CELLULAR IMMUNOTHERAPY: The Next Wave of Cancer Care

RYAN LANGDALE, DIRECTOR
DAN DEPONTE, ASSOCIATE PRINCIPAL

CHARTIS ONCOLOGY SOLUTIONS

Cellular therapy has been a mainstay for the treatment of blood cancers for the past 50 years with Autologous and Allogeneic stem cell transplant. A new category of cellular immunotherapy (e.g., CAR-T therapy) is rapidly shifting the care paradigm by harnessing the immune system to fight cancer through extraction, re-engineering, and reinfusion of a patient's T-cells. The 5 FDA-approved CAR-T products on the market have demonstrated tremendous impact on survival, and in some cases have proved curative. Dozens more CAR-T agents are in advanced stages of clinical trial, as are a host of other immune effector class agents. As these powerful new therapies come to market, cancer programs around the country are racing to develop the infrastructure and competencies to safely deliver next-generation cancer care.

Figure 1: Universe of Cellular and Immune Therapies

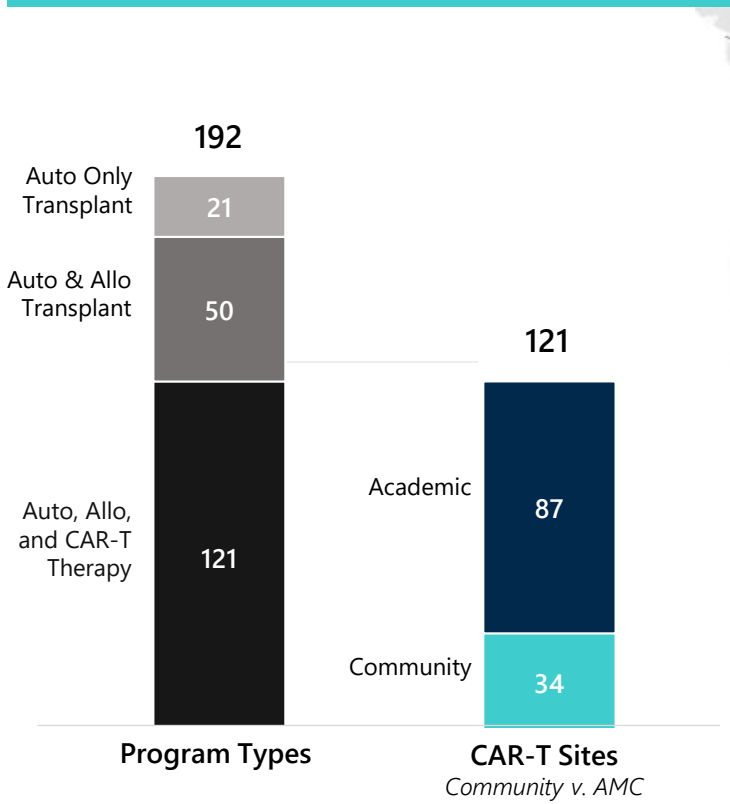
Cellular Therapy			Immunotherapy			
Stem Cell Transplant	**Cellular Immunotherapy**			**Other Immunotherapy**		
Autologous and Allogenic Stem Cell Transplant	Autologous ACT *(auto-CAR-T, TIL)*	"Off the Shelf" ACT *(NK, allo-CAR-T)*	Therapeutic Vaccines	Immune Modulators	Monoclonal Antibodies	Checkpoint Inhibitors
Hematopoietic stem cells infused from patient's own stem cells (autologous) or from a related or unrelated donor (allogeneic) following high-dose chemo and/or radiation. Stem cells migrate to the bone marrow, replicate, and replenish the immune system.	Patient or donor immune cells (e.g., T-cells, NK cells, TILs) are removed, shipped to a manufacturer, reengineered to target certain tumor antigens, multiplied, and then infused following conditioning therapy to target and kill cancer cells.	Immune cells (e.g., NK cells, T-cells) are sourced from healthy donors, cord blood, iPSCs, or cell lines, reengineered to target certain antigens, multiplied, and then infused following conditioning therapy to target and kill cancer cells.	Leverage the immune system by provoking antigenic response through viral-based, mRNA-based, antigen-based, and cellular-based mechanisms.	Cytokine given to patient to increase the number of immune cells (e.g., T-cell, NK cell) to help the immune system attack cancer cells.	Antibodies target antigens, as naked, conjugated (attach to chemo or radioactive particle), or bispecific (attach to a cancer cell and immune cell).	Antibodies block checkpoint proteins (e.g., PD-1, CTLA-4) from binding between T-cells and cancer cells, "releasing brakes" on immune system.

