Sickle Cell Disease 2023

ICER SNAPSHOT

The ICER Snapshot is a summary designed to help patients and the broader community learn about the key results and recommendations from ICER's 2023 Final Evidence Report on Sickle Cell Disease Gene Therapies.

The information included is up to date as of August 2023. New information about these therapies may become available, but is not captured here.

Let's Take a Look

What is Sickle Cell Disease?

Sickle cell disease (SCD) is a disorder passed down through families that causes red blood cells to take on a "sickle" or crescent shape. These abnormal red blood cells deliver less oxygen to different parts of the body, causing a range of symptoms and complications.

Sickle cell disease affects approximately 100,000 Americans, most of whom are of African descent. Historically, SCD has been overlooked and underfunded, with a lack of awareness of SCD in broader communities. Racism and discrimination can make getting appropriate care very difficult for patients.

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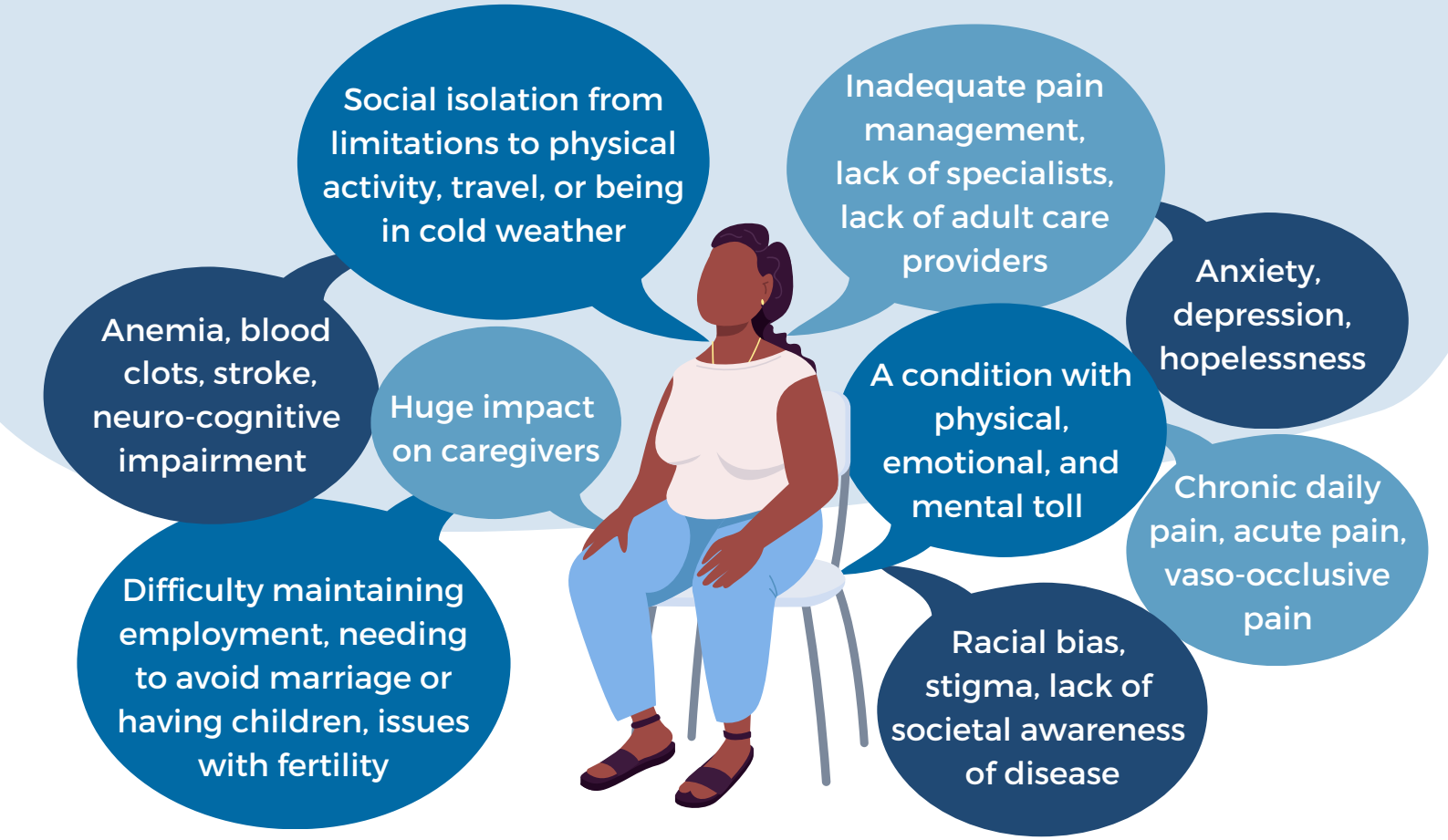
Impact on Sickle Cell Warriors

