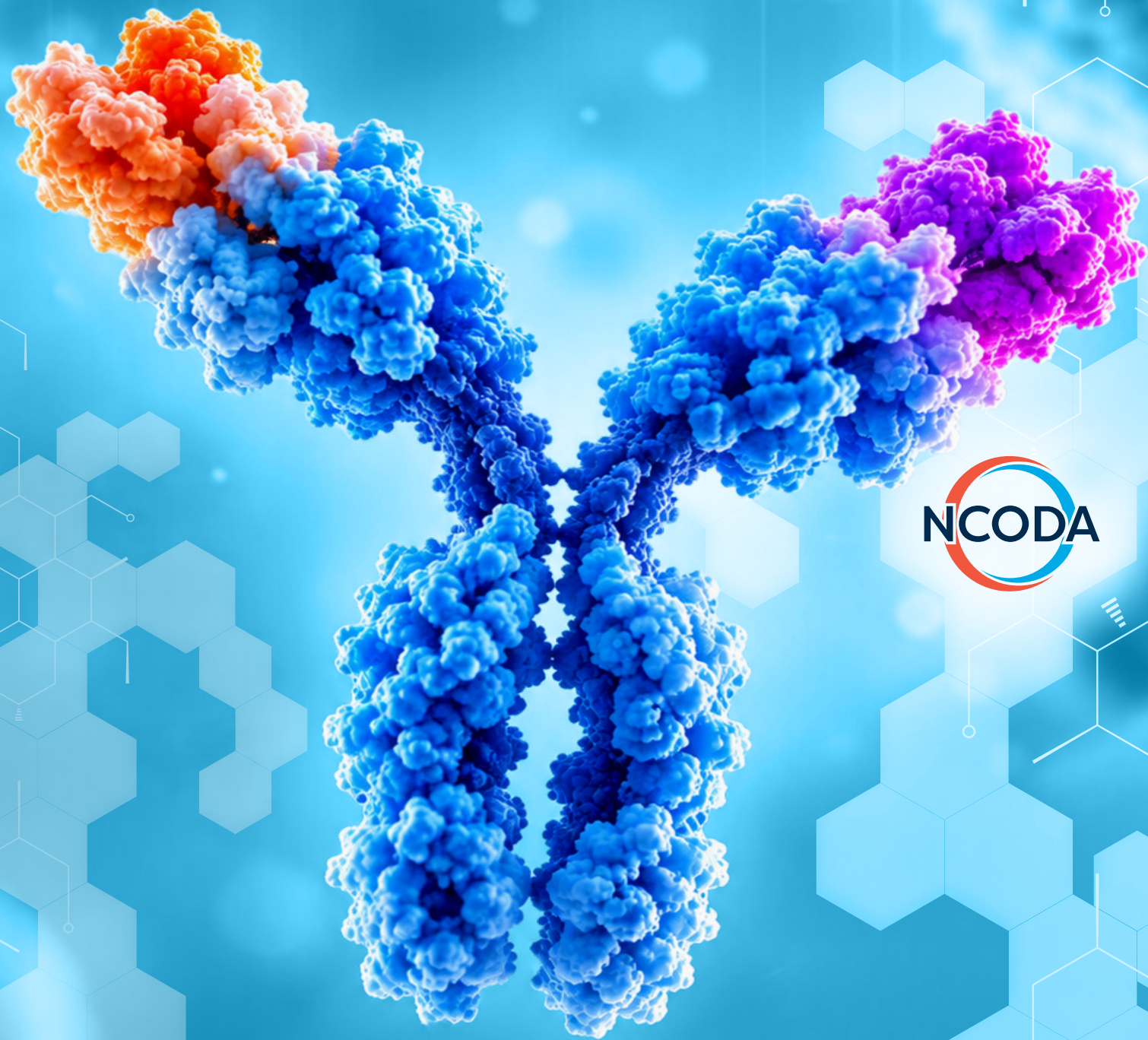




OPERATIONALIZING OUTPATIENT BISPECIFIC THERAPY:

Practical Considerations for Safe & Sustainable Implementation

Authored by: Tara Graff, DO, MS

Executive Summary

Bispecific antibodies are rapidly transforming the treatment landscape for hematologic malignancies, offering highly effective, off-the-shelf immunotherapy options that are increasingly being delivered in outpatient oncology settings. As their use expands, oncology practices must establish the operational infrastructure necessary to safely manage treatment initiation, toxicity monitoring, multidisciplinary coordination, and patient support outside the hospital.

To better understand current implementation practices, NCODA surveyed 126 multidisciplinary oncology professionals representing predominantly community-based practices with experience delivering bispecific therapies for hematologic malignancies in the outpatient setting. The survey explored operational readiness, patient selection, staffing, toxicity management, workflow integration, and barriers to successful implementation.

Results demonstrate that outpatient bispecific therapy has become well established across many practices, with most respondents reporting experience administering maintenance dosing and more than half delivering step-up dosing in the outpatient setting.

While practices have successfully expanded access, respondents identified several operational priorities that continue to influence program success, including standardized clinical protocols, multidisciplinary communication, patient and caregiver education, after-hours support, and coordinated approaches to cytokine release syndrome (CRS) and immune effector cell-associated neurotoxicity syndrome (ICANS) management.

The survey also highlights that successful outpatient programs extend beyond clinical expertise alone. Respondents emphasized the importance of clearly defined team roles, strong physician and operational leadership, standardized workflows, and ongoing quality improvement to support safe and consistent care delivery.

This white paper summarizes the survey findings and presents practical considerations for practices implementing or expanding outpatient bispecific therapy programs. By highlighting common operational challenges and sharing strategies adopted by experienced centers, it aims to support the continued evolution of safe, efficient, and patient-centered outpatient bispecific care.