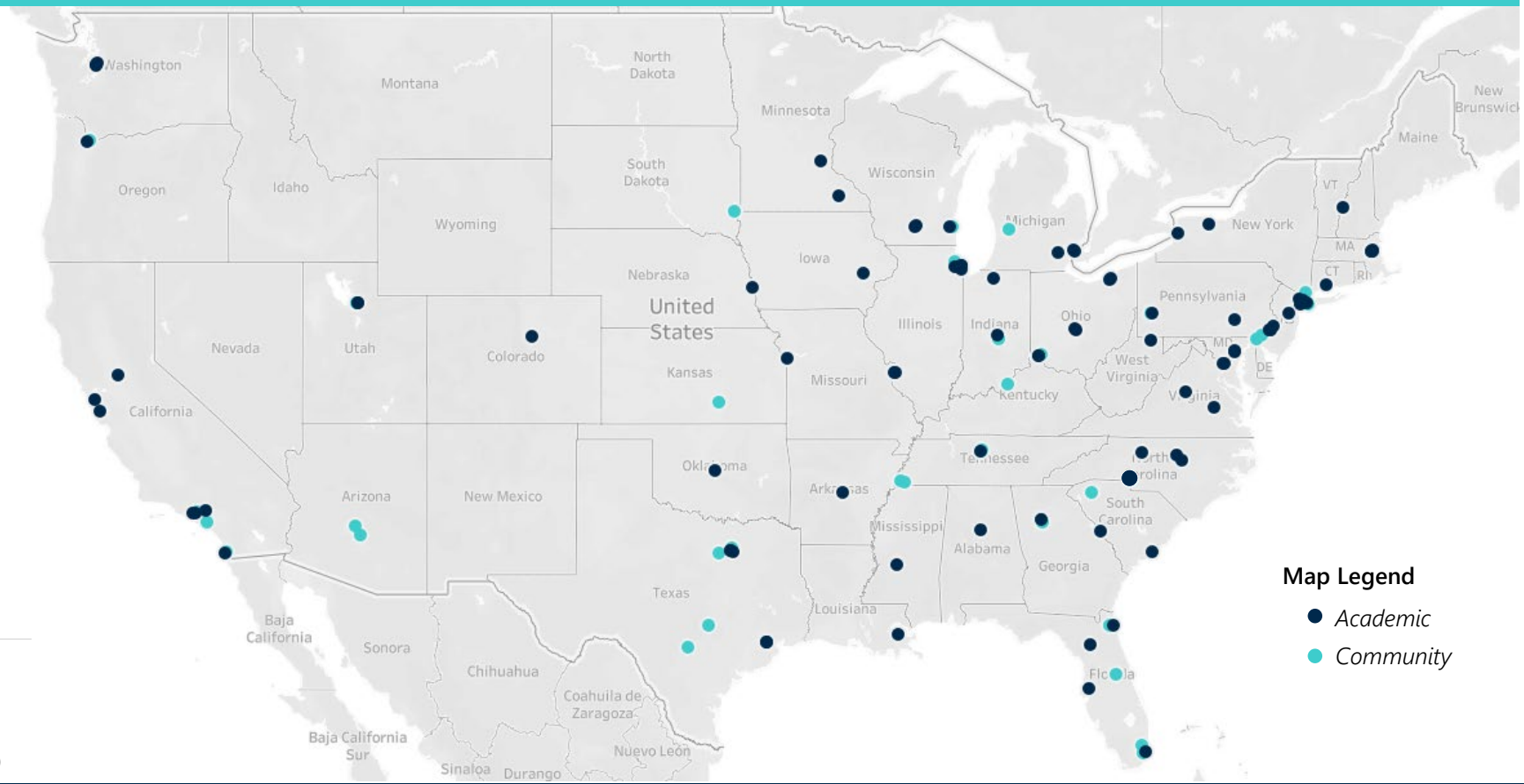
Source: Chartis research

Adoption of CAR-T Therapy

As of September 2021, over 120 programs in the United States were certified by CAR-T manufacturers to provide cellular immunotherapy (Figure 2). To date, all certified CAR-T programs also have stem cell transplant programs, driven by the complexity of the treatment and the shared/complementary assets between CAR-T and stem cell transplant. Many in the industry predict that new hospital and physician practice entrants may go directly to CAR-T therapy, bypassing traditional stem cell transplant, and that the mix of academic versus community providers will continue to shift as large community health systems deploy their scale and resources toward offering CAR-T therapy.

