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RESEARCH BRIEF

Interpreting Access in a New Era of Targeted Therapies: A Closer Look at Antibody-Drug Conjugate Treatment Patterns in Metastatic Breast Cancer

Real-world data shows growing clinical acceptance but differing treatment patterns across demographics

KEY FINDINGS:

- **Rapid treatment adoption with faster patient access:** Antibody-drug conjugate (ADC) treatment rates increased 3.7-fold from 2021 to 2023 (1,353 to 4,965 per 100,000 newly diagnosed metastatic breast cancer patients), while median time to treatment dramatically decreased from 331 to 109 days.
- **Differences in treatment patterns detected based on age and insurance:** Younger women (19-35 years) showed the highest treatment rates (8,803 per 100,000) and fastest access (median 217 days), while women age 66+ had the lowest rates (2,557 per 100,000) and longest delays (median, 242 days). Patients insured by Medicaid received treatment at nearly twice the rate of patients insured by Medicare (5,911 vs. 3,020 per 100,000).
- **Treatment patterns reflect disease biology across racial groups:** Despite similar overall metastatic breast cancer incidence rates between White and Black women (180 vs. 169 per 100,000), ADC usage patterns differed substantially. Black women had the highest ADC treatment rate (4,948 per 100,000), primarily driven by Trodelvy use for triple-negative breast cancer, a subtype more common in this population.[1] Asian women showed higher rates of HER2-targeted ADCs (Enhertu, Kadcyla), and an overall ADC rate of 4,911 per 100,000. White women had lower overall ADC usage (3,583 per 100,000), consistent with different breast cancer subtype distributions.

EXECUTIVE SUMMARY:

Not all providers adopt new cancer treatments at the same pace; for patients with metastatic breast cancer, this can mean significant gaps and delays in receiving advanced therapies. This analysis examines how prescribing patterns for ADCs vary across demographic groups to shed light on the role of patient characteristics in shaping access to novel drugs.

ADCs represent a breakthrough in precision oncology, combining the specificity of monoclonal antibodies with the cytotoxic potency of chemotherapy drugs. This innovative approach allows for precise delivery of potent anti-cancer agents directly to tumor cells (via binding to tumor antigens and subsequent endocytosis) while minimizing exposure to healthy tissue, providing a more targeted and effective therapy.[2]

Our findings reveal varied patterns in treatment access across age, insurance, and racial groups. The underlying factors driving these variations require further investigation to understand their clinical and policy implications.

METHODOLOGY:

This analysis was powered by Komodo's Healthcare Map®, which tracks the healthcare journeys of over 330 million de-identified U.S. patients. From an initial cohort of 431,276 women newly diagnosed with metastatic breast cancer (from January 2021 through December 2023), we analyzed a refined subset of 17,005 patients who received treatment with ADCs and for whom information on event dates, demographics, and location was complete.

ADCs Analyzed

ADCs represent a targeted therapy approach that requires specific molecular markers for eligibility. The three FDA-approved ADCs analyzed were:

- Trastuzumab emtansine (Kadcyla; approved February 2013): HER2-positive cancers
- Trastuzumab deruxtecan (Enhertu; first approved December 2019): HER2-positive, and later (2022) expanded to HER2-low cancers
- Sacituzumab govitecan (Trodelvy; first approved April 2020): Triple-negative and, later (2023), HR-positive/HER2 cancers

We chose these three ADCs because they represent a breakthrough in precision oncology and the evolution of targeted therapy for breast cancer. Each drug targets a distinct molecular subtype, effectively demonstrating how ADCs have expanded to treat HER2-positive, HER2-low, and triple-negative breast cancers. (The newest FDA-approved ADC, Datroway [datopotamab deruxtecan], was not yet on the market in the time frame of this analysis, although it represents the continued expansion in this treatment class.)