Clinical Background & Current State of Outpatient BTCE Care

A bispecific T-cell engager (BTCE) is an agent that binds CD3 on T cells and a tumor-associated target. This contact directs T-cell activity toward malignant cells.¹ The T-cell-engaging mechanism shapes the adverse event profile and the resources needed for treatment.² BTCEs have shown meaningful activity in relapsed or refractory multiple myeloma and B-cell lymphomas. Approved agents target B-cell maturation antigen (BCMA) or G protein-coupled receptor class C group 5 member D (GPCR5D) in myeloma. Other agents target CD20 in lymphoma.³⁻⁷ The landscape continues to expand as new agents and combination regimens enter practice and move into earlier treatment settings.⁸⁻¹⁰

BTCEs require a distinct approach to treatment initiation. In early cycles of treatment, and primarily during step-up dosing, BTCEs can cause cytokine release

syndrome (CRS) through rapid T-cell activation and the release of pro-inflammatory cytokines into the bloodstream.^{11,12} CRS most often presents with fever and flu-like symptoms, such as myalgia. More severe cases may involve hypotension, coagulopathy, capillary leak, or pulmonary edema.¹³ Neurologic adverse events, including immune effector cell-associated neurotoxicity syndrome (ICANS), have also been reported with BTCEs. ICANS often occurs after CRS but may develop independently. It is an immune-mediated toxicity that affects the central nervous system following the activation of T cells and other immune effector cells.^{14,15} Common manifestations include tremor, impaired attention, dysgraphia, and expressive aphasia.¹⁵ These events require prompt assessment because symptoms may evolve after a patient leaves the infusion center.

The American Society for Transplantation and Cellular Therapy (ASTCT) grading framework provides a common language for severity and supports timely treatment decisions.^{15,16} Consistent use depends on staff training and clear escalation pathways.

Because BTCEs can cause serious immune-mediated adverse events, step-up dosing is an important strategy for mitigating risk during treatment initiation. This approach, incorporated into the dosing regimens of currently FDA-approved BTCEs, including teclistamab, talquetamab, elranatamab, linvoseltamab, epcoritamab, glofitamab, and mosunetuzumab,^{8-10,17-20} begins with one or more lower doses before the target dose is reached. This gradual dose escalation allows for progressive immune activation and may reduce the incidence and severity of CRS and ICANS.

However, step-up dosing schedules, dose levels, observation requirements, and criteria for treatment interruption are product specific. Consequently, practices cannot rely on a single class-wide protocol and should develop treatment pathways that align with the current prescribing information for each agent. Step-up dosing is typically completed during the first treatment cycle, although some therapies also require repeat step-up dosing after prolonged treatment interruptions to allow for gradual immune reactivation.^{8-10,17-20} The timing of CRS varies across agents and dosing schedules. In many regimens, CRS incidence increases as patients progress toward the full treatment dose, then declines with subsequent administrations.¹² These differences directly influence monitoring strategies and observation periods during treatment initiation. From an operational perspective, step-up dosing creates important scheduling and resource considerations. Treatment appointments must be coordinated around the period of highest CRS risk while ensuring adequate observation capacity and access to urgent or inpatient care if needed.¹⁵ Chair availability, staffing, laboratory testing, and weekend or holiday coverage may all influence when therapy can begin. Delays in treatment can alter the dosing schedule or necessitate repeat step-up dosing, further increasing operational complexity.^{21,22} Before each administration, the care team should verify prior doses, treatment interruptions, and recent toxicities. Standardized communication is particularly important when step-up dosing is initiated at one site, and maintenance therapy is continued at another, helping ensure continuity of care

and consistent adherence to product-specific monitoring recommendations.

Early clinical implementation of BTCEs frequently relied on inpatient admission during step-up dosing. Continuous observation and rapid access to rescue therapies or escalation of care made the inpatient setting the most practical approach during initial adoption. Although hospitalization remains appropriate for selected therapies and higher-risk patients, reliance on inpatient initiation may be constrained by limited bed availability, scheduling challenges, and additional travel or logistical burden for patients.²¹ As institutional experience has increased and toxicity management has become more standardized, many centers have transitioned selected patients to outpatient step-up dosing. Real-world experience with teclistamab and prospective evidence with epcoritamab demonstrate that outpatient initiation can be implemented safely within structured clinical programs, although monitoring requirements and recommendations continue to differ across agents and indications.^{23,24}

Transitioning BTCE administration to the outpatient setting shifts, rather than reduces, the operational demands of care delivery. Successful programs require standardized eligibility criteria, product-specific treatment pathways, and multidisciplinary workflows that support consistent monitoring throughout treatment initiation. Electronic health record (EHR) order sets should incorporate premedications, laboratory requirements, toxicity grading, and management algorithms that are readily accessible to the care team. Clinical decision support tools may further facilitate adverse event recognition, documentation, and treatment escalation.^{22,25,26} Equally important is comprehensive education for physicians, advanced practice providers, pharmacists, nurses, and other clinical staff to ensure familiarity with product-specific administration requirements and prompt recognition and management of CRS and ICANS.²² Outpatient programs should also establish 24-hour clinical coverage and predefined pathways for emergency evaluation and hospital admission before the first dose is administered.

Throughout treatment with BTCEs, serious and opportunistic infections can occur. Hypogammaglobulinemia and prolonged cytopenia may increase this risk.¹⁶ These complications require continued laboratory surveillance and infection-prevention planning. Practices also need a clear process for holding therapy and restarting

treatment. Supportive care must be coordinated across settings. A program must balance standardized pathways with clinical judgment as these needs differ by agent and by patient.¹⁶

Patient selection for outpatient BTCE therapy extends beyond traditional clinical factors such as disease status and performance status. Geographic distance from the treatment center, transportation reliability, caregiver availability, and the patient's ability to recognize and report symptoms all influence whether outpatient initiation is appropriate.^{22,25,26} Patients and caregivers should receive clear education regarding expected toxicities, symptom reporting, and after-hours communication. Coordination with local emergency departments is equally important so that treating teams can rapidly communicate treatment history and recommended management when urgent evaluation is required. In parallel, practices must address the financial and operational infrastructure needed to sustain these programs. Drug acquisition, reimbursement, billing, and staffing models

may influence the feasibility of outpatient BTCE delivery, particularly in community oncology settings with more limited resources.²⁷ Differences in staffing models, clinic hours, health system infrastructure, geographic access, and relationships with affiliated hospitals all influence how care is delivered and how rapidly patients can be evaluated if complications arise.

