

Considerations for Managing Patients With Hematologic Malignancy During the COVID-19 Pandemic: The Seattle Strategy

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In January 2020, the first documented patient in the United States infected with severe acute respiratory syndrome coronavirus 2 was diagnosed in Washington State. Since that time, community spread of coronavirus disease 2019 (COVID-19) in the state has changed the practice of oncologic care at our comprehensive cancer center in Seattle. At the Seattle Cancer Care Alliance, the primary oncology clinic for the University of Washington/Fred Hutchinson Cancer Consortium, our specialists who manage adult patients with hematologic malignancies have rapidly adjusted clinical practices to mitigate the potential risks of COVID-19 to our patients. We suggest that our general management decisions and modifications in Seattle are broadly applicable to patients with hematologic malignancies. Despite a rapidly changing environment that necessitates opinion-based care, we provide recommendations that are based on best available data from clinical trials and collective knowledge of disease states.

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INTRODUCTION

Patients with hematologic malignancies routinely receive highly myelotoxic and lymphotoxic therapies, often administered with curative intent. The coronavirus disease 2019 (COVID-19) pandemic presents unique challenges for optimal management of these patients. Seattle was home to the first patient diagnosed with COVID-19 identified in the United States and an early long-term-care facility outbreak, and preparations for care of our patients with hematologic malignancies have been under way since February 2020.¹⁻³ During this dynamic time, our faculty have generated guidelines to best balance the risk of underlying malignancy with the risks of COVID-19 infection and mortality.⁴ Simultaneously, we worked to minimize the need for inpatient care in anticipation of an expected community surge of patients infected with COVID-19, while recognizing that all patients with illness need care, even during a pandemic.

Herein, we lay out treatment guidelines that we have instituted in our patients with hematologic malignancies as well as the evidence, when available. Because of the rapidly evolving nature of the pandemic, these principles are not entirely data driven; instead, they represent a general consensus for appropriate treatments. The suggestions for care modification include

oral and/or outpatient options; regimens that reduce risk of cytopenias; and deferral of therapy, if possible. Clinical trial participation is significantly curtailed, and the risk-benefit ratio of experimental therapies and their required logistics must be reconsidered. Because of the specialized care for different hematologic malignancies, we include best practices for lymphoid malignancies, myeloid neoplasms, acute lymphoblastic leukemia (ALL), and multiple myeloma (MM) as listed in [Table 1](#).

GENERAL CONSIDERATIONS AND SUPPORTIVE CARE

Whether the risk of acquiring COVID-19 infection is higher in the inpatient versus outpatient setting for patients with hematologic malignancies depends on COVID-19 epidemiology in the local community. Experience from other countries has confirmed the risk of nosocomial spread of COVID-19 in hospital settings.⁵ Concerns also exist about inpatient capacity constraints. To ensure prevention in the community, we have focused on patient and caregiver education about the importance of social distancing, hand hygiene, and masking.

Entrance into our cancer center has been confined to a single point at which all patients, staff, and caregivers are screened; those with symptoms concerning for

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TABLE 1. Summary of Treatment Recommendations for Hematologic Malignancies in the Era of COVID-19 by Disease

