of patients with cancer and their care teams; and to offer guidance to oncologists for the role that they might play as they develop and adapt to altered standards that affect care for their patients during these challenging situations.’ | ‘Summary of Recommendations:* Allocation of scarce resources in a pandemic should be based on maximizing health benefits.
* A fair and consistent prioritization and allocation policy should be developed before allocation becomes necessary.
* ASCO recommends The Hastings Center’s “Ethical Framework for Health Care Institutions & Guidelines for Institutional Ethics Services Responding to the Coronavirus Pandemic” as a model for approaching ethical decision making in the context of COVID-19 and resource shortages.
* Another useful framework, which provides practical guidance for those making difficult decisions under conditions of severe shortage, is the University of Pittsburgh’s “Allocation of Scarce Critical Care Resources During a Public Health Emergency”[2](https://ascopubs.org/doi/full/10.1200/JCO.20.00960),[3](https://ascopubs.org/doi/full/10.1200/JCO.20.00960) with the following clarification regarding multiprinciple scoring systems:

○ If a policy takes pre-existing life-limiting diseases into account, it should do so consistently across types of disease and should consider evidence-based information regarding life expectancy.○ All cancer diagnoses and prognoses should be considered individually, with input from the treating oncologist. Cancer diagnosis alone should not be considered terminal, even for patients living with advanced or metastatic disease. Consideration of cancer as either a major or severely life-limiting comorbidity should reflect evidence-based factors, including the individual patient’s clinical status and prognosis.* Decisions regarding allocation of scarce resources should be separated from bedside decision making. The oncologist caring for a patient should not make scarce resource allocation decisions about that patient.
* Oncologists should work with their institutions on how best to use scarce resources for care and support of patients with cancer.
* Oncologists should communicate allocation plans and decisions to their patients with compassion and honesty, and health care institutions should offer support to oncologists in these communications.
* Oncologists should engage in advance care planning discussions with their patients and carefully document patient preferences for goals of care, particularly end-of-life care.’
 |
| [ASCO Coronavirus Resources | ASCO](https://www.asco.org/asco-coronavirus-information) | ASCO webpages:[General Information about COVID-19 & Cancer | ASCO](https://www.asco.org/asco-coronavirus-resources/care-individuals-cancer-during-covid-19/general-information-about-covid-19) (April 2021)[Cancer Screening, Diagnosis, Staging & Surveillance | ASCO](https://www.asco.org/asco-coronavirus-resources/care-individuals-cancer-during-covid-19/cancer-screening-diagnosis-staging) (April 2021)[Disease-Specific Information | ASCO](https://www.asco.org/asco-coronavirus-resources/care-individuals-cancer-during-covid-19/disease-specific-information) (April 2021)[Cancer Treatment & Supportive Care | ASCO](https://www.asco.org/asco-coronavirus-resources/care-individuals-cancer-during-covid-19/cancer-treatment-supportive-care) (April 2021) | ‘Cancer Treatment & Supportive Care’ includes the following topics:* Anti-cancer Therapy for Patients with COVID-19 Infection: Should cancer therapy be delayed in patients who are infected with COVID-19?
* Surgery: Can/should surgery be canceled or delayed?  If surgery is delayed, should patients be started earlier on neoadjuvant therapy if that is an available option?
* Radiation: Can/should the initiation of radiation be delayed? Can radiation be interrupted or postponed if already in progress?
* Immune Checkpoint Inhibitors: Can/should treatment with immune checkpoint inhibitors (e.g. ipilimumab, nivolumab) be delayed or interrupted? Are any special precautions or actions needed with respect to their use?
* Advance Care Planning: Should we discuss code status with patients on active treatment?
 |
|  | [COVID-19 Vaccines & Patients with Cancer | ASCO](https://www.asco.org/asco-coronavirus-resources/covid-19-vaccines-patients-cancer) (April 2021) | Guidance on COVID-19 vaccination, including:* Should people with cancer be vaccinated against COVID-19?

At this time, patients with cancer may be offered vaccination against COVID-19 as long as components of that vaccine are not contraindicated. * Should people undergoing active treatment for cancer be vaccinated against COVID-19?

At this time, patients undergoing treatment may be offered vaccination against COVID-19 as long as any components of the vaccine are not contraindicated. Oncologists have experience providing other types of vaccines to patients receiving treatment for cancer, including chemotherapy, immunotherapy, radiation therapy or stem cell transplantation.* Should cancer survivors be vaccinated against COVID-19?