Although published studies have demonstrated that outpatient BTCE administration can be implemented safely in appropriately selected patients, published guidance describing operational implementation in routine oncology practice remains limited. As more practices adopt outpatient BTCE programs, understanding current approaches to implementation, including patient selection, multidisciplinary coordination, toxicity management, and operational workflows, may help inform best practices and identify opportunities for standardization. To explore these real-world experiences, NCODA surveyed 126 multidisciplinary oncology professionals involved in outpatient bispecific therapy delivery.

National Survey Findings: Real-World Outpatient BTCE Implementation

KEY TAKEAWAY: The survey captured a diverse cross-section of oncology practices with real-world experience implementing outpatient BTCE programs across multiple hematologic malignancies and varying levels of operational maturity.

Survey Population and Outpatient BTCE Experience

To better understand how oncology practices are implementing outpatient BTCE therapy, NCODA surveyed 126 multidisciplinary oncology professionals involved in the delivery of bispecific therapies across community oncology practices, academic medical centers, integrated health systems, and hospital-based programs. The survey examined operational readiness, multidisciplinary coordination, patient selection, toxicity management, and barriers to outpatient implementation.

The survey findings provide important context for understanding how outpatient BTCE programs are being

implemented across diverse oncology settings. **Figure 1** summarizes the characteristics of participating practices and the maturity of their outpatient programs.

Practice Characteristics and Program Maturity

The survey reflects broad real-world experience with outpatient BTCE implementation across multiple oncology practice settings. Community oncology practices represented the majority of respondents, with additional perspectives from academic medical centers, integrated health systems, and hospital-based programs. The multidisciplinary composition of respondents, including pharmacists, physicians, advanced practice providers, infusion nurses, practice administrators, and care coordinators, reflects the collaborative nature of outpatient BTCE care and provides perspectives from the broad range of professionals involved in implementation.

Respondents also reported experience administering bispecific therapies across multiple hematologic malignancies, with the greatest concentration of treated

FIGURE 1. Survey Respondent and Program Characteristics

Survey respondents represented a diverse range of oncology practice settings, multidisciplinary roles, levels of outpatient BTCE implementation, and annual patient volumes, providing a broad perspective on current real-world operational experience.



The respondent population was predominantly community-based and included practices with meaningful experience delivering maintenance dosing, step-up dosing, and post-dose monitoring in the outpatient setting.

patients in multiple myeloma and diffuse large B-cell lymphoma (DLBCL). More than half indicated that multiple myeloma accounted for at least 26% of their outpatient bispecific-treated population, including nearly one-third reporting that it represented more than half of treated patients. DLBCL was also well represented, while experience with follicular lymphoma, other non-Hodgkin lymphomas, chronic lymphocytic leukemia (CLL), and other hematologic malignancies reflected the expanding role of outpatient bispecific therapy across disease settings.

Survey responses further demonstrated considerable variation in program maturity. Maintenance dosing was administered in the outpatient setting by 79.4% of respondents, while 57.9% reported outpatient step-up dosing and 41.3% reported outpatient post-dose monitoring following inpatient administration. At the same

time, 17.5% indicated that outpatient implementation remained in progress, and 8.7% reported that bispecific therapy was still delivered exclusively in the inpatient setting. Annual outpatient treatment volumes also varied substantially, ranging from programs treating fewer than 10 patients annually to nearly one-fifth of respondents managing more than 50 patients each year.

Collectively, these findings demonstrate that outpatient BTCE delivery has expanded across diverse oncology practice settings with varying levels of operational experience and program maturity. This broad representation provides an important foundation for interpreting the operational strategies, implementation challenges, and best practices identified throughout the remainder of this white paper.

Operational Foundations for Outpatient BTCE Programs

KEY TAKEAWAY: Successful outpatient BTCE programs are built on multidisciplinary leadership, standardized clinical workflows, operational infrastructure, and continuous quality improvement. Survey findings suggest that these elements evolve together as practices gain experience delivering bispecific therapies.

Multidisciplinary Leadership Drives Implementation

Survey findings demonstrate that outpatient BTCE implementation is a multidisciplinary effort requiring coordinated leadership across clinical and operational teams. Although hematologists/oncologists most frequently served as implementation champions (42.9% of responding sites), leadership extended well beyond physicians. Pharmacy directed implementation at 17.5% of sites, while multidisciplinary steering committees, nursing leadership, and practice administration also played important roles in establishing outpatient programs. Successful implementation is rarely owned by a single discipline but instead depends on shared governance among physicians, pharmacists, nurses, advanced practice providers, administrators, and care coordinators.

Respondents consistently described multidisciplinary collaboration as essential for developing treatment pathways, allocating operational resources, defining team responsibilities, and establishing the organizational infrastructure required to support outpatient BTCE programs. As patient volumes increase and additional BTCEs become available, coordinated leadership provides the structure needed to maintain consistency while allowing programs to adapt to evolving clinical experience.