Disease	Recommendations
Aggressive NHL	Avoid inpatient regimens for untreated aggressive NHL, except in select circumstances (young patients with Burkitt lymphoma or high-grade B-cell lymphoma), and administer EPOCH-R as outpatient if possible.
	Select outpatient salvage regimens in relapsed disease. If autologous HSCT must be delayed, consider bridging with systemic therapy or localized radiotherapy.
	Select tisagenlecleucel over axicabtagene ciloleucel because of lower rates of hospitalization/intensive care unit admission.
HL	Avoid intensive chemotherapy combinations (brentuximab plus AVD, BEACOPP) for untreated patients to minimize risk of hospitalization.
	Consider outpatient salvage chemotherapy regimens when possible.
CLL	If treatment initiation is required during the pandemic, an oral agent without the need for hospitalization, infusion, or frequent clinic visits would be preferred.
	In patients with CLL without COVID-19, continue oral targeted agents but hold antibody treatments, chemotherapy, and IVIG infusions.
	In patients with CLL with a COVID-19 diagnosis, hold CLL treatment with monoclonal antibodies and chemotherapy but consider continuing oral targeted agents in selected patients with high risk for disease flare after discontinuation.
PTCL	In older patients with PTCL with a statistically low chance of cure with multi-agent regimens, consider frontline therapy with novel single agents.
	Defer autologous HSCT indefinitely.
Indolent lymphomas/ MCL	Consider deferring therapy until strongly indicated.
	Consider low-dose local radiotherapy (2 × 2 Gy) for localized symptomatic disease control.
	Consider the use of less myelosuppressive/immunosuppressive regimens whenever possible.
	Refrain from anti-CD20 antibody maintenance therapy to allow for B-cell recovery.
AML	Consider outpatient induction and consolidation when feasible.
	Consider maintenance therapy if allogeneic HSCT is unavailable for patients who would normally be eligible.
	Consider less intensive treatment in patients with relapsed/refractory disease.
MDS/MPN	No changes to the general management of chronic MPNs, including phlebotomy, hydroxyurea, interferons, and Janus kinase inhibitors.
	For lower-grade MDS, consider initiation of growth factors, such as ESAs and eltrombopag to decrease transfusion need; consider delaying HMAs.
	For high-grade MDS, HMAs should be initiated or continued while definitive therapy with allogeneic HSCT is delayed.
ALL	Curative-intent treatment of adults with ALL will likely require a period of inpatient management and blood product support. Even if successful, consolidation/maintenance therapy unavoidably includes a risk of immunosuppression.
	When resources are limited, options exist for relapsed/refractory ALL, although realistic outcomes from these interventions vary.
	The role of allogeneic HSCT is potentially debatable (particularly in MRD-negative CR1) and contingent upon response to therapy.
MM	For newly diagnosed MM, prefer regimens that allow for limited exposure to health care facilities (ie, allow for substitution of oral for intravenous chemotherapy, minimize dosing frequency).
	Defer autologous HSCT for patients with MM and consider collecting and storing cells only.
	Continue maintenance therapy with lenalidomide or bortezomib.
	Consider holding anti-CD38 antibody treatment in patients with stable disease or in durable remission to mitigate risks of plasma cell depletion.

Abbreviations: ALL, acute lymphoblastic lymphoma; AML, acute myeloid leukemia; AVD, doxorubicin, vinblastine, and dacarbazine; BEACOPP, bleomycin, etoposide, doxorubicin, cyclophosphamide, vincristine, procarbazine, and prednisone; CLL, chronic lymphocytic leukemia; COVID-19, coronavirus disease 2019; CR1, first complete remission; EPOCH-R, etoposide, prednisone, vincristine, cyclophosphamide, and doxorubicin plus rituximab; ESA, erythropoiesis-stimulating agent; HL, Hodgkin lymphoma; HMA, hypomethylating agent; HSCT, hematopoietic stem-cell transplantation; IVIG, intravenous immunoglobulin; MDS, myelodysplastic syndrome; MM, multiple myeloma; MPN, myeloproliferative neoplasm; MRD, measurable residual disease; NHL, non-Hodgkin lymphoma; PTCL, peripheral T-cell lymphoma.

COVID-19 are masked and tested. Patients with known respiratory symptoms are instructed to stay home and contact the COVID RN hotline to arrange for a telehealth visit to coordinate testing at a drive-through testing location. Patients are limited to one caregiver with any outpatient appointment (age < 12 years not allowed). Inpatient visitors are strictly limited.

We recommend increased use of granulocyte colony-stimulating factor (G-CSF) and antibiotic prophylaxis to reduce admission for febrile neutropenia.⁶ There are no known instances of COVID-19 transmission through blood products, but we recommend more stringent transfusion thresholds in asymptomatic patients (hemoglobin, 7 g/dL; platelet count, 10,000/ μ L) in light of decreased donor availability. Antifibrinolytics can decrease risk of spontaneous bleeding in patients with thrombocytopenia. Transfusion-dependent patients continue to interact with health care providers frequently, but we recommend transitioning to telehealth visits when feasible to allow for social distancing.

At this point, routine testing of asymptomatic patients for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is not performed before standard chemotherapy. The management of the asymptomatic patient with a positive test result is unclear; the risks of treatment delay will need to be carefully considered and, in some scenarios, may outweigh any potential benefit. Because of limitations in COVID-19 testing capacity, we have prioritized testing of symptomatic patients as well as screening before planned procedures, inpatient admissions, hematopoietic stem-cell transplantation (HSCT), and chimeric antigen receptor (CAR) T-cell therapy.