What ICER Learned from the Community



Treatments of Focus in ICER's Review

	GENE THERAPY	HOW IT WORKS	CLINICAL TRIAL*
1	**Lovo-cel** (bluebird bio)	Increases levels of functional adult hemoglobin	**HGB-206** 36 patients Ages 12 to 50 yrs Followed for 2+ yrs
2	**Exa-cel** (Vertex Pharma-ceuticals & CRISPR Therapeutics)	Uses CRISPR technology to increase levels of fetal hemoglobin	**CLIMB-121** 35 patients Ages 12 to 35 yrs Followed for 2+ yrs

Both lovo-cel and exa-cel are gene therapies that patients only take once. Chemotherapy and bone marrow transplant are part of the treatment with gene therapy.

*These trials excluded patients who were eligible for a stem cell transplant.

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Sickle Cell Disease 2023

What Did Clinical Trials Show?

Both Lovo-cel & Exa-cel

REDUCED painful crises

REDUCED hospitalizations

INCREASED total hemoglobin levels

These represent some, but not all outcomes that were measured in the clinical trials. In addition, these clinical trials only show **short-term** benefits.

Safety of Lovo-Cel and Exa-Cel

Both therapies had serious adverse events in the trials, such as **blood cancer** (lovo-cel only) and **death** (both trials). These events were mainly linked to the bone marrow transplant required before receiving the gene therapies. The **long-term risks** of these gene therapies in the real world are still **uncertain**. Patient input helped inform ICER's understanding about the broader safety of these therapies.

ICER's report findings are NOT recommendations that support the use of these gene therapies. Patients and families should always talk with their doctors to make shared decisions about treatment for sickle cell disease.

What We Still Don't Know

- How well the gene therapies work outside of clinical trials
- How often the therapies really work (only studied in small number of people so far)
- How the therapies will work in children under 12 years old
- How the therapies affect other chronic complications of SCD, such as organ damage
- How lovo-cel and exa-cel compare to each other
- How the therapies work for patients in the long-term

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Sickle Cell Disease 2023

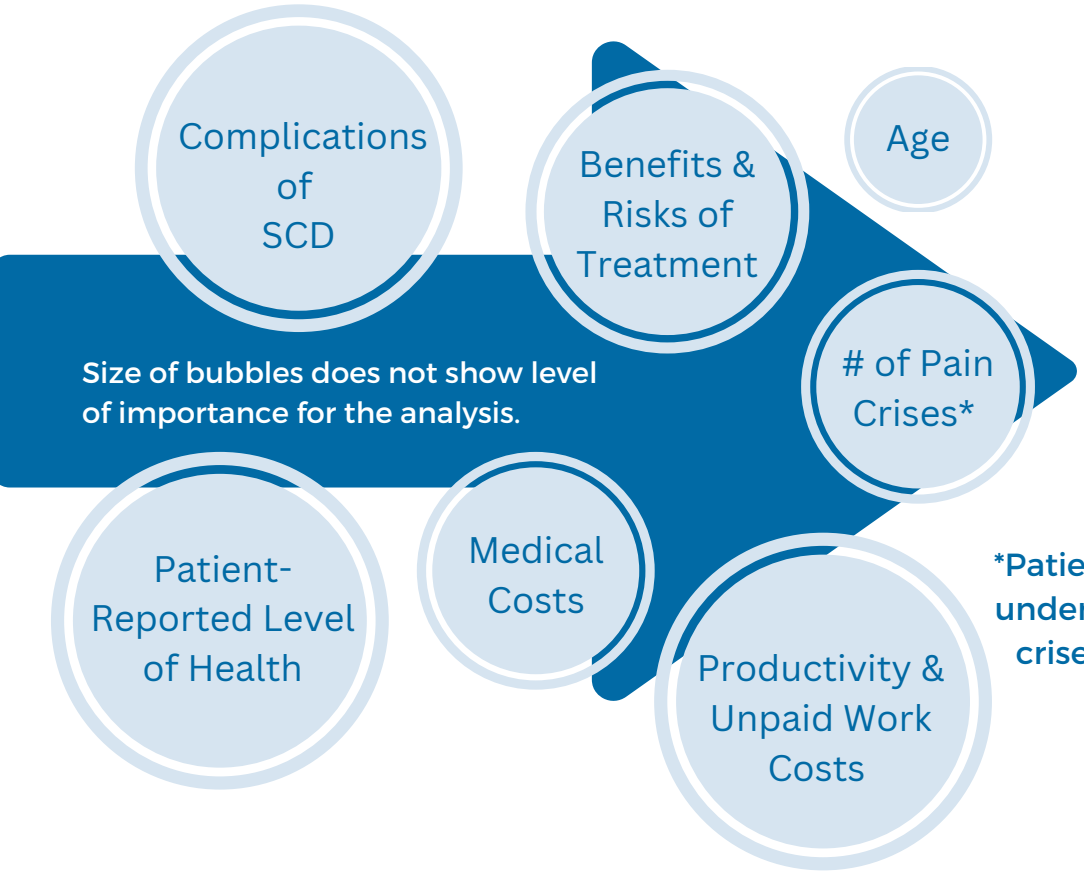
How Did ICER Calculate a Fair Price?