Infrastructure and Resource Planning Enable Safe Outpatient Care

Survey responses also highlight the importance of operational infrastructure in supporting outpatient treatment. More than half of respondents reported access to rapid inpatient admission when needed (59.5%) and after-hours clinical triage support (61.1%), while approximately half indicated availability of standardized monitoring documentation (57.1%), staff for extended monitoring (49.2%), dedicated infusion chair capacity (46.0%), dedicated observation space (45.2%), and on-site emergency response resources (46.8%). These findings demonstrate that outpatient BTCE programs rely on multiple complementary resources rather than a single operational capability.

Despite these resources, implementation challenges remained common. When asked to identify the greatest team-related barriers, respondents most frequently cited coordination between departments (28.6%), after-hours coverage (23.8%), and training gaps (21.4%), whereas staffing availability (11.9%) and role clarity (6.4%) were selected less often. Open-ended responses further emphasized the importance of communication between outpatient oncology teams, emergency departments, inpatient services, and affiliated hospitals to ensure patients experiencing CRS or other treatment-related toxicities receive timely and appropriate care.

These operational findings reinforce that successful outpatient implementation extends beyond the infusion center and depends on reliable coordination across the broader healthcare system.

Standardization Supports Consistent Care

Survey respondents consistently identified standardized clinical workflows as a defining characteristic of operational readiness. Institutions described implementing protocols addressing treatment scheduling, laboratory monitoring, premedication requirements, toxicity assessment, observation periods, documentation, and escalation procedures. Standardized electronic health record order sets and treatment pathways were viewed as important tools for reducing practice variation, improving documentation consistency, and reinforcing adherence to product-specific prescribing information.

Importantly, respondents also indicated that protocol development remains an iterative process. As outpatient programs mature and clinical experience expands, practices continue refining institutional pathways to incorporate emerging evidence, lessons learned through implementation, and the unique administration requirements of newly approved BTCEs. These results suggest that protocol standardization should be viewed as a continuous quality improvement initiative rather than a one-time implementation milestone.

Comprehensive Staff Education Supports Program Readiness

Education emerged as another core component of operational readiness. Survey respondents most frequently identified ICANS recognition and management

(69.1%) and CRS recognition and management (66.7%) as the highest educational priorities for multidisciplinary teams. Additional educational needs included patient and caregiver education (41.3%), post-dose observation procedures (35.7%), documentation workflows (27.8%), emergency escalation procedures (28.6%), after-hours triage (28.6%), and product-specific monitoring requirements (20.6%).

Respondents emphasized that education should extend beyond the oncology team to include emergency department clinicians, hospitalists, inpatient nursing teams, and other healthcare professionals who may participate in the care of patients receiving BTCE therapy. Several respondents identified communication and coordination between the outpatient oncology team and emergency departments, inpatient services, and affiliated hospitals as important implementation challenges, underscoring the need for institution-wide education, standardized communication pathways, and clearly defined escalation processes.

Operational Readiness Continues to Evolve

Survey findings consistently reflected organizations at different stages of implementation, ranging from centers actively developing outpatient BTCE programs to practices treating more than 50 patients annually. This variation in program maturity was also evident operationally. Although step-up dosing delays were uncommon for many organizations, approximately one-third of respondents reported that operational or scheduling constraints delayed treatment in 10–25% of cases, illustrating that resource limitations continue to influence care delivery even in experienced programs.

Collectively, these findings demonstrate that operational readiness is not a single implementation milestone but an ongoing process of refinement. As outpatient BTCE programs mature, institutions continue to strengthen multidisciplinary communication, expand education, optimize workflows, and adapt protocols in response to increasing patient volumes, new therapeutic indications, and evolving clinical evidence. Sustainable outpatient programs are therefore distinguished not only by their initial infrastructure, but by their ability to continuously improve the systems that support safe, consistent, and efficient care.

The operational framework described in this section establishes the foundation for outpatient BTCE delivery. However, even the most mature infrastructure depends on selecting appropriate patients for outpatient treatment.

The following section examines how practices evaluate patient eligibility and determine readiness for outpatient BTCE administration.

FIGURE 2. Top Operational Challenges to Outpatient BTCE Implementation

Survey respondents most frequently identified coordination across departments, after-hours coverage, and staff education as the greatest operational challenges to outpatient BTCE implementation. Qualitative responses further emphasized communication and standardized workflows as critical determinants of program success.

MOST FREQUENTLY REPORTED CHALLENGES

Coordination between departments

28.6%

After-hours clinical coverage

23.8%

Staff education / training gaps

21.4%

Staffing availability

11.9%

Role clarity

6.4%

QUALITATIVE THEMES



Communication across care settings



Standardized escalation pathways



Emergency department preparedness



Consistent multidisciplinary workflows



Resource availability during step-up dosing

Patient Selection and Readiness for Outpatient BTCE Therapy

KEY TAKEAWAY: Successful outpatient BTCE programs distinguish between patients who are clinically eligible for therapy and those who are logistically prepared to safely initiate treatment outside the hospital. Survey findings demonstrate that patient selection requires coordinated evaluation of clinical risk, caregiver support, logistical readiness, and patient engagement before treatment begins.

Patient Selection Extends Beyond Clinical Eligibility

Survey findings consistently demonstrated that practices view patient selection as a comprehensive readiness assessment that integrates clinical, functional, social, and logistical considerations rather than relying solely on disease characteristics. Respondents described evaluating traditional clinical factors alongside caregiver support,

transportation, geographic proximity, communication reliability, and patient engagement before determining whether outpatient treatment was appropriate. These findings reinforce that outpatient eligibility depends not only on a patient's ability to receive BTCE therapy but also on the infrastructure available to support treatment initiation and early toxicity monitoring.

While published evidence supports outpatient administration in appropriately selected patients, survey responses suggest that successful implementation relies on standardized institutional processes for assessing readiness before the first dose is administered.

Clinical Assessment Remains the Foundation

Respondents identified disease burden, performance status, anticipated treatment tolerance, infection risk, and prior treatment-related toxicities as central clinical

considerations during patient selection. Although these factors help estimate the likelihood of treatment-related complications, respondents emphasized that clinical eligibility alone is insufficient when determining outpatient suitability.