Cancer survivors may be offered vaccination against COVID-19 as long as any components of the vaccine are not contraindicated.* Are there people who should not be vaccinated?

At this time, only those with contraindications to a specific vaccine component should not be offered vaccination with that specific product. These contraindications are described in detail in [CDC interim clinical guidance](https://www.cdc.gov/vaccines/covid-19/info-by-product/clinical-considerations.html#Contraindications).* What other concerns are there for people with cancer who are vaccinated?

As there is still uncertainty around the extent to which immunocompromised patients with cancer will develop immunity in response to vaccination, vaccinated patients should continue to follow current guidance to protect themselves from exposure to COVID-19.  |
| ASCOJazieh et al.[Delivering Cancer Care During the COVID-19 Pandemic: Recommendations and Lessons Learned From ASCO Global Webinars | JCO Global Oncology (ascopubs.org)](https://ascopubs.org/doi/full/10.1200/GO.20.00423)Sept 2020 | This article does not appear on the ASCO website as a COVID-19 resource. The article summarises consensus recommendations from experts who participated in ASCO’s global webinar series.Consensus recommendations under 7 categories. | Consensus recommendations are provided under the 7 categories, with detailed tables of recommendations/guidance for the categories: risk minimisation, care prioritisation, health care team management, clinical research and recovery plans. A more general section: ‘Recommendations from different regions and disciplines’, includes the text:The guiding principle of delivering care during the COVID-19 pandemic is to do so in a safe environment for patients and the health care team, prioritizing treatment of patients with curative intent, as well as providing for those in need of symptomatic palliation. Patient care should be prioritized to balance the risk of COVID-19 disease and the underlying cancer condition (ie, early-stage v late-stage disease). Treatment needs to be tailored to the individual, and, when possible, plans should be simplified to minimize the number of required in-person health care visits. For patients receiving radiotherapy, abbreviated fractionation schemes should be considered to reduce the time to deliver radiotherapy and potential viral exposure.[31](https://ascopubs.org/doi/full/10.1200/GO.20.00423),[32](https://ascopubs.org/doi/full/10.1200/GO.20.00423) For those cancers whose treatment course could be delayed with neoadjuvant systemic therapy, the pros and cons of delaying surgery and radiotherapy should be discussed.Communication and coordination of care remains a priority before resuming normal hospital activities. Therefore, scheduling the patients previously postponed for screening or treatment should take priority.[33](https://ascopubs.org/doi/full/10.1200/GO.20.00423),[34](https://ascopubs.org/doi/full/10.1200/GO.20.00423)Patients who are experiencing anxiety regarding the safety of being treated must be reassured as they transition between different diagnostic and therapeutic services, such as radiology, pathology, surgery, radiation oncology, and medical oncology. |
| **ASTRO**[FAQs - COVID-19 Resources - American Society for Radiation Oncology (ASTRO) - American Society for Radiation Oncology (ASTRO)](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs)Updated June 2020 | FAQs and clinical recommendations.Mostly consensus-based, many sources provided. | FAQs addressed:[1. What is a pandemic?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q1)[2. What is coronavirus? What are the signs and symptoms of coronavirus?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q2)[3. What is the best estimate for the incubation time after exposure?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q3)[4. Are there guidelines for a practice to follow if a patient tests positive for COVID-19? If a patient is seen at an outpatient clinic, should the clinic be quarantined?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q4)[5. Is it recommended that patients on treatment and neutropenic but who are not hospitalized wear a mask outdoors? Is an N95 necessary?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q5)[6. How should radiation oncology departments prepare for significant resource depletion and/or staff shortages with the COVID-19 outbreak?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q6)[7. Should I wear gloves during a routine physical exam on an asymptomatic patient with no risk factors?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q7)[8. Should we be delaying new consult/starts of patients who can be triaged for two to three (e.g., prostate cancers on ADT) when significant community spread of COVID-19 is detectable in our area? Should we delay new starts of more indolent cancers (e.g., skin cancers, new adjuvant breast radiation, new prostate radiation, etc.)?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q8)[9. Should we assess patients via telephone or telemedicine to avoid entering the hospital?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q9)[10. What measures should we take regarding routine follow-up visits for patients in surveillance who are not feeling ill? When a physical exam is important and telehealth is not a good option, should we be proactive and reschedule or should we continue to see them as scheduled?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q10)[11. How should patients be assessed prior to entering the clinic? What questions should patients be asked when being screened? What should be done with screening-positive patients?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q11)[12. What are some practical steps that can be done to protect clinic staff?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q12)[13. What is the best way to disinfect the clinic?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q13)[14. How can we limit patient volume in the clinic to decrease the risk to staff?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q14)[15. What sort of education should we be providing to patients and their families?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q15)[16. How should we treat patients who are infected with COVID-19?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q16)[17. What changes are recommended for RO residency programs?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q17)[18. Are there any issues related to quality and safety that my department should consider due to COVID-19-based changes to our process of care?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#q18)[19. Can we use a linear accelerator to sterilize PPE?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#19)[20. Is a DIY cloth mask a substitute for an N95 mask?](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/COVID-19-FAQ-Updates/COVID-19-FAQs#20) |
