

# THE VALUE OF MEDICINES IN Treating Leukemia

Leukemia is one of the most common cancers in the world. It was estimated that, worldwide, approximately 350,000 people were diagnosed with leukemia and 265,000 succumbed to the disease in 2012.<sup>1</sup> Great strides, however, have been made in our ability to better treat and manage certain forms of the disease, including in children. In fact, thanks to the collaborative efforts of pediatricians and pediatric oncologists, there has been a 20 percent increase in the five-year survival rate in childhood leukemia in the last 35 years.<sup>2</sup> Still, challenges remain—and despite a number of significant advancements in the treatment of chronic leukemia—discovery and development of treatments for acute leukemia have not progressed at the same pace. In the U.S., the five-year relative survival rate for adults with chronic leukemia is between 60 to 80 percent, while the five-year survival rate for those with acute myeloid leukemia (AML) is only about 25 percent, although the rate is better in both children and adolescents.<sup>3</sup>

## KEY TAKEAWAYS

Leukemia is one of the most common cancers in the world, with an estimated 350,000 new cases and 265,000 deaths worldwide in 2012.<sup>1</sup>

Advances in the treatment of chronic myeloid leukemia (CML) have led to more than 9 in 10 patients enjoying a life expectancy comparable to healthy age-matched individuals.<sup>3</sup>

Acute myeloid leukemia (AML) is the second most common form of leukemia. Compared to other forms of leukemia, AML patients face the lowest five-year relative survival rate—approximately 25 percent. This rate, however, is 10 percent higher compared to 15 years ago.<sup>3,19</sup>

Transformative and innovative research provides hope for the future of acute leukemia treatment and our goal of ultimately treating both acute and chronic leukemia as manageable diseases.

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Ferlay J, Soerjomataram I, Ervik M, Dikshit R, et al. GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11. Lyon, France: International Agency for Research on Cancer, 2013. <http://globocan.iarc.fr>. Accessed December 18, 2016.

## Understanding the Types of Leukemia: Acute and Chronic

Leukemia occurs when abnormal cells grow and collect in the bone marrow and bloodstream, preventing normal blood cells from functioning effectively.<sup>4</sup> Depending on how quickly the cancer progresses, leukemia is either classified as acute (acute lymphocytic leukemia (ALL) and acute myeloid leukemia (AML)), or chronic (chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML)).<sup>5</sup>

Without treatment, acute leukemia progresses rapidly. Bone marrow often stops producing enough red blood cells, white blood cells, and normal platelets. Anemia, a lack of enough red blood cells, develops in virtually all people who have leukemia. A lack of normal white blood cells prevents the body from fighting infections and a shortage of platelets results in bruising and easy bleeding.<sup>6</sup> In acute leukemia, abnormal blood cells, often called blasts, remain immature, increase rapidly, and overwhelm normal cells from functioning correctly. This cascade of events leads to a leukemic disease state that gets worse quickly.<sup>5</sup> In chronic leukemia, abnormal cells accumulate more slowly, allowing more functional cells to generate and slow the progression of the disease.<sup>6</sup>

## The Burden of Disease: Challenges to Individuals, Families and Society

Leukemia is a traumatic and life-threatening disease that creates high levels of anxiety for patients and family members. The disease can cause additional serious health problems including increased infections due to a person's reduced immunity, anemia, constant weakness and fatigue, easy bruising, prolonged bleeding, reduced appetite, and weight loss. The cancer also

causes swelling of the lymph nodes, liver, and spleen.<sup>7</sup> From diagnosis to treatment in acute leukemias, the impact to patients and families can be quite dramatic. Aggressive treatment including stem cell transplant and intensive chemotherapy combinations, requiring hospitalization and time away from work and home, coupled with the fast progression of the disease can be traumatic in nature.