Early discussions about goals of care are important during a pandemic, which is believed to lead to increased complications among patients with cancer,^{4,7} advanced age, and other comorbidities. Involvement of palliative care, identifying a power of attorney, and completing living wills should be prioritized. Frank discussions about risk and benefit of treatment are important to review with patients, particularly if inpatient or intensive care unit bed availability is limited.

LYMPHOID MALIGNANCIES

Aggressive Non-Hodgkin Lymphoma

Treatment of newly diagnosed aggressive non-Hodgkin lymphoma (NHL), often with intent to cure, has shifted to outpatient administration of therapies (including infusional regimens such as dose-adjusted etoposide, prednisone, vincristine, cyclophosphamide, and doxorubicin plus rituximab [EPOCH-R]) whenever feasible. EPOCH-R has been examined in phase II studies for both Burkitt lymphoma⁸ and MYC-rearranged large B-cell lymphomas.⁹ EPOCH-R therapy could be initiated with the intent to transition to an alternate inpatient regimen when hospital resources become available.

Early-stage diffuse large B-cell lymphoma (DLBCL) is a special consideration because many patients may benefit from abbreviated chemotherapy without the need for consolidative radiotherapy (RT).¹⁰ Patients with the lowest risk or those with a negative positron emission tomography (PET) scan after 3 cycles require only 4 cycles of rituximab plus cyclophosphamide, doxorubicin, vincristine, and prednisone (CHOP) without RT.^{10a} For older patients, we prefer abbreviated chemo (R-CHOP x 3) + consolidative RT given similar efficacy with lower risk of febrile neutropenia.^{10b}

Patients with relapsed DLBCL who are eligible for potentially curative therapies should consider less intensive and/or outpatient approaches that produce similar outcomes.¹¹ Autologous HSCT remains an option for those with complete metabolic response after salvage, but less intensive therapies should otherwise be offered. Tisagenlecleucel should be used over axicabtagene ciloleucel when CAR T-cell therapy is indicated, given outpatient administration and lower rates of cytokine release syndrome and neurotoxicity. Polatuzumab vedotin plus rituximab with bendamustine is approved for DLBCL after 2 prior lines of therapy but has high rates of febrile neutropenia and is not curative. Thus, bendamustine dose reduction should be considered.¹² Off-label use of ibrutinib or lenalidomide may also be considered. If needed, bridging RT to limited symptomatic sites of disease can be considered between systemic therapies.¹³

Hodgkin Lymphoma

Patients with untreated Hodgkin lymphoma (HL) and most patients with relapsed HL are treated with curative intent. Patients with asymptomatic or minimally symptomatic HL can consider deferring therapy for 1-2 months until more clarity exists with regard to the pandemic. For young (age < 60 years) and fit patients with untreated advanced-stage classical HL, we prefer doxorubicin, bleomycin, vinblastine, and dacarbazine (ABVD) over brentuximab vedotin (BV) plus doxorubicin, vinblastine, and dacarbazine (AVD) because of its favorable toxicity profile, long-term efficacy data, and decreased risk of febrile neutropenia.¹⁴ Young patients without significant smoking history or history of underlying lung disease can receive a bleomycin-containing regimen without baseline pulmonary function tests (PFTs) because access to PFTs is currently limited. Interim PET scans after 2 cycles of ABVD can identify the patients with good outcomes and allow risk-adapted therapy (for an ABVD/AVD de-escalation approach, the 2-year progression-free survival rate is 83.1%). For patients with a positive interim PET scan, we elect to alter therapy to BV plus AVD given a high 3-year progression-free survival rate of 68%.¹⁵ Bleomycin, etoposide, doxorubicin, cyclophosphamide, vincristine, procarbazine, and prednisone-based regimens should be avoided because of high rates of febrile neutropenia.