Figure 2: U.S. CAR-T Programs - September 2021





Source: CAR-T provider lists (Bristol Myers Squibb, Novartis, Kite/ Gilead)

CAR-T Financial Feasibility

CAR-T therapy has unique economic challenges that influence financial feasibility for our clients. These challenges include extensive infrastructure and training, fluid Medicare and commercial reimbursement dynamics, and a cost profile—including the average $375,000 CAR-T product expense (Figure 3)—that leaves little margin for error when business planning for cellular immunotherapy. For these reasons, it is critical that a hospital evaluate CAR-T with a contemporary understanding of things like Centers for Medicare and Medicaid Services reimbursement, invoice-based commercial payment dynamics, FACT accreditation, requirements of inpatient versus outpatient CAR-T infusion, and a lens on the broader trajectory of CAR-T patient eligibility over the near- and medium-term.

Figure 3: FDA-Approved CAR-T Product Costs

CAR-T Therapy	FDA Approval	Indication	Cost (WAC)
KYMRIAH®	August 2017	• Patients ≤ 25 years with refractory/relapsed B-cell Acute Lymphoblastic Leukemia	$475,000
	May 2018	• Adult patients with R/R large B-cell lymphoma[1] after ≥2 lines systemic therapy	$373,000
YESCARTA®	October 2017	• Adult patients with R/R large B-cell lymphoma after ≥2 lines systemic therapy	$373,000
	March 2021	• Adult patents with R/R follicular lymphoma after ≥2 lines systemic therapy	
TECARTUS™	July 2020	• Adult patients with R/R mantle cell lymphoma	$373,000
	October 2021	• Adult patients with relapsed/refractory B-cell precursor ALL	$373,000
Breyanzi®	February 2021	• Adult patients with R/R large B-cell lymphoma[2] after ≥2 lines systemic therapy	$410,300
Abecma®	March 2021	• Adult patients with R/R multiple myeloma after ≥4 lines prior therapy[3]	$419,500

Notes: [1]Includes DLBCL NOS, DLBCL from follicular lymphoma, primary mediastinal large B-cell, high-grade B-cell | [2] Includes DLBCL NOS (and DLBCL indolent lymphoma), primary mediastinal large B-cell, high-grade B-cell, follicular lymphoma grade 3B | [3] prior therapy includes immunomodulatory agent, proteasome inhibitor, and an anti-CD38 monoclonal antibody **Source**: Clinical Options (CCO)

Staying on the Vanguard of Cancer Care

Despite its operational and financial complexities, immune cell therapy has rapidly shifted from early market to mainstream market interest among larger cancer centers. As the technology proliferates, it will be imperative that academic and large community cancer centers understand the treatment and its specific applications in their local environment and create plans for CAR-T program implementation. In coming years, we believe immune cell therapy will migrate from a program differentiator to a requirement for provision of contemporary cancer care.

RYAN LANGDALE
Director
rlangdale@chartis.com

DAN DEPONTE
Associate Principal
ddeponte@chartis.com

About The Chartis Group

The Chartis Group® (Chartis) provides comprehensive advisory services and analytics to the healthcare industry. It brings critical thinking and deep industry experience paired with cutting-edge data, analytics, and technology to deliver #NextIntelligence. With an unparalleled depth of expertise in strategic planning, performance excellence, health analytics, informatics and technology, digital and emerging technologies, clinical quality and operations, and strategic communications, Chartis helps leading academic medical centers, integrated delivery networks, children's hospitals, and healthcare service organizations achieve transformative results and build a healthier world. Chartis has offices in Atlanta, Boston, Chicago, New York, Minneapolis, and San Francisco.

Connect with us: www.chartis.com | LinkedIn | Twitter | YouTube

THE CHARTIS GROUP