Beyond the direct effects of the disease, people with leukemia experience a host of indirect, but equally challenging burdens. Fears of death and disability, as well as fatigue and problems gaining employment or health insurance weigh heavily on individuals and their families and caregivers.<sup>8</sup> As a result of these high burdens, it is estimated that globally, individuals with leukemia have lost 9.3 million years of “healthy living.”<sup>9</sup>

### Economic Costs of Leukemia: Facts and Figures

- Patients with leukemia often require treatments like stem cell transplants and intensive chemotherapies which involve hospitalization for long periods at high cost. In the U.S., patients hospitalized for leukemia have the longest average length of stay (15.5 days) and most expensive average stay (\$40,200) among all cancer-related hospitalizations.<sup>10</sup>
- As one of the more common forms of cancer, the costs associated with leukemia for the individual patient can vary. The National Cancer Institute reports that leukemia care for U.S. patients 65 and over in their last year of life can cost over \$130,000 in Medicare claims.<sup>11</sup>
- A U.S. study of Medicare beneficiaries newly diagnosed with AML showed average healthcare costs for any condition being treated and AML-related costs were \$96,078 and \$66,550 respectively, despite a median survival of only 2.5 months after diagnosis.<sup>12</sup>
- In Germany, the economic burden of CLL alone is estimated to be approximately €322 million, accounting for €189.7 million in direct costs and €132.0 million in indirect costs. With the aging population and the increasing prevalence of the disease, it is likely that these economic cost burdens will continue to grow.<sup>13</sup>

### The Value of Medicines: A CML Success Story

To address this rising burden, improved and more targeted cancer treatments have become available in the past several years and have boosted survival rates for certain types of leukemia. For example, CML, which accounts for about 10 to 15 percent of leukemia cases, has seen several new medications and advances become available. Previously, patients with CML were treated with stem cell transplants in conjunction with conventional chemotherapeutic agents, and also immunotherapies, but these medications did not significantly delay disease progression.<sup>14</sup> Stem cell transplant is effective in

### The Burden Of Leukemia

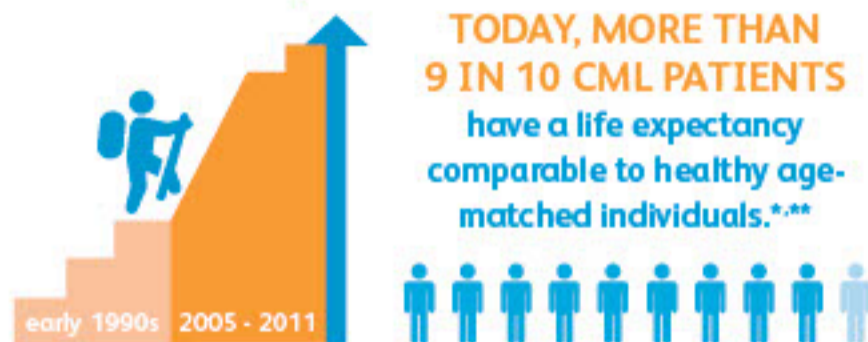


Naghavi M. (2015). The Global Burden of Cancer 2013. *JAMA Oncol.* 2015;1(4):505-527. doi:10.1001/jamaoncol.2015.0735.

giving some patients the potential for cure, but some patients eventually relapse. In addition, other factors such as finding a donor match, toxicities, and long hospitalizations create a high burden for patients. Today, new therapies with tyrosine kinase inhibitors (TKIs) have, over the past two decades, doubled the five-year relative survival rate for CML from 31 percent in the early 1990s to 63 percent for patients diagnosed from 2005 to 2011. CML patients are now living close to normal life spans.<sup>15,16</sup>

These innovations in the treatment of CML have increased patient survival not only by improving the management of the disease, but also by allowing patients to live long enough to benefit from ever-evolving therapies as they become available. Researchers from Tufts Medical Center analyzed 29 studies published between 1996 and 2012 investigating nine different blood cancer medications. The researchers compared these treatment options against commonly used benchmarks for the treatment costs associated with extending the life of a patient in otherwise good health by one year. The researchers found that 73 percent of the studies demonstrated that blood cancer drugs were cost effective in prolonging a good quality of life for at least one year.<sup>16</sup>

Innovations in the treatment of CML have led to a 32 percent increase in the 5-year relative survival rate for the disease.