| ASTRO[COVID-19 Recommendations and Information - American Society for Radiation Oncology (ASTRO) - American Society for Radiation Oncology (ASTRO)](https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/Clinical-Guidance)January 2021 | Webpage that includes: ASTRO Recommendation on COVID-19 Vaccination for Cancer Patients Receiving Radiation Therapy.Webpage also lists links to publications/other websites for clinical guidance | Clinical guidance section includes:‘Hypofractionation has been demonstrated to be equally effective as standard conventional courses of radiation therapy in specific clinical situations. ASTRO supports the use of hypofractionated regimens in disease sites where the treating radiation oncologist determines it is a reasonable approach.’ |
| **CDC (USA)**[Non-COVID-19 Care Framework | CDC](https://www.cdc.gov/coronavirus/2019-ncov/hcp/framework-non-COVID-care.html)Updated June 2020 | Webpage with a framework to deliver non-COVID-19 health care during the COVID-19 pandemic. | This framework (which is not cancer-specific) provides a matrix using the categories:* potential for patient harm (highly likely, less likely, unlikely)
* degree of community transmission (substantial, minimal to moderate, or no to minimal community transmission)
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| CDC[Scientific Evidence for Conditions that Increase Risk of Severe Illness | COVID-19 | CDC](https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/underlying-evidence-table.html)2021 | Science Brief: Evidence used to update the list of underlying medical conditions that increase a person’s risk of severe illness from COVID-19. | List of underlying medical conditions, including cancer, that put adults of any age at higher risk for severe illness from the virus that causes COVID-19 and the supporting evidence base (for cancer, the evidence base: 2 Systematic Reviews; 3 Cohort Studies; 3 Case Series; and one Case Control Study.) |
| **ESMO** Curigliano et al [Managing cancer patients during the COVID-19 pandemic (esmo.org)](https://www.esmo.org/guidelines/cancer-patient-management-during-the-covid-19-pandemic/consensus-recommendations-managing-cancer-patients-during-the-covid-19-pandemic)July 2020 | Multidisciplinary expert panel and virtual consensus meeting developed expert consensus statements under 10 ‘Working package’ (WP) areas:1. Strategies for patient management and follow-up
2. Prevention of SARS-CoV-2 infection in cancer patients and prioritisation of cancer care
3. G-CSF use and thromboprophylaxis in cancer patients during the COVID-19 pandemic: benefits, risks and impact in COVID-19-negative and COVID-19-positive cancer patients
4. COVID-19 testing: who, when and how (PCR, serology)
5. Use of immunotherapy
6. Use of targeted TKI therapies
7. Implementation of adjuvant/neoadjuvant ChT
8. RT strategies during the COVID-19 pandemic
9. Prioritisation of cancer care and ICU triage in cancer patients/rehabilitation after COVID-19 infection
10. Clinical trial activities in the COVID-19 era
 | 28 main consensus statements are provided under the 10 working package areas. References are included in the text for the Statements. Some of the more general statements include:STATEMENT 1: Telehealth and digital health in oncology can be an excellent tool for real-time video consultations for primary care triage and interventions such as counselling, medication prescribing and management, management of long-term treatment and post-discharge coordination supported by remote-monitoring capabilities. It can also be an excellent tool for wellness interventions and in areas such as health education, physical activity, diet monitoring, health risk assessment, medication adherence and cognitive fitness.STATEMENT 2: Cancer care prioritisation and cancer care intensity should be adapted to the pandemic scenario (from 1 to 4 according to the ECDC), to local R0 index and to health facilities and resources.STATEMENT 3: When feasible in the context of available resources, cancer patients requiring admission to hospital for cancer treatment should be tested for SARS-CoV-2 regardless of symptoms or chest radiological findings if considered at high risk of mortality in case of SARS-CoV-2 infection.STATEMENT 4: Perform a point-of-care risk assessment to assess the likelihood of SARS-CoV-2 infection, including the clinical presentation of the patient and a review of clinical, epidemiological and travel history. This should aim to achieve a rapid evaluation of the risk of infectiousness based on signs, symptoms and the procedures likely to result in infectious respiratory droplets and aerosols.STATEMENT 5: PPE should be provided to all health care professionals and used meticulously. Health care workers in enclosed spaces should wear eye protection, a gown and a surgical mask or, if available, an FFP, and practice hand hygiene or protection (gloves). Swab testing should be offered to all symptomatic health professionals. |
| ESMO [Cancer Patient Management During the COVID-19 Pandemic | ESMO](https://www.esmo.org/guidelines/cancer-patient-management-during-the-covid-19-pandemic)2020 | Online resourceHeading areas:* Who is at specific risk?
* Treatment decision recommendations
* Cancer patient prioritisation