Analysis Framework

We looked at treatment rates and time-to-treatment patterns across demographic variables, including race and ethnicity, age groups (19-35, 36-45, 46-55, 56-65, 66+), and payer type (commercial, Medicare, Medicaid). Patients were counted as receiving treatment based on one or more claims for the given drug; treatment rates were calculated per 100,000 newly diagnosed metastatic breast cancer patients; and time to treatment represents median days from metastatic diagnosis to first ADC prescription. Access to Keytruda (pembrolizumab) served as a reference comparison due to its broader familiarity among clinicians and longer market presence, while acknowledging that ADCs are typically indicated for later lines of therapy compared to Keytruda's first-line use in triple-negative breast cancer.

Key Limitations

- Small sample sizes prevented the drawing of reliable conclusions about geographical access patterns. When analyzed by region and urban/rural status, sample sizes frequently dropped below 30 patients, making rates and treatment calculations less meaningful.
- Inherent claims data limitations make accurate cancer subtype classification challenging, as administrative data lacks the specific biomarker test results (ER, PR, HER2 status) needed for precise molecular classification.
- Inconsistent coding and reporting practices across healthcare systems can make it difficult to reliably identify these molecular subtypes, even when specific codes are available.

RESULTS

Treatment Adoption Overview

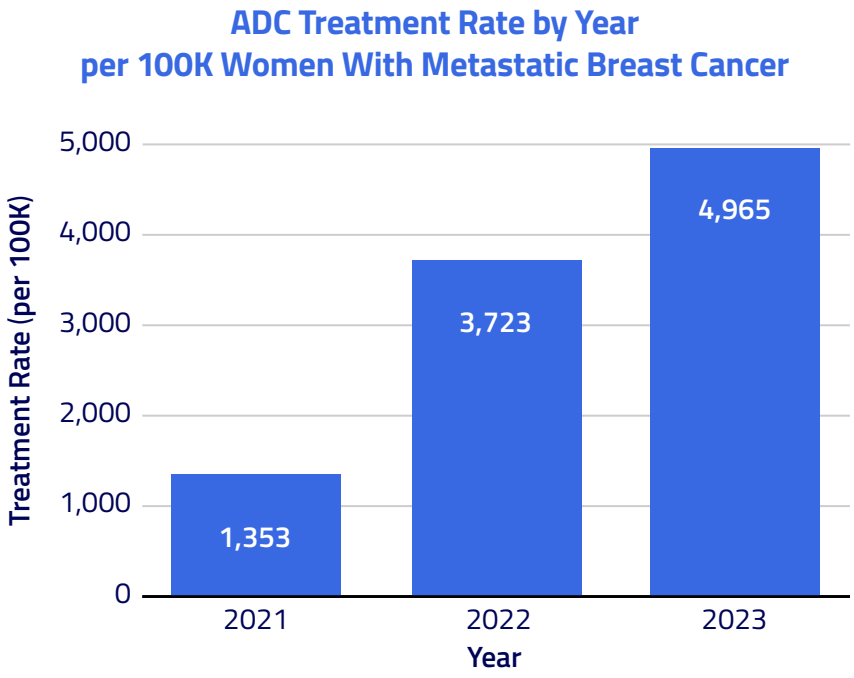
Among women newly diagnosed with metastatic breast cancer between 2021 and 2023, ADC treatment rates increased 3.7-fold. Patterns emerged across demographic groups that challenge traditional disparities in cancer care: Younger patients received ADCs more frequently, while Medicaid patients had the highest rates of adoption.

Clinical Context: ADCs as Later-Line Therapy

Among patients treated with ADCs, 84% initiated therapy more than 60 days after metastatic diagnosis. While median time to treatment overall was 235 days, early use (<30 days) was rare and likely represents atypical clinical scenarios. This time to therapy is consistent with clinical guidelines, which generally recommend ADCs for use in later lines of therapy following progression on other treatments.