For patients age \geq 60 years, combination outpatient regimens include CHOP, BV plus dacarbazine, and BV followed

by AVD. Concurrent BV with AVD may be more toxic, with higher rates of infections and febrile neutropenia.¹⁴ We would avoid bleomycin-containing regimens in this population given the current inability to monitor PFTs in patients with higher rates of toxicity.¹⁶ BV monotherapy does not lead to durable responses.¹⁷

For relapsed or refractory chemosensitive HL, cure rates with consolidative autologous HSCT are high and should be prioritized if possible. Outpatient salvage options include BV plus bendamustine¹⁸ and BV plus nivolumab.¹⁹ For patients with multiply-refractory disease, allogeneic HSCT should be avoided at this time, and patients should be maintained with current standards, including BV and/or programmed cell death 1 inhibitors.

Chronic Lymphocytic Leukemia

Patients with chronic lymphocytic leukemia (CLL) have impaired immunity and an increased risk of contracting infections.²⁰ With a median age of 70 years at diagnosis, they are more likely to have inferior outcomes if infected by SARS-CoV-2.²¹ Therefore, our strategy is primary prevention by minimizing potential exposure. For patients not on treatment, we have postponed return visits and laboratory work in most. When clinical assessment is required, we use telemedicine and local laboratories. Intravenous immunoglobulin (IVIG) infusions are generally canceled or delayed.

For patients who need to start therapy for CLL during the pandemic, oral targeted agents are preferred (eg, ibrutinib, acalabrutinib). We would avoid treatments such as chemotherapy and monoclonal antibodies that require frequent visits, hospitalization, or infusions. In addition, initiation of venetoclax, which requires frequent and prolonged clinic visits, is discouraged if other options exist.²² For patients with stable disease on treatment, we are using telemedicine visits. We are continuing oral targeted agents but hold infusional treatments unless clinically necessary. For patients with CLL on active treatment with COVID-19 infection, we favor holding treatment, although the risk of disease flare after stopping treatments like kinase inhibitors should be weighed against possible immunosuppressive effects.

Peripheral T-Cell Lymphoma

The peripheral T-cell lymphoma (PTCL) management landscape has changed significantly in the past decade with the development of novel agents and molecular stratification. While aggressive multi-agent induction with curative intent is the most frequently pursued initial treatment goal, the actual cure rate remains low for most histologic types. Thus, in the COVID-19 pandemic, new agents with reduced hematologic toxicity provide a reasonable alternative for older, frail, or medically compromised patients. These alternative options include histone deacetylase inhibitors, antifolates, immunoconjugates, phosphatidylinositol 3-kinase inhibitors, and hypomethylating agents (HMAs). Selected patients with low disease burden, minimal

or no symptoms, and clinically nonaggressive disease behavior could delay therapy with close monitoring and frequent imaging (ie, every 6-8 weeks), depending on the presence of symptoms.

Autologous HSCT in first remission should be postponed given the lack of definitive evidence that it is beneficial. Patients with PTCL in complete remission who are pursuing palliative intent therapy with continuous single-agent administration should consider a treatment holiday until progression or the resolution of the pandemic, given the lack of evidence that continuous therapy is preferred to retreatment strategy. In patients with single or few isolated residual foci of disease after systemic chemotherapy, RT may be considered in favor of alternative systemic salvage options. Excessive use of antineoplastic agents with deleterious effect on adaptive immunity (including glucocorticoids and alemtuzumab) should be avoided.

Indolent B-Cell NHL and Mantle Cell Lymphoma

As in the pre-COVID-19 era, the management of newly diagnosed or relapsed indolent B-cell NHL primarily depends on whether there is a strong indication for treatment, such as bulky adenopathy, organ compromise, cytopenias, or symptoms. Similarly, many patients with mantle cell lymphoma (MCL) can undergo a watch-and-wait approach, including symptom education and, potentially, surveillance imaging. Our current approach has been to maximally extend the pretreatment observation period.

If treatment is indicated, we prefer regimens with the least immunocompromise and fewest appointments. For patients with limited-stage disease who are seeking localized symptom control, high response rates are seen with 1 or 2 fractions of palliative RT with minimal toxicity.²³ For asymptomatic patients with limited-stage disease who are seeking definitive RT, we recommend deferring treatment by 3-6 months.