Guidance is also provided online for specific cancers, including brain, breast, GIT, gynae, lung.Also guidance is provided online for Palliative care and Supportive care:[Palliative Care in the COVID-19 era | ESMO](https://www.esmo.org/guidelines/cancer-patient-management-during-the-covid-19-pandemic/palliative-care-in-the-covid-19-era)[Supportive Care in the COVID-19 era | ESMO](https://www.esmo.org/guidelines/cancer-patient-management-during-the-covid-19-pandemic/supportive-care-in-the-covid-19-era) | Selected text from the 3 heading areas in the online material:**Who is at specific risk?**Therefore, during the COVID-19 pandemic, the Benefit/Risk ratio of cancer treatment may need to be reconsidered in certain patients.Two groups of patients have been identified: “patients off therapy” (A) who have completed a treatment or have disease under control (off therapy); and patients under treatment (neoadjuvant or adjuvant curative treatment or treatment for metastatic disease) (B). Patients with “active disease” can be eligible for surgery, chemotherapy and/or radiotherapy, biological therapy, endocrine therapy and immunotherapy (either in the adjuvant or in in the metastatic setting).In cancer patients, categories at risk include:* Patients receiving chemotherapy, or who have received chemotherapy in the last 3 months
* Patients receiving extensive radiotherapy
* People who have had bone marrow or stem cell transplants in the last 6 months, or who are still taking immunosuppressive drugs
* People with some types of blood or lymphatic system cancer which damage the immune system, even if they have not needed treatment (for example, chronic leukaemia, lymphoma or myeloma).

**Specific risk groups are cancer patients with an impaired immune system such as:*** Leukocytopaenia
* Low immunoglobulin levels
* Long lasting immunosuppression (steroids, antibodies)

**Treatment decision recommendations*** Communication, discussion with other professionals and with patients preferably by phone rather than face-to-face is strongly recommended
* Decisions for treatment initiation or continuation must be discussed for both uninfected patients and SARS-CoV2-positive patients if they are a- or pauci-symptomatic, still fit to be treated and willing to do so after proper risk/benefit explanation
* Discuss the benefits and risks of present cancer therapy in the setting of the COVID-19 pandemic: treatment setting, disease prognosis, patient comorbidities, patient preferences, probability and risks from COVID-19 infection.