Treatment Adoption Trends

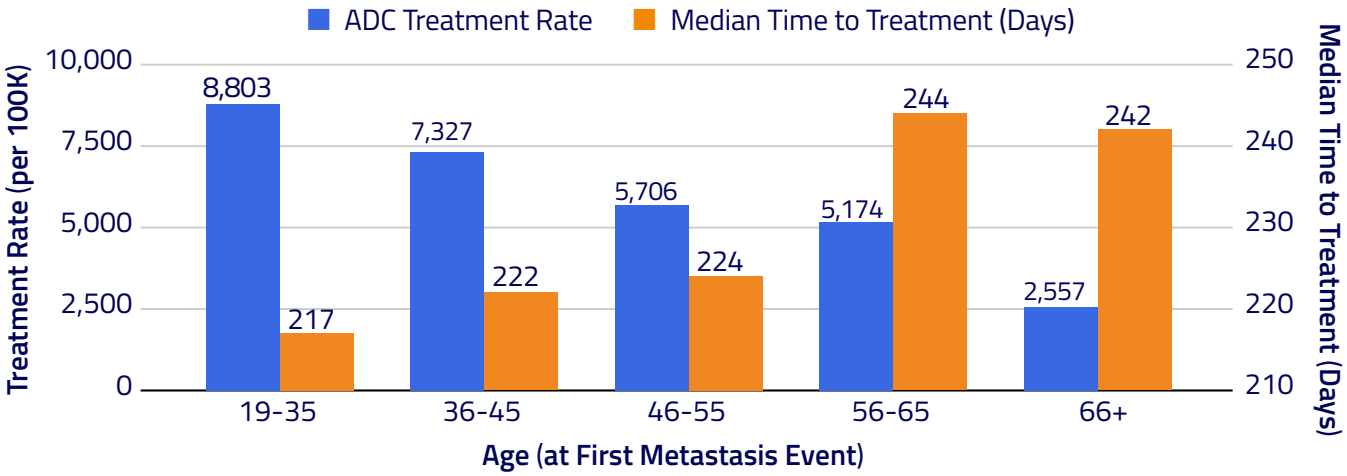
ADC treatment rates increased 3.7-fold from 2021 to 2023 (from 1,353 to 4,965 patients per 100,000 diagnosed), while median time to treatment dropped dramatically from 331 to 109 days. This acceleration reflects both expanding clinical indications and growing prescriber familiarity, driven by clinical experience, broader access, and label expansions that occurred across 2022 and 2023 for Enhertu and Trodelvy.



Demographic Treatment Patterns

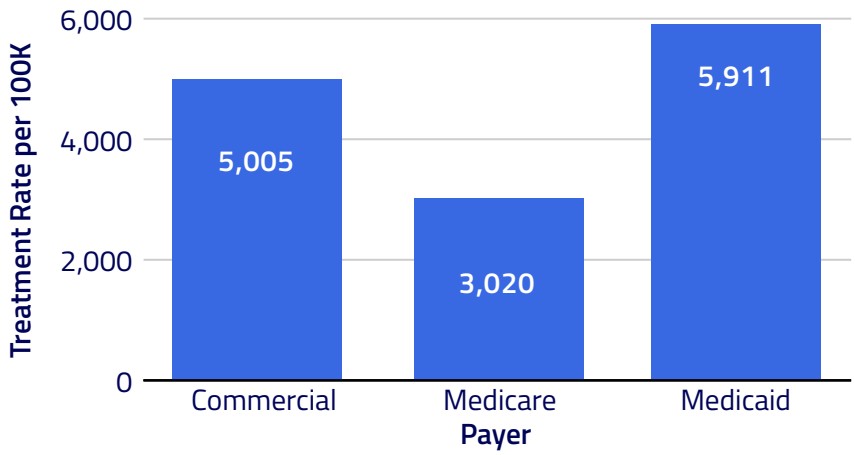
Age distribution: Women age 19 to 35 had the highest treatment rates (8,803 per 100,000) and the shortest median time to treatment (217 days) compared to women age 66+, who had rates 3.4 times lower (2,557 per 100,000) and longer delays (242 days). Treatment rates declined stepwise across age groups: 36 to 45 (7,327 per 100,000), 46 to 55 (5,706), and 56 to 65 (5,174); time to treatment increased correspondingly. This pattern may reflect more aggressive treatment approaches in younger patients and potential differences in tumor biology or treatment tolerance across age groups.