Because the timing and incidence of CRS and ICANS differ across BTCE products, practices reported individualizing patient selection according to product-specific monitoring requirements and institutional experience rather than applying a single standardized eligibility algorithm.

In addition to clinical risk, respondents described evaluating a patient's ability to understand treatment expectations, recognize evolving symptoms, comply with scheduled monitoring visits, and communicate promptly with the oncology team should adverse events occur.

Caregiver Support and Logistical Readiness Influence Outpatient Success

Survey responses consistently highlighted caregiver availability and logistical readiness as essential components of outpatient treatment planning. Respondents emphasized that reliable transportation, geographic proximity to the treatment center, and the ability to rapidly return for urgent evaluation were critical determinants of whether outpatient initiation was appropriate.

These considerations were viewed as particularly important during step-up dosing, when CRS and other immune-mediated toxicities are most likely to occur. Several respondents noted that outpatient treatment should only proceed when patients have dependable support systems capable of recognizing early symptoms and facilitating timely communication with the treating team.

Collectively, these findings suggest that many practices evaluate operational readiness with the same level of importance as clinical eligibility when determining outpatient candidacy.

Multidisciplinary Assessment Supports Safe Outpatient Care

Determining outpatient readiness was described as a shared clinical decision involving multiple members of the care team. Physicians, advanced practice providers, pharmacists, infusion nurses, nurse navigators, schedulers,

financial counselors, and administrative personnel each contributed to assessing whether patients were prepared for outpatient treatment.

This collaborative approach allowed practices to identify potential barriers before therapy began, coordinate supportive services, and establish individualized monitoring plans tailored to each patient's clinical and logistical circumstances.

Taken together, the survey findings indicate that outpatient readiness extends well beyond traditional measures of clinical fitness. Successful programs integrate clinical assessment with caregiver engagement, logistical planning, structured education, and multidisciplinary decision-making to ensure that patients are prepared to safely initiate BTCE therapy outside the hospital. These patient-centered readiness assessments complement the operational infrastructure described in the previous section and establish the foundation for effective toxicity monitoring and management throughout treatment initiation.

Education Begins Before Treatment Starts

Survey findings demonstrated that patient and caregiver preparation begins before the first dose is administered. Respondents described structured education addressing treatment expectations, expected toxicities, symptom recognition, observation requirements, after-hours communication, emergency department instructions, and when immediate medical evaluation should be sought as an essential component of outpatient readiness.

Education was viewed as an ongoing process that continued throughout step-up dosing, reinforcing key safety messages as patients progressed through treatment. Respondents also emphasized that caregivers play an active role in recognizing early symptoms and facilitating rapid communication with the oncology team. Patient and caregiver education is one of the most important educational priorities for outpatient BTCE programs.

Safety Infrastructure and Toxicity Management

KEY TAKEAWAY: Safe outpatient BTCE administration depends on standardized monitoring protocols, coordinated communication pathways, and rapid access to escalation of care. Survey findings demonstrate that successful programs rely on multidisciplinary systems designed to recognize and manage CRS, ICANS, and other treatment-related complications throughout treatment initiation.

Standardized Monitoring Supports Early Toxicity Recognition

Survey findings demonstrated that practices have implemented structured monitoring systems to support early recognition of CRS, ICANS, and other treatment-related toxicities during the highest-risk period following BTCE administration. Respondents reported using standardized observation periods, laboratory monitoring, toxicity documentation, and product-specific monitoring protocols to promote consistent patient assessment following treatment administration. Although monitoring practices varied across institutions and BTCE products, respondents consistently emphasized the importance of standardized workflows that facilitate early recognition of CRS and ICANS.

These insights align with current clinical recommendations that monitoring strategies should reflect the prescribing information for each BTCE rather than a single class-wide approach. As institutional experience has expanded, many practices have continued to refine monitoring protocols based on product-specific experience and operational lessons learned.

Rapid Escalation Pathways Are Essential

Survey responses highlighted the importance of clearly defined escalation pathways that provide rapid access to oncology providers, emergency evaluation, and inpatient admission when clinically indicated.

Consistent with findings described in the Operational Foundations section, most organizations reported access to after-hours clinical triage (61.1%) and rapid inpatient admission pathways (59.5%). These resources were

frequently identified as critical components of safe outpatient implementation, allowing practices to respond quickly when patients required additional evaluation or escalation of care. Conversely, respondents identified after-hours coverage and coordination between departments among the most common operational challenges, highlighting opportunities for continued improvement in communication across care settings.

Communication Across Care Settings

Effective toxicity management depended on coordinated communication across outpatient oncology, emergency medicine, inpatient services, pharmacy, and affiliated hospitals. Respondents described using structured communication pathways to facilitate rapid recognition and management of BTCE-related toxicities when patients transitioned between care settings.

Several qualitative responses emphasized that patients frequently present to providers who may be less familiar with BTCE-associated toxicities. As a result, practices described implementing standardized communication tools, treatment summaries, emergency contact information, and institution-specific management pathways to improve coordination during urgent evaluations. These findings reinforce that successful toxicity management depends on integrated communication across the broader healthcare system rather than within the oncology clinic alone.

Safety Systems Continue Beyond Step-Up Dosing

Although the highest risk for CRS and ICANS occurs during treatment initiation, safety infrastructure must support patients throughout the continuum of therapy. Ongoing laboratory surveillance, infection monitoring, assessment for delayed toxicities, management of treatment interruptions, repeat step-up dosing when indicated, and coordination following hospitalization or emergency evaluation remain important components of outpatient care.