**Cancer patient prioritisation**The tiered approach of ESMO in delivering a guidance for cancer patients during the COVID-19 pandemic is designed across three levels of priorities, namely: tier 1 (high priority intervention), 2 (medium priority) and 3 (low priority) – defined according to the criteria of the Cancer Care Ontario, Huntsman Cancer Institute and ESMO-Magnitude of Clinical Benefit Scale (ESMO-MCBS), incorporating the information on the value-based prioritisation and clinical cogency of the interventions* High priority: Patient's condition is immediately life threatening, clinically unstable, and/or the magnitude of benefit qualifies the intervention as high priority (e.g. significant overall survival [OS] gain and/or substantial improvement in quality of life [QoL]);
* Medium priority: Patient's situation is non-critical but delay beyond 6 weeks could potentially impact overall outcome and/or the magnitude of benefit qualifies for intermediate priority;
* Low priority: Patient's condition is stable enough that services can be delayed for the duration of the COVID-19 pandemic and/or the intervention is non-priority based on the magnitude of benefit (e.g. no survival gain with no change nor reduced QoL).
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| ESMO[COVID-19 vaccination (esmo.org)](https://www.esmo.org/covid-19-and-cancer/covid-19-vaccination)December 2020; updated 27 April 2021. | ESMO statements for vaccination against covid-19 in patients with cancer | Statements:* Effective and safe vaccines against COVID-19, authorised after thorough, independent and robust scientific review by regulatory authorities, should be administered in the context of operationally sound vaccination programmes [V]. A pharmacovigilance plan is mandatory in the context of the vaccination programme.
* Effective mass vaccination programmes coupled to robust pharmacovigilance are key for preventing infections and emergence of viral mutations, while safeguarding favourable vaccine risk/benefit profiles [V].
* Ongoing scientific assessment by medical and regulatory authorities underpins the safe and effective use of COVID-19 vaccines. Use of the vaccine during vaccination campaigns take into account the pandemic situation and vaccine availability at national level.
* Continued research in the context of clinical trials and registries as well as in-trial and post-trial follow-up is advised in order to generate more data on vaccine efficacy and safety in the general population as well as in special populations, including patients with active cancer or history of cancer [V].
* Patients with cancer have an increased risk of severe COVID-19 (i.e. haematological malignancy requiring chemotherapy or active, advanced solid tumour or history of solid tumour <5 years ago) and should be vaccinated against SARS-CoV-2 regardless of any other indications (i.e. age) and positioned at high prioritisation [V]. Patients who have received B cell depletion in the past 6 months may derive reduced protection. The time-point for vaccination after allogeneic stem cell transplantation should follow general recommendations – usually, in the absence of graft-versus-host disease (GvHD), the vaccine can be applied 6 months post stem cell transplantation [V]. Patients in clinical trials, e.g. immunotherapy, should not be deprived of COVID-19 vaccination; therefore, efforts should be made for clinical trial protocols to allow concurrent COvID-19 vaccines.
* Healthcare workers caring for patients with cancer with increased risk should be prioritised in receiving vaccination to minimise nosocomial transmission [III].
* The efficacy and duration of immunity in patients with cancer are still unknown and unexplored. Given the often-immune compromised status and the frailty of these patients, we suggest monitoring in the context of registries and dedicated clinical trials [V].

Close surveillance and monitoring of patients with cancer is required after COVID-19 vaccination to assess potential adverse events and measure clinical outcomes, e.g. infection, severity and mortality from COVID-19, complications from cancer, etc. [V].* Physical distancing measures, masks, face shields, sanitizers and other hygiene measures are still required during the pandemic, including for patients with cancer, and should certainly accompany the vaccination strategies [V].
* Accumulated evidence from influenza vaccinations suggests that patients with cancer are able to mount a protective immune response from anti-SARS-CoV-2 vaccines, though the level of immunity may be modulated by a range of factors (type of malignancy, antineoplastic therapies and timing of administration, pre-existing immune dysfunction, fitness) [V]. Data on the interaction of such factors with vaccine-induced immunity in patients with cancer are needed.
* Although no established safety concerns, distinct from the general population, are evident in patients with cancer, there is a clear need to generate data on preference of vaccine technology and interaction of SARS-CoV-2 vaccines with antineoplastic therapies, potentially impacting on efficacy, dosing or toxicity, via in-trial, post-trial and registry monitoring [V].
* While acknowledging the need to generate data in the context of trials or registries, in order to refine the risk/benefit profile and prioritise subgroups of patients with cancer for anti-SARS-CoV-2 vaccination, we propose a four-step process [V]:
	+ Step 1: Consider the phase of malignant disease and therapy: active cancer on treatment, chronic disease after treatment or survivorship.
	+ Step 2: Consider age, fitness/ performance status and medical comorbidities as general risk factors; specifically, anaphylactic history, obesity, diabetes mellitus, hypertension, respiratory, cardiac and renal disorders, hypercoagulability.
	+ Step 3: Consider vaccine-related interactions on the tumour and on the treatment efficacy.
	+ Step 4: Secure informed consent and improve shared decision making.
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| **ESTRO**["Radiotherapy in a time of crisis".](https://www.estro.org/About/Newsroom/News/Radiotherapy-in-a-time-of-crisis)Undated | Statement from ESTRO Presidents | Headings include:* Should all new patients still start their treatment, or should it be delayed?
* What to do if a patient under treatment becomes infected?
* What to do when the staffing in the radiotherapy department becomes critical?
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| **NICE**[Overview | COVID-19 rapid guideline: delivery of systemic anticancer treatments | Guidance | NICE](https://www.nice.org.uk/guidance/ng161)Rapid guideline published March 2020 and updated February 2021 | Rapid guideline developed ‘using the [interim process and methods for developing rapid guidelines on COVID-19](https://www.nice.org.uk/process/pmg35) in response to the rapidly evolving situation.’Supporting rapid evidence review:[NG161 and NG161 The effects of systemic anticancer treatment (SACT) or radiotherapy on risk of severe illness or death in patients with cancer and COVID-19: rapid evidence review (nice.org.uk)](https://www.nice.org.uk/guidance/ng161/evidence/the-effects-of-systemic-anticancer-treatment-sact-or-radiotherapy-on-risk-of-severe-illness-or-death-in-patients-with-cancer-and-covid19-rapid-evidence-review-pdf-9013195261)(February 2021) | Guidance on systemic anticancer treatments includes:1. Communicating with patients and minimising risk* [All patients](https://www.nice.org.uk/guidance/ng161/chapter/1-Communicating-with-patients-and-minimising-risk#all-patients)
* [Patients without COVID‑19](https://www.nice.org.uk/guidance/ng161/chapter/1-Communicating-with-patients-and-minimising-risk#patients-without-covid19)
* [Patients with known or suspected COVID‑19](https://www.nice.org.uk/guidance/ng161/chapter/1-Communicating-with-patients-and-minimising-risk#patients-with-known-or-suspected-covid19)