Patients with more extensive disease who require treatment can consider rituximab and lenalidomide on the basis of comparable activity to chemoimmunotherapy with fewer infections and severe neutropenia.²⁴ Ibrutinib is US Food and Drug Administration approved for Waldenström macroglobulinemia and relapsed marginal zone lymphoma, whereas any of the Bruton tyrosine kinase (BTK) inhibitors can be used in MCL. BTK inhibitors should also be considered for patients with previously untreated MCL; they may suffice as a bridge to more definitive therapy later in younger patients. Rituximab and lenalidomide is an option for MCL as well.²⁵ Finally, rituximab monotherapy can be used for indolent B-cell NHL, with recognition that the benefit will be more palliative and less durable.

If chemoimmunotherapy is administered, growth factor support and antimicrobials should be considered. In addition, fewer cycles can be considered for patients treated with palliative intent who experience maximal benefit early on. Given the lack of overall survival benefit in follicular

lymphoma, we recommend against maintenance therapy with an anti-CD20 monoclonal antibody to allow for faster B-cell recovery.²⁶

MYELOID NEOPLASMS

Acute Myeloid Leukemia

While treatment of acute myeloid leukemia (AML) is often considered an emergency, retrospective analyses suggest that delaying treatment does not lead to worse outcomes.²⁷ Induction can likely be delayed to await COVID-19 testing in a symptomatic patient or to support a patient through COVID-19 infection. Consideration should be given to administering outpatient induction when feasible²⁸ or early hospital discharge if chemotherapy is administered inpatient.²⁹

Patients with AML in remission who are undergoing consolidation chemotherapy should receive outpatient care when possible. In some cases, the number of consolidation cycles can be decreased from 4 to 3. Increased use of G-CSF may be beneficial.³⁰ Consolidative allogeneic HSCT is recommended for patients with intermediate- or adverse-risk genomic characteristics, but availability is currently limited. Maintenance regimens can be considered, including midostaurin for *FLT3*-mutated AML or azacitidine.^{31,32}

Low-intensity regimens such as HMA and venetoclax can be used for patients not eligible for intensive chemotherapy, although without curative intent. Patients with relapsed/refractory disease likewise have few options and are commonly receiving less intensive outpatient therapies. Treatment of acute promyelocytic leukemia is essentially unchanged, although consideration is being given to more outpatient management during remission induction (eg, discharge at approximately day 15 when risk of differentiation syndrome decreases significantly).

Myeloproliferative Neoplasms

Myeloproliferative neoplasm (MPN) therapies, such as low-dose aspirin, phlebotomy, hydroxyurea, anagrelide, and interferons, should be continued because they decrease the risk of short-term complications, including thrombosis, bleeding, disease-related symptoms, and splenomegaly. Close care should be given to limit neutropenia associated with hydroxyurea. Initiation of Janus kinase (JAK) inhibitors (ruxolitinib, fedratinib) can lead to worsening anemia early in therapy, are associated with atypical infections,³³ and can cause rapid splenomegaly and cytokine storm if stopped abruptly in the setting of critical illness. Of note, JAK inhibitors are being evaluated for therapy for patients with COVID-19 (ClinicalTrials.gov identifier: [NCT04321993](https://clinicaltrials.gov/ct2/show/study/NCT04321993)) as anti-inflammatory agents and, thus, should be continued in patients already on therapy. For patients with anemia on JAK inhibitors, erythropoietin-stimulating agents (ESAs) can be added to decrease transfusion need. Danazol can also be added in myelofibrosis to improve anemia.³⁴ Allogeneic HSCT is currently limited to patients in accelerated/blast phase.

Myelodysplastic Syndrome

For lower-grade myelodysplastic syndrome (MDS), we are focusing on decreasing transfusions and symptom burden with ESAs while trying to delay initiation of HMAs when possible. Eltrombopag can be considered in those with severe thrombocytopenia in whom ultimate curative-intent therapy is not planned to decrease use of transfusions and bleeding events.^{35,36} In general, we treat MDS with excess blasts more like AML at our institution. However, because allogeneic HSCTs are generally being delayed for these patients, prevention of progression of disease to AML is important. Thus, HMAs should be initiated or continued if patients are already responding.³⁷

ALL

Patients with ALL can often be treated with curative intent but frequently need urgent intervention, so treatment should not be delayed in nearly all circumstances. Hyper-fractionated cyclophosphamide, vincristine, doxorubicin, and dexamethasone is among the most common regimens but is challenging to administer outpatient, requiring frequent transfusion support and hospitalization for complications. Less intense approaches for older adults may be attractive in certain situations.^{38,39} Particularly in younger adults, pediatric-inspired regimens like C10403 can be given primarily in an ambulatory setting, but their complexities may not be feasible.⁴⁰ For Philadelphia chromosome-positive (Ph+) disease, lower-intensity strategies can be given outpatient with minimal transfusion support.⁴¹ However, even these regimens likely should be started inpatient to monitor for acute complications in the setting of high-burden disease.