**TODAY, MORE THAN 9 IN 10 CML PATIENTS have a life expectancy comparable to healthy age-matched individuals.\*,\*\***

\* Leukemia Types: Chronic myeloid leukemia. Cancer Treatment Centers of America. <http://www.cancercenter.com/leukemia/types/tab/chronic-myeloid-leukemia/>. Accessed December 18, 2016.  
 \*\* Jain P, Kantarjian H, Cortes J. Chronic myeloid leukemia: overview of new agents and comparative analysis. *Curr Treat Options Oncol*. 2013 Jun;14(2):127-43. doi: 10.1007/s11864-013-0234-8.

## Leukemia Survival Rates: Chronic vs. Acute

Treatment advances in chronic leukemia have improved survival rates and quality of life for many patients. Unfortunately, the prognosis for patients with acute leukemia is still challenging.

### Key Facts

- **CML** accounts for about 10 to 15 percent of all leukemia cases in U.S. adults, and with treatment advances, more than 9 in 10 patients now have a life expectancy comparable to healthy age-matched individuals; 5-year survival rates have increased from 32 percent in the 1990s to 70 percent today.<sup>17,3,18</sup>
- **CLL** is the most common type of leukemia among adults, accounting for 37 percent of new cases in the U.S. The five-year relative survival rate for CLL has risen to roughly 80 percent.<sup>3</sup>
- **AML** is the second most common form of leukemia, accounting for approximately one-third of new cases in the U.S. Compared to other forms of leukemia, AML patients face the lowest five-year relative survival rate—approximately 25 percent. This rate though is 10 percent higher compared to 15 years ago.<sup>3,19</sup>
- **ALL** is most frequently diagnosed among children, adolescents, and young adults, accounting for 75 percent of new cases across those age groups in the U.S. However, the disease does affect older adults.<sup>20</sup> While about 80 to 90 percent of adult patients will have some form of remission, about half will relapse, with an overall cure rate of around 40 percent.<sup>21</sup> The 5-year survival rate has increased over the last four decades from 60 percent to approximately 90 percent for children and from 28 percent to more than 75 percent for adolescents.<sup>22</sup>

While there have been considerable advances in the treatment of chronic leukemia over the past few decades with regard to increased survival times, new treatments are badly needed for acute leukemia where survivability rates are significantly lagging.

## The Need for New Therapies: Acute Leukemia and the Promise of Innovation

Current research is aimed at developing novel therapies that address an unmet medical need in acute leukemia therapies to obtain disease control, maintain remission, prevent relapse, and prolong survival. Additionally, researchers are examining the most effective combination of chemotherapy treatments that limit unwanted side effects. This approach is especially important for older patients, who are less likely to fully benefit from current treatments.<sup>23</sup>

New treatments take time, however. As researchers uncover a greater understanding of the biology and complex genetic underpinnings of acute leukemia, various healthcare sectors are committed to continued research to advance therapies and new treatments for the benefit of patients worldwide. By delivering these incremental improvements, patients have the benefit of more time without their disease progressing as researchers continue their work toward transformative medicine. Gene therapy treatments have the potential to revolutionize treatments for cancer. Recently, the FDA approved its first gene therapy treatment for ALL based on a trial where 63 severely ill children had a remission rate of 83% within three months.<sup>24</sup>

The evolution of therapy from stem cell transplants and chemotherapy to the use of TKIs has changed the course of the disease for CML patients and provides an encouraging example for the leukemia community as they work to advance new treatments which will hopefully bring similar success to acute leukemia patients. In 2015, there were more than 106 leukemia treatments in development utilizing a number of different innovative approaches—with over 70 focused on addressing acute leukemia.<sup>25</sup> Only through the continued commitment to research and innovation will we identify important and cumulative advances that give patients more time until our goal of a major transformation becomes reality: treating both acute and chronic leukemia as manageable diseases.



**In 2015, OVER 7 OUT OF 10 LEUKEMIA TREATMENTS IN DEVELOPMENT were focused on acute leukemia.**

**Promising new therapies for acute leukemia provide hope for similar success seen with current treatments for CML.**

2015 Medicines in Development—Leukemia & Lymphoma. The Pharmaceutical Researchers and Manufacturers of America (PhRMA). 2015. <http://phrma-docs.phrma.org/sites/default/files/pdf/2015-blood-cancers-mid-list-final.pdf>. Accessed March 6, 2016.

## Endnotes

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