2. Patients with symptoms of COVID‑19 at presentation3. Systemic anticancer treatments* [Shared decision making with individual patients](https://www.nice.org.uk/guidance/ng161/chapter/3-Systemic-anticancer-treatments#shared-decision-making-with-individual-patients)
* [Prioritising systemic anticancer treatments](https://www.nice.org.uk/guidance/ng161/chapter/3-Systemic-anticancer-treatments#prioritising-systemic-anticancer-treatments)

4. Modifications to usual service* [Interim NHS England treatment options](https://www.nice.org.uk/guidance/ng161/chapter/4-Modifications-to-usual-service#interim-nhs-england-treatment-options)
* [Treatment breaks](https://www.nice.org.uk/guidance/ng161/chapter/4-Modifications-to-usual-service#treatment-breaks)

5. Staff who are self-isolatingRecommendations for research* [1 Risk of systemic anticancer treatment in people with cancer and COVID-19](https://www.nice.org.uk/guidance/ng161/chapter/Recommendations-for-research#1-risk-of-systemic-anticancer-treatment-in-people-with-cancer-and-covid-19)
* [2 Duration of risk of systemic anticancer treatment in people with cancer and COVID-19](https://www.nice.org.uk/guidance/ng161/chapter/Recommendations-for-research#2-duration-of-risk-of-systemic-anticancer-treatment-in-people-with-cancer-and-covid-19)
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| NICE[Overview | COVID-19 rapid guideline: delivery of radiotherapy | Guidance | NICE](https://www.nice.org.uk/guidance/ng162)Rapid guideline published March 2020 and updated February 2021 | Supporting rapid evidence review:[NG161 and NG161 The effects of systemic anticancer treatment (SACT) or radiotherapy on risk of severe illness or death in patients with cancer and COVID-19: rapid evidence review (nice.org.uk)](https://www.nice.org.uk/guidance/ng161/evidence/the-effects-of-systemic-anticancer-treatment-sact-or-radiotherapy-on-risk-of-severe-illness-or-death-in-patients-with-cancer-and-covid19-rapid-evidence-review-pdf-9013195261)(February 2021) | Guidance on radiotherapy includes:1. Communicating with patients 2. Patients not known to have COVID-193. [Patients with known or suspected COVID‑19](https://www.nice.org.uk/guidance/ng161/chapter/1-Communicating-with-patients-and-minimising-risk#patients-with-known-or-suspected-covid19)4. Patients with symptoms of COVID‑19 at presentation5. Grouping and separating patients to reduce risk6. Supporting all staff, including staff who are self-isolating7. [Prioritising radiotherapy treatments](https://www.nice.org.uk/guidance/ng161/chapter/3-Systemic-anticancer-treatments#prioritising-systemic-anticancer-treatments)8. Modifications to usual careRecommendations for research* [Risk of radiotherapy in people with cancer and COVID-19](https://www.nice.org.uk/guidance/ng161/chapter/Recommendations-for-research#1-risk-of-systemic-anticancer-treatment-in-people-with-cancer-and-covid-19)
* [Duration of risk of radiotherapy in people with cancer and COVID-19](https://www.nice.org.uk/guidance/ng161/chapter/Recommendations-for-research#2-duration-of-risk-of-systemic-anticancer-treatment-in-people-with-cancer-and-covid-19)
* Radiation-induced lymphopenia and risk of new COVID-19 and severity of COVID-19
 |
| **NICE/NHS (UK)**[Specialty guides | NICE](https://www.nice.org.uk/covid-19/specialty-guides#cancer)Speciality guides for patient management during the coronavirus pandemicDelivery of cancer treatment for non-COVID patients during the coronavirus pandemicUpdated April 2021 | Guide aimed at specialists working in England during the pandemic, that aims to help departments continue essential care for patients while supporting the wider hospital and community to provide care for people with COVID-19.Guides were produced by NHS England and NHS Improvement for guidance only and are not mandatory.  | Includes guidance on planning cancer services for surgery using categorisation of patients:* **Priority level 1a**