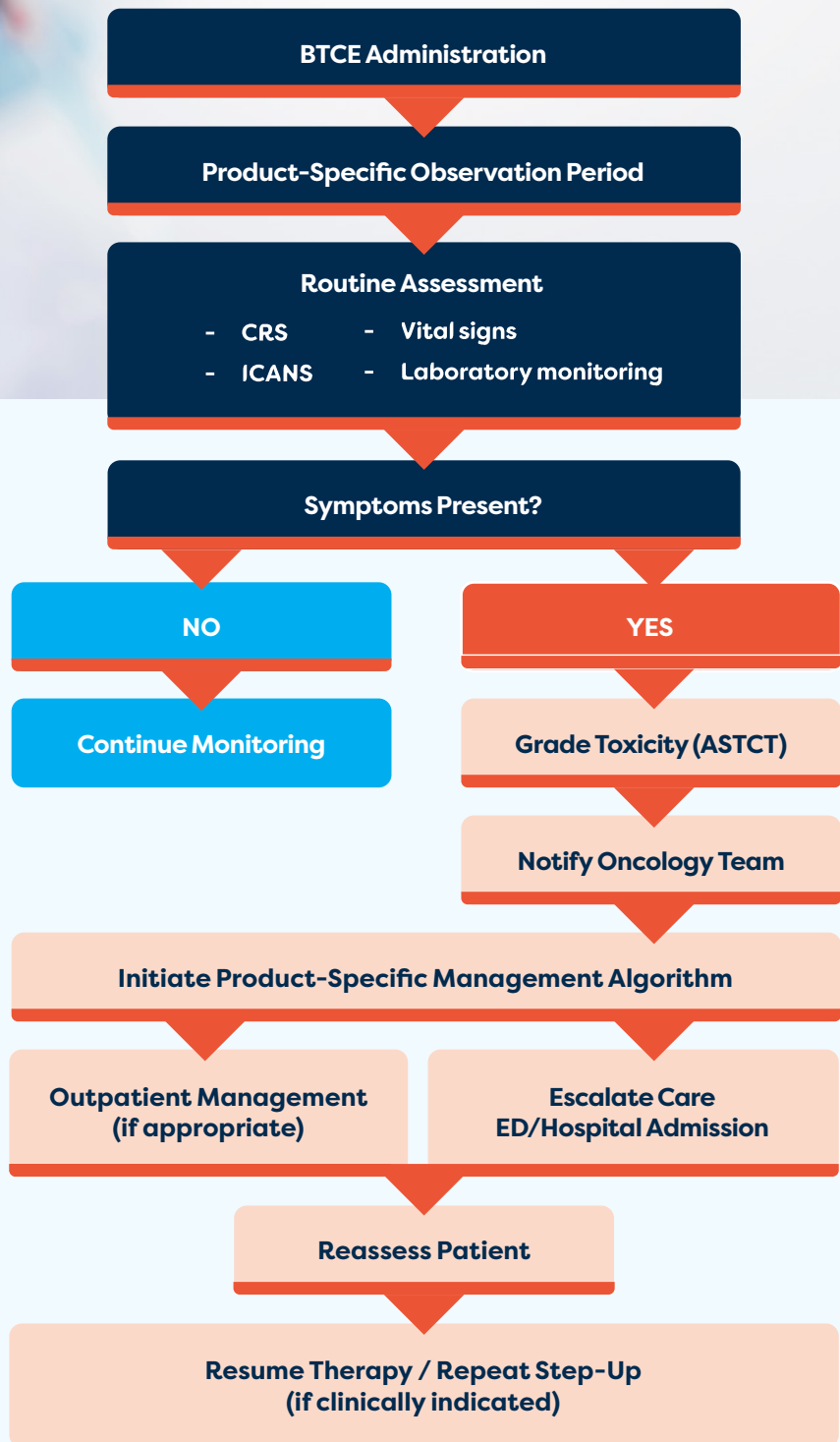
The survey results demonstrate that safety infrastructure is not limited to the first treatment cycle but represents a longitudinal component of outpatient BTCE care that evolves with the patient's treatment journey.



FIGURE 3. Monitoring and Escalation Pathway for Outpatient BTCE Therapy

Standardized monitoring, toxicity grading, and predefined escalation pathways support timely recognition and management of CRS and ICANS while promoting coordinated care across outpatient and inpatient settings.

Collectively, the findings illustrate that successful outpatient BTCE programs rely on standardized monitoring, rapid escalation pathways, multidisciplinary communication, and continuous patient engagement to support safe treatment delivery. While practices differed in the operational details of these systems, respondents consistently reinforced that successful outpatient BTCE programs depend on reliable monitoring processes, predefined escalation pathways, and coordinated communication across the continuum of care.



Practical Considerations for Outpatient BTCE Implementation

KEY TAKEAWAY: Survey findings identified several operational characteristics shared by successful outpatient BTCE programs.

Although implementation approaches varied across organizations, common themes emerged that may help practices establish, expand, and sustain safe outpatient BTCE delivery.

Multidisciplinary Leadership

Successful outpatient BTCE implementation extends beyond physician leadership. Across participating organizations, collaborative governance models engaged physicians, pharmacists, advanced practice providers, nursing leaders, administrators, and care coordinators throughout program planning and implementation. Clearly defined roles, shared accountability, and coordinated decision-making supported the development of consistent clinical workflows while allowing organizations to adapt to evolving operational needs.

Adaptable Standardized Workflows

Standardized clinical workflows emerged as a defining characteristic of more mature outpatient BTCE programs. Respondents emphasized the value of product-specific treatment pathways, electronic health record order sets, toxicity management algorithms, documentation templates, and operational protocols. At the same time, implementation strategies must remain adaptable as new BTCEs become available, product-specific recommendations evolve, and institutional experience grows. Standardized processes are most effective when viewed as living frameworks that are refined through continuous quality improvement.