ADC Treatment Rate and Median Time to Treatment (Days) by Age at First Metastasis

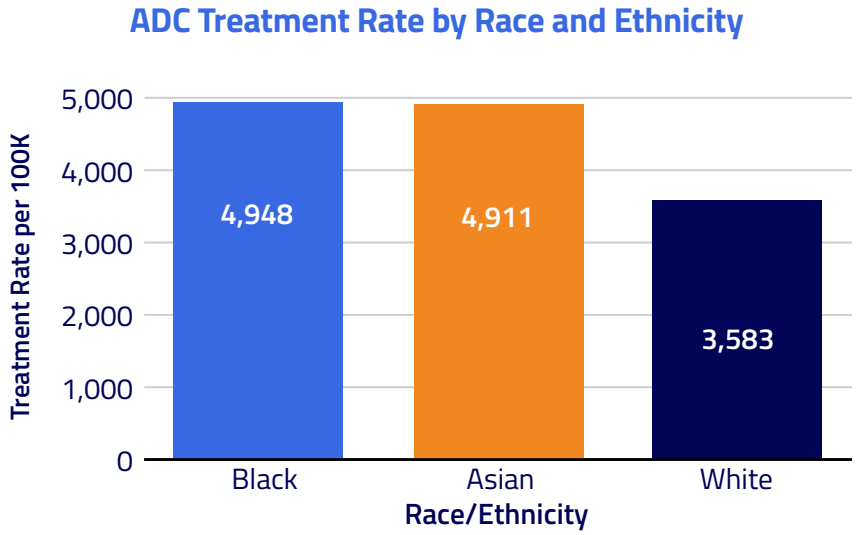


Insurance coverage: Medicaid claims showed patients with the highest treatment rates across both drug groups (TNBC and HER2+) at 5,911 per 100,000, nearly twice the rate of patients insured by Medicare (3,020) and higher than commercially insured patients (5,005). This finding warrants further investigation, as the relationship between insurance type and treatment access involves multiple factors, including age distribution, disease stage at diagnosis, treatment setting, and coverage policies. Medicaid serves a predominantly younger population than Medicare (which covers patients 65+) and may have different concentrations of patients treated at academic or NCI-designated cancer centers, where ADC adoption rates are higher.

Treatment Rate by Payer at First Metastasis Event



Race and ethnicity: Despite similar metastatic breast cancer incidence rates between White and Black women (180 vs. 169 per 100,000), Black women had the highest ADC treatment rates (4,948), followed by White women (3,583). This pattern reflects underlying disease biology: Black women had higher Trodelvy usage for triple-negative breast cancer, while Asian women showed higher rates of HER2-targeted ADCs (Enhertu, Kadcyla). White women's lower ADC usage aligns with their higher prevalence of HR-positive, HER2-negative subtypes, for which these ADCs are not first-line treatments.[3-4] These findings suggest that the observed racial differences in ADC utilization are driven by cancer subtype distribution rather than our ability to ascertain differences in access to care.



Geographic access: Across the five states analyzed (CA, GA, IL, NY, TX), patients living in urban areas had significantly higher ADC treatment rates than those in rural areas (4,277 vs. 3,664; $P<0.05$) and faster days to treatment initiation (224 vs. 268), though the timing difference was not statistically significant.