Emergency - operation needed within 24 hours to save life* **Priority level 1b**

Urgent - operation needed within 72 hours * **Priority level 2**

Elective surgery with the expectation of cure* **Priority level 3**

Elective surgery can be delayed for 10 to 12 weeks will have no predicted negative outcome. |
| **NCCN**[2021-covid-infectious-disease-management.pdf (nccn.org)](https://www.nccn.org/docs/default-source/covid-19/2021-covid-infectious-disease-management.pdf?sfvrsn=63f70c30_7)NCCN Best Practices Guidance: Management of COVID-19 Infection in Patients with Cancer(March 2021) | ‘This “best practices guidance” extends and updates that provided by NCCN in April 2020 and addresses indications for SARS-CoV-2 testing in patients with cancer, management of cancer-directed therapies during the COVID-19 pandemic, and therapy of COVID-19 infection in this patient group. These recommendations are based on previously published guidelines set forth by other specialty societies and organizations, as well as on rapidly emerging data. | This NCCN guidance: ‘Management of COVID-19 Infection in Patients with Cancer’ includes the headings:* COVID-19 Testing in Cancer Patients
* Isolation Considerations for Patients with Cancer
* Cancer Treatment Considerations for SARS-CoV-2–Positive Patients
* Treatment of COVID-19 in Cancer Patients
* COVID-19–Related Complications in Cancer Patients
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| NCCN[2021-covid-self-care-stress-management-providers-english.pdf (nccn.org)](https://www.nccn.org/docs/default-source/covid-19/2021-covid-self-care-stress-management-providers-english.pdf?sfvrsn=5d9ffbc_5)2021 | Consensus-based guidance for health care professionals | Guidance on stress management for health care professionals |
| NCCN[2021\_covid-19\_vaccination\_guidance\_v2-0.pdf (nccn.org)](https://www.nccn.org/docs/default-source/covid-19/2021_covid-19_vaccination_guidance_v2-0.pdf?sfvrsn=b483da2b_2)2021 | Consensus-based guidance for health care professionals | Recommendations of the NCCN COVID-19 Vaccination Advisory Committee* Patients with active cancer and those on treatment should be prioritized for vaccination and should be immunized when any vaccine that has been authorized for use by the FDA is available to them.
* Immunization is recommended for all patients receiving active therapy, with the understanding that there are limited safety and efficacy data in these patients.
* Reasons for delay of vaccines are similar to those that impede delivery to the general public (eg, recent exposure to COVID-19), and there are also cancer-specific factors. Vaccination should be delayed for at least 3 months following hematopoietic cell transplantation (HCT) or engineered cellular therapy (eg, chimeric antigen receptor [CAR] T-cells) to maximize vaccine efficacy.
* Caregivers and household/close contacts should be immunized whenever possible.
* The committee supports use of any of the available EUA approved vaccines (Pfizer/BioNTech [BNT162b2 mRNA vaccine], Moderna [mRNA-1273 SARS-CoV-2 Vaccine] and Janssen/Johnson & Johnson [Ad26.COV2.S Adenovirus vector vaccine]) in patients who are eligible.
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| **Ontario Health/CCO**[Pandemic Planning Clinical Guideline for Patients with Cancer (cancercareontario.ca)](https://www.cancercareontario.ca/sites/ccocancercare/files/guidelines/full/PandemicPlanningClinicalGuidelines-Cancer.pdf)April 2020 | ‘This guidance document was produced by Ontario Health (Cancer Care Ontario) (OH-CCO) to provide recommendations for a systematic approach in determining priority for consultation and treatment of patients with cancer in Ontario during the time of a pandemic.’ | Guidance includes:* Cancer patient priority classification