Options available for relapsed/refractory ALL may be relatively easy to administer in the context of COVID-19. Inotuzumab ozogamicin can be given on an outpatient basis, although risks of early toxicity should be considered. Blinatumomab requires hospitalization, but this is typically limited to treatment initiation. CD19-targeted CAR T cells would be particularly challenging because of inpatient management of toxicities and frequent need for intensive care. For T-cell ALL, nelarabine and liposomal vincristine can both be given outpatient, although response rates are low.

Adults with Ph+- and Ph-negative ALL who achieve measurable residual disease-negative remission with initial therapy can potentially defer allogeneic HSCT.^{42,43} Historically, HSCT is believed to be the only intervention with curative potential in those with relapsed/refractory disease. However, emerging data have suggested that it may not substantively improve outcomes for patients who have responded favorably to blinatumomab and CAR T cells.^{44,45}

MM

Management of MM must balance the urgency of need for therapy and the increased risk of viral infections while on therapy. For a patient with newly diagnosed, symptomatic

MM with evidence of end-organ damage (CRAB [calcium level, renal dysfunction, anemia, and destructive bone lesions] criteria), treatment should be instituted with a 3-drug regimen such as lenalidomide, bortezomib, and dexamethasone. In select asymptomatic patients who only meet the three new 2014 International Myeloma Working Group criteria (eg, involved-to-uninvolved free light chain ratio > 100, magnetic resonance imaging with > 1 focal lesion [>5 mm in size], and bone marrow plasmacytosis [$> 60\%$]), we have opted to defer the initiation of therapy in favor of close monitoring with monthly biomarker measurements.⁴⁶

Autologous HSCT, typically performed after induction therapy, is standard for transplant-eligible patients with newly diagnosed MM and results in durable remissions but not cure. HSCT leads to a 2–3-week period of profound myelosuppression and increased risk of infection (20% v 9%, compared with lenalidomide, bortezomib, and dexamethasone alone).⁴⁷ We have recommended deferral of HSCT; patients undergo collection and cell storage, followed by ongoing induction for a total of 8 cycles (as per the IFM2009 trial) and lenalidomide or bortezomib maintenance.

After HSCT, patients require frequent clinic visits and laboratory tests, including cytomegalovirus polymerase chain reaction; in-person laboratory visits continue, but provider visits have been primarily converted to telemedicine. Patients with quantitative IgG levels < 400 mg/dL receive monthly infusions of IVIG, although currently available IVIG does not have adequate SARS-CoV-2 antibodies to be protective.

We have not substantially changed our treatment of patients with relapsed MM in need of urgent therapy. The one exception has been the limitation of plasma cell-depleting agents; studies of daratumumab have consistently shown a higher risk of viral upper respiratory tract infections.^{48,49} We have been holding daratumumab in some patients with stable disease and low tumor burden to mitigate the risk associated with agents that affect B-cell/plasma cell number or function. For patients with smoldering MM or monoclonal gammopathy of undetermined significance, all visits are telemedicine (on the same quarterly to annual schedule), and laboratory testing is deferred if disease indices are stable.

In summary, the care of patients with hematologic malignancies at our center has been altered to mitigate the risks of COVID-19 in our vulnerable patient population and to balance resource utilization. Common themes include using oral and outpatient regimens, increasing telemedicine visits, and avoiding or omitting therapies known to be associated with higher risk of viral infections (unless administered with curative intent). Given that our region was the first in the nation to have a local outbreak, decisions were made rapidly and were largely based on opinion and expert knowledge. Whenever possible, our recommendations are evidence based and represent a consensus opinion. Greater understanding of COVID-19, and in particular its risks alongside hematologic malignancies, will doubtless result in evolving approaches to care.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**Considerations for Managing Patients With Hematologic Malignancy During the COVID-19 Pandemic: The Seattle Strategy**

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