> "The encouraging patterns we see in this analysis — where ADC utilization aligns with disease biology — suggest that equitable outcomes are possible in precision medicine. Understanding the factors that contributed to these patterns can inform future therapeutic development. However, the question of why older women have significantly lower treatment rates remains critical and demands investigation to ensure appropriate care for all patients."
>
> — Maimah Karmo, CEO and Founder, Tigerlily Foundation

DISCUSSION

Findings and Limitations

At first glance, the variation in treatment rates across racial groups appears to differ from historical cancer care patterns, but underlying differences in disease biology point to the multitude of variables at play when analyzing patterns in access. The higher rates of ADC use among Black and Asian women and lower rates among White women are consistent with the known epidemiology of TNBC and HER2-positive breast cancer, respectively. This highlights the importance of analyzing treatment patterns at the molecular level, not just the disease level, and the challenges in analyzing subtype prevalence using claims data alone.

Though the rapid adoption of ADCs represents significant progress, the treatment rates across groups warrant careful interpretation. For example, younger patients receive treatment more often than older patients. This could be influenced by insurance coverage differences, treatment eligibility, or a higher comorbidity burden in older populations. These remain open-ended questions and areas for future research.

The data showing a 3.4-fold lower treatment rate in women age 66 and older compared to those age 19 to 35 raises important questions about potential age-related differences. These could be related to a number of factors, including insurance coverage type (e.g., Medicare vs. commercial), treatment eligibility based on the comorbidity burden in older populations, or other factors that warrant further investigation. These findings underscore that, while ADCs are becoming more widely adopted, additional research is necessary to determine if age and/or insurance coverage type are barriers to access.

The regional analysis limitations highlight an important consideration for specialized treatment research: Even with comprehensive national datasets, newer treatments that have limited uptake can present challenges for geographic analysis. The small sample sizes may reflect both the specialized nature of these treatments and their concentration in certain clinical settings. This could indicate geographic access patterns that require different methodological approaches to detect reliably.

These findings underscore the importance of using real-world data to detect treatment access patterns as they develop. The substantial increase in ADC adoption demonstrates growing provider familiarity with these targeted therapies, but understanding the clinical factors that drive treatment selection will be crucial for interpreting access patterns and developing appropriate interventions.

Progress Amid Persistent Challenges

This analysis reveals treatment patterns that align with cancer subtype distribution across different populations, and no racial access barriers were detected. The higher rates of ADC use among certain racial groups (e.g., Black women for triple-negative breast cancer and Asian women for HER2-positive breast cancer) align with known cancer subtype distributions. This warrants further study to understand the factors — including drug design, prescribing behaviors, and coverage policies — that may have contributed to these patterns.

"These findings tell us something important: The treatment patterns we're observing are encouraging," says Maimah Karmo, Founder and CEO, Tigerlily Foundation. *"The 3.7-fold increase shows innovation is reaching patients faster, and the alignment of treatment patterns with disease biology rather than showing racial disparities suggests that equitable access is achievable in precision medicine. When we see Black women, Asian women, young women, and Medicaid patients receiving these therapies at rates that reflect their cancer subtypes, it demonstrates that racial barriers are not inevitable."*

"At Tigerlily, we also recognize that equitable access is only the first step in achieving health equity. We need to ensure not just that women receive these therapies, but that there are effective therapies for everyone. This is why diverse representation in clinical trials remains critical — so that the treatments we're celebrating today are developed and tested with all patients in mind, leading to better outcomes for everyone."

However, the stark age-related differences raise important questions that require further investigation. Women 66 and older receive ADC treatment at rates more than three times lower than younger patients and experience significantly longer treatment delays. This difference could reflect several factors: Older patients may have higher rates of comorbidities; cancer characteristics may be different across groups; or patient preferences may vary. Understanding whether these patterns reflect appropriate clinical decision-making or represent barriers to care is essential.