* Program criteria for classification of patients
* Cancer screening programs
* Palliative care symptom management
* Radiation treatment program
* Surgical oncology program
* Systemic therapy
* Criteria to determine whether a program/service should cease operating
* Cancer program operational recommendations
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| Ontario Health/CCO[Ontario Health Cancer Care Ontario COVID-19 Supplemental Clinical Guidance for Patients with Cancer\_29Mar20 PDF.pdf](https://www.ontariohealth.ca/sites/ontariohealth/files/2020-04/Ontario%20Health%20Cancer%20Care%20Ontario%20COVID-19%20Supplemental%20Clinical%20Guidance%20for%20Patients%20with%20Cancer_29Mar20%20PDF.pdf)March 2020 | Guidance specific to clinical care during the COVID-19 pandemic, that is ‘supplemental to that provided in sections of the Pandemic Planning Clinical Guideline and does not replace it.’ | Includes guidance relating to:* Cancer screening programs
* Cervical screening
* Gastrointestinal endoscopy services
* Priority B cancer patients: further considerations for prioritising patients in need of systemic treatment and/or radiotherapy, cancer imaging and cancer surgery
* Treatment modality specific guidance
* Systemic treatment
* Radiation treatment
* Cancer imaging
* Surgical oncology
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| Ontario Health/CCO[COVID-19 Vaccine and Cancer: Frequently Asked Questions (PDF)](https://www.cancercareontario.ca/sites/ccocancercare/files/assets/COVID-19VaccineClinicianFAQ.pdf)(April 2021) | The COVID-19 Vaccine and Cancer: Frequently asked questions |  FAQs on COVID-19 vaccination:1. Are all COVID-19 vaccines safe for cancer patients?
2. Which patient factors require further consideration prior to receiving a COVID-19 vaccine?
3. Which cancer patients are at a higher risk of becoming infected with COVID-19 and/or having severe complications with COVID-19?
4. When will cancer patients receive immunity (mount an immune response) after the COVID-19 vaccine?
5. When is the optimal time for cancer patients to receive the COVID-19 vaccine?
6. When should the COVID-19 vaccine be given in relation to other vaccinations?
7. What are possible side effects of the vaccination?
8. Can a cancer patient receive the COVID-19 vaccine if they have allergies?
9. Are any trials of COVID-19 being done in immunocompromised populations?
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Abbreviations

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| ACS | American College of Surgeons |
| ASCO | American Society of Clinical Oncology |
| ASTRO | American Society for Radiation Oncology  |
| CDC | Centres for Disease Control and Prevention |
| COVID-19 | Coronavirus disease 2019 |
| ESMO | European Society for Medical Oncology |
| ESTRO | European Society of Radiotherapy and Oncology |
| ICI | Immune checkpoint inhibitor |
| LMICs | Low- and middle-income countries |
| MA | Meta-analysis |
| MDT | Multidisciplinary team |
| NCCN | National Comprehensive Cancer Network |
| NICE | National Institute for Health and Care Excellence |
| OCPs | *Optimal Care Pathways* |
| OH/CCO | Ontario Health/ Cancer Care Ontario |
| OR | Odds ratio |
| RR | Relative risk |
| SARS-CoV-2 | Severe acute respiratory syndrome coronavirus 2 |
| SR | Systematic review |
| US | United States of America |
| WHO | World Health Organization |

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1. The 14 cancer types examined were: breast, colorectal, lung, prostate, melanoma of the skin, stomach, kidney, pancreatic, liver, uterine, ovarian, cervical, vaginal, and vulval cancers. [↑](#footnote-ref-2)
2. For telehealth services, videoconferencing is the preferred substitute for a face-to-face consultation.122, 123 [↑](#footnote-ref-3)