Education Across the Care Continuum

Education was consistently identified as a critical component of successful outpatient implementation. In addition to preparing physicians, pharmacists, nurses, and advanced practice providers, practices emphasized the importance of educating emergency department clinicians, hospital-based teams, and other healthcare

professionals who may participate in the management of BTCE-related toxicities. Structured education for patients and caregivers before treatment initiation was likewise viewed as essential for promoting timely symptom recognition, effective communication, and adherence to monitoring recommendations.

Safety Infrastructure

Safe outpatient BTCE delivery depends on coordinated systems that support patients throughout treatment initiation and beyond. Practices consistently highlighted the importance of after-hours clinical support, predefined escalation pathways, communication across care settings, and timely access to inpatient evaluation when clinically indicated. These operational elements enable teams to respond efficiently to treatment-related toxicities while maintaining continuity of care across outpatient and inpatient settings.

Continuous Quality Improvement

Outpatient BTCE implementation is best viewed as an iterative process rather than a fixed operational model. As patient volumes increase and new therapies enter clinical practice, organizations continue refining institutional protocols, evaluating workflow efficiency, addressing operational barriers, expanding education, and incorporating lessons learned into routine care. This commitment



FIGURE 4.**Six Principles for Successful Outpatient BTCE Programs**

This implementation framework synthesizes survey findings and published evidence into six operational principles that support the safe, coordinated, and sustainable delivery of outpatient BTCE therapy across diverse oncology practice settings.

practice, organizations continue refining institutional protocols, evaluating workflow efficiency, addressing operational barriers, expanding education, and incorporating lessons learned into routine care. This commitment to continuous quality improvement allows programs to remain responsive to emerging evidence while maintaining safe, efficient, and consistent care delivery.

Collectively, these observations reveal that successful outpatient BTCE implementation depends on more than clinical expertise alone. Practices with established outpatient programs consistently described multidisciplinary leadership, adaptable standardized workflows, comprehensive education, robust safety infrastructure, and continuous quality improvement as foundational elements supporting safe and sustainable care. As the use of BTCEs continues to expand across hematologic malignancies, these practical considerations can be synthesized into six core operational principles that provide a flexible framework for organizations seeking to establish or expand outpatient BTCE programs.

Safe, Coordinated, & Sustainable Outpatient BTCE Delivery

 PROGRAM LEADERSHIP	 CLINICAL OPERATIONS	 PATIENT SELECTION
Physician champion Pharmacy leadership Nursing leadership Administrative support Governance structure Standard operating procedures	Staff education CRS/ICANS recognition Product-specific protocols Documentation Observation workflows Order sets/ checklists	Performance status Caregiver availability Travel distance Transportation Disease burden Infection risk Readiness assessment
 MULTIDISCIPLINARY COORDINATION	 SAFETY & EMERGENCY PREPAREDNESS	 CONTINUOUS QUALITY IMPROVEMENT
Defined team responsibilities Shared workflows Cross-setting communication Care transitions and handoffs Physician/APP/ pharmacy/nursing Navigation/financial support	CRS/ICANS escalation Tocilizumab availability After-hours triage ED communication Rapid admission pathway Product-specific observation	Measure program outcomes Review treatment delays Update protocols Ongoing education Simulation exercises Incorporate lessons learned
DESIRED PROGRAM OUTCOMES		
- Safe outpatient administration - Timely treatment initiation - Consistent toxicity management - Reduced avoidable hospital utilization - Improved patient experience - Expanded access to BTCE therapy		

Conclusion

Bispecific T-cell engagers have transformed the treatment landscape for hematologic malignancies while introducing new operational considerations for outpatient oncology practices. Findings from this national survey demonstrate that outpatient BTCE delivery has become an established model of care across diverse practice settings, supported by multidisciplinary collaboration, standardized workflows, thoughtful patient selection, robust safety infrastructure, and a commitment to continuous quality improvement.

As BTCE use continues to expand into additional disease settings and earlier lines of therapy, sharing real-world implementation experience will remain essential for supporting safe, efficient, and patient-centered care. Although operational approaches will continue to evolve, the principles identified in this white paper provide a practical, adaptable foundation that practices can use to strengthen existing programs and guide future implementation efforts.

Acknowledgment

NCODA gratefully acknowledges AbbVie for its sponsorship and support of this white paper. NCODA and the physician author retained full editorial independence and final editorial control over the content, interpretation of findings, and conclusions presented herein.

References

1. Albayrak G, Wan PKT, Fisher K, et al. T cell engagers: expanding horizons in oncology and beyond. *Br J Cancer*. 2025;133:1241-1249. doi:10.1038/s41416-025-03125-y. <https://doi.org/10.1038/s41416-025-03125-y>.
2. Herrera M, Pretelli G, Desai J, et al. Bispecific antibodies: advancing precision oncology. *Trends Cancer*. 2024;10(10):893-919. doi:10.1016/j.trecan.2024.07.002. <https://doi.org/10.1016/j.trecan.2024.07.002>.
3. Moreau P, Garfall AL, van de Donk NWCJ, et al. Teclistamab in relapsed or refractory multiple myeloma. *N Engl J Med*. 2022;387(6):495-505. doi:10.1056/NEJMoa2203478. <https://doi.org/10.1056/NEJMoa2203478>.
4. Chari A, Minnema MC, Berdeja JG, et al. Talquetamab, a T-cell-redirecting GPRC5D bispecific antibody for multiple myeloma. *N Engl J Med*. 2022;387(24):2232-2244. doi:10.1056/NEJMoa2204591. <https://doi.org/10.1056/NEJMoa2204591>.
5. Budde LE, Sehn LH, Matasar M, et al. Safety and efficacy of mosunetuzumab, a bispecific antibody, in patients with relapsed or refractory follicular lymphoma: a single-arm, multicentre, phase 2 study. *Lancet Oncol*. 2022;23(8):1055-1065. doi:10.1016/S1470-2045(22)00335-7. [https://doi.org/10.1016/S1470-2045\(22\)00335-7](https://doi.org/10.1016/S1470-2045(22)00335-7).
6. Dickinson MJ, Carlo-Stella C, Morschhauser F, et al. Glofitamab for relapsed or refractory diffuse large B-cell lymphoma. *N Engl J Med*. 2022;387(24):2220-2231. doi:10.1056/NEJMoa2206913. <https://doi.org/10.1056/NEJMoa2206913>.
7. Thieblemont C, Phillips T, Ghesquieres H, et al. Epcoritamab, a novel, subcutaneous CD3xCD20 bispecific T-cell-engaging antibody, in relapsed or refractory large B-cell lymphoma: dose expansion in a phase I/II trial. *J Clin Oncol*. 2023;41(12):2238-2247. doi:10.1200/JCO.22.01725. <https://doi.org/10.1200/JCO.22.01725>.
8. Lynozyfic (linvoseltamab-gcpt) [prescribing information]. Regeneron Pharmaceuticals, Inc; revised July 2025. Accessed July 23, 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2025/761400s000lbl.pdf.
9. Epkinly (epcoritamab-bysp) [prescribing information]. Genmab US, Inc; revised March 2026. Accessed July 23, 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2026/761324s010lbl.pdf.