Implications for Healthcare Delivery

Provider Responsibilities

Healthcare providers play a crucial role in building on these successes. The analysis suggests that the swift initiation of treatment with ADCs is possible: The median time to treatment decreased from 331 to 109 days over the study period. This improvement demonstrates that, when barriers are identified and addressed, meaningful change can occur quickly. Providers can influence this acceleration by proactively addressing insurance barriers, advocating for their patients with payers, and ensuring that treatment delays are investigated and resolved promptly. Additionally, providers should examine whether age-related treatment patterns in their practices reflect appropriate clinical considerations or unintended barriers.

Patient Empowerment and Education

The complexity of ADC eligibility and insurance requirements highlights the critical need for patient education and advocacy. Patients, particularly older women, must be prepared to advocate for themselves by understanding their cancer subtype and available treatments and navigating insurance processes with support from their healthcare team. *"Knowledge is power, and asking questions is your right,"* Karmo advises.

This is why Tigerlily Foundation's ANGEL Advocacy Program focuses on helping patients understand their specific cancer subtype and ask the right questions about targeted treatments — because, as this analysis shows, when the right patient gets the right treatment, better outcomes are possible.

Policy and System-Level Interventions

The differences in treatment patterns revealed in this analysis demand careful attention. Although claims showed that Medicaid patients had higher treatment rates than expected, the persistent gaps between Medicare and commercial insurance coverage, along with age-related prescribing differences, suggest that determining how current policies influence access to innovative therapies is a question that requires investigation.

System-level planning should focus on understanding and potentially replicating the factors that contributed to the observed alignment between treatment patterns and disease biology. Additionally, continued research is essential to ensure that age-related differences in treatment are driven by disease biology and clinical appropriateness, not systemic barriers.

The geographic differences between urban and rural patients, while not statistically significant in treatment timing, are trends that warrant continued monitoring as these treatments become more widely available.

"Multilevel, multidimensional, and multisectoral engagement are required for real-world, solution-focused strategies that attend to policy, coverage, health system and provider issues to improve access to medical and cancer treatment advances to benefit all with the clinical need," explains Kimlin Tam Ashing, PhD, Professor, Beckman Research Institute, and Medical Advisory Board Member for the Tigerlily Foundation.

CONCLUSION

"This analysis shows that racial disparities in cancer treatment access are not inevitable," says Karmo. *"The alignment of ADC utilization patterns with disease biology across racial groups is encouraging. While we can't claim that the drugs themselves caused this outcome, understanding what factors — drug design, prescribing practices, coverage policies — contributed to these patterns could offer valuable insights for future therapeutic development and policy decisions.*

"At the same time, the age-related patterns raise important questions. Why do older women have significantly lower treatment rates? Is this reflecting appropriate clinical decision-making based on comorbidities and patient preferences, or are there barriers we need to address? Answering these questions should be our next research priority."

For reasons such as these, Tigerlily established the **POWER Center of Excellence (CoE)**, a dedicated research program for gathering insights from the community and stakeholders. Its **RACE Alliance** and **#InclusionPledge** provides healthcare stakeholders with a model for committing to specific, measurable actions that build on encouraging findings like these while rigorously investigating remaining questions about access and equity.

Gathering deep insights enables Tigerlily to provide solutions that improve patient access and treatment. Critically, achieving this requires collaborating iteratively with all stakeholders and engaging patients every step of the way.

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About Tigerlily Foundation

Tigerlily Foundation is a national women's health and oncology organization providing education, awareness, advocacy and hands-on support to young women (15-50) before, during and after cancer. Its mission is to educate, advocate for, empower, and support young women at every stage of their health journey, with programs designed to serve women of all backgrounds, including those at heightened risk, those facing health disparities, and those with less access to care. The foundation addresses healthcare inequities through evidence-based programs, including the ANGEL Navigation Program, the ANGEL Advocacy Program and the HEAL Policy Center of Excellence. The foundation strives to improve quality of life, end isolation among cancer survivors, and show women that they are not alone in their journey—that they can be transformed during and after cancer, beautiful and strong like the tiger and the lily.

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