10. Tecvayli (teclistamab-cqyv) [prescribing information]. Janssen Biotech, Inc; revised March 2026. Accessed July 23, 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2026/761291s018lbl.pdf.
11. Ravi G, Costa LJ. Bispecific T-cell engagers for treatment of multiple myeloma. *Am J Hematol*. 2023;98(suppl 2):S13-S21. doi:10.1002/qjh.26628.
12. Radtke KK, Bender BC, Li Z, et al. Clinical pharmacology of cytokine release syndrome with T-cell-engaging bispecific antibodies: current insights and drug development strategies. *Clin Cancer Res*. 2025;31(2):245-257. doi:10.1158/1078-0432.CCR-24-2247.
13. Maude SL, Barrett D, Teachey DT, Grupp SA. Managing cytokine release syndrome associated with novel T cell-engaging therapies. *Cancer J*. 2014;20(2):119-122. doi:10.1097/PPO.0000000000000035.
14. Géraud A, Hueso T, Laparra A, et al. Reactions and adverse events induced by T-cell engagers as anti-cancer immunotherapies, a comprehensive review. *Eur J Cancer*. 2024;205:114075. doi:10.1016/j.ejca.2024.114075.
15. Lee DW, Santomaso BD, Locke FL, et al. ASTCT consensus grading for cytokine release syndrome and neurologic toxicity associated with immune effector cells. *Biol Blood Marrow Transplant*. 2019;25(4):625-638. doi:10.1016/j.bbmt.2018.12.758.
16. Crombie JL, Graff T, Falchi L, et al. Consensus recommendations on the management of toxicity associated with CD3×CD20 bispecific antibody therapy. *Blood*. 2024;143(16):1565-1575. doi:10.1182/blood.2023022432. <https://doi.org/10.1182/blood.2023022432>.
17. Talvey (talquetamab-tgvs) [prescribing information]. Janssen Biotech, Inc; revised 2025. Accessed July 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2025/761342s016lbl.pdf.
18. Elrexio (elranatamab-bcmm) [prescribing information]. Pfizer Inc; revised 2025. Accessed July 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2023/761345Orig1s000lbl.pdf.
19. Columvi (glofitamab-gxbm) [prescribing information]. Genentech USA, Inc; revised 2025. Accessed July 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2023/761309s000lbl.pdf.
20. Lunsumio (mosunetuzumab-axgb) [prescribing information]. Genentech USA, Inc; revised 2025. Accessed July 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2022/761263s000lbl.pdf.
21. Mahmoudjafari Z, Ali A, Davis J, Sandahl T, Nachar V, Mancini R. Seamless navigation of bispecific therapies: optimizing management and outpatient access with a focus on coordination. *J Adv Pract Oncol*. Published online September 11, 2024. doi:10.6004/jadpro.2024.15.8.15.
22. Pharmacy Times. The term “bispecific antibody” is no longer enough. Published June 16, 2025. Accessed July 23, 2026. <https://www.pharmacytimes.com/view/the-term-bispecific-antibody-is-no-longer-enough>.
23. Sandahl TB, Soefje SA, Fonseca R, et al. Real-world safety and health care resource utilization of teclistamab under an outpatient model for step-up dosing administration. *JCO Oncol Pract*. 2025;21(5):702-709. doi:10.1200/OP-24-00489. <https://doi.org/10.1200/OP-24-00489>.
24. Andorsky D, Torres Lopez A, Vaidya R, et al. Epcoritamab monotherapy as outpatient treatment for patients with relapsed/refractory diffuse large B-cell lymphoma: interim results from EPCORE NHL-6. *Clin Lymphoma Myeloma Leuk*. 2026;26(5):317-327.e10. doi:10.1016/j.clml.2026.02.006. <https://doi.org/10.1016/j.clml.2026.02.006>.
25. Garfall AL, Banerjee R, Frenzel L, et al. A roadmap to implementing outpatient administration of bispecific antibodies in multiple myeloma. *Front Oncol*. 2025;15:1630146. doi:10.3389/fonc.2025.1630146. <https://doi.org/10.3389/fonc.2025.1630146>.
26. NCODA. Putting Bispecific T-Cell Engagers into Action. Updated November 20, 2025. Accessed July 23, 2026. <https://ncoda.org/resource/putting-bispecific-t-cell-engagers-into-action/>.
27. AJMC. Pain points in bispecific operationalization. *American Journal of Managed Care*. December 18, 2023. Accessed July 23, 2026. <https://www.ajmc.com/view/pain-points-in-bispecific-operationalization>.