Using economic modeling, we calculated the cost effectiveness of lovo-cel and exa-cel based on how well they reduced acute and chronic complications, compared to standard of care. See below for what types of information ICER considered to calculate a fair price range for the two gene therapies.

Population

This analysis included adolescents and adults with severe SCD who were not eligible to get a stem cell transplant.

Factors Included in ICER's Economic Analysis



*Patient input helped ICER better understand the average # of pain crises to use for our analysis.

Fair Price Range for Lovo-Cel and Exa-Cel

$1.35 - $2.05 MILLION

A fair price is how much a treatment should cost based on how well it works for patients. Our economic analysis concluded that the fair-price range for lovo-cel and exa-cel is between $1.35 and $2.05 million. This price is for a one-time treatment.

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Sickle Cell Disease 2023

Key Policy Recommendations

The Policy Roundtable at the ICER public meeting informed several policy recommendations for pricing, access, guidelines, and future research in SCD. A few key recommendations are summarized below.

1 **Patient groups have a powerful voice to create significant pressure for fair pricing and appropriate insurance coverage across all parts of the health system.**

Working with insurance plans and clinical societies, patient organizations can help lead the work to improve access to treatments and hold drug makers accountable to fair pricing.

2 **Insurance plans should 1) design coverage policies that can support travel for patients and their families to receive therapy, and 2) provide insurance coverage for fertility preservation.**

Since lovo-cel and exa-cel will only be available in specialized medical centers, sickle cell warriors should have fair opportunity to access these gene therapies without issues with how far they live or how much money they make. In addition, we heard from both warriors and clinical experts that fertility preservation is an important consideration when managing SCD. Insurance plans should cover fertility preservation along with coverage for gene therapies.

3 **The FDA, drug makers, and clinical researchers should be consistent in how they measure patient-important outcomes for sickle cell disease.**

The FDA should require drug makers to use the same definition for outcomes (such as vaso-occlusive crises) in order to allow researchers and the patient community to directly compare therapies. Outcomes captured in clinical trials should reflect all important aspects of living with sickle cell disease, including mental health outcomes that were highlighted by sickle cell warriors as often overlooked.

Sickle Cell Disease 2023

4 Patient groups have the opportunity to discuss risks and benefits of new therapies with their community in order to support shared decision-making for every patient.

Advocacy groups can work to educate sickle cell warriors about the potential risks and benefits of new therapies, with an emphasis on potential harms. Evidence-based materials can help support this education, and should be accessible to all patients, including those with low health literacy

5 All stakeholders have a responsibility to ensure equitable and optimal patient access to gene therapies for SCD.

Steps should be taken by all stakeholders to ensure that all sickle cell warriors have access to multidisciplinary care that takes a broad view of the needs of patients and their families for services such as mental health and social support.

Impact of Patient Engagement

Community input allowed ICER to better understand the **average number of pain crises** that sickle cell warriors experience in the real world. As a result, **ICER revised this number in our economic model**.

ICER gained valuable insights from the patient community about the **impacts of living with SCD**, and the hopes of patients and their families about new treatments.

Patient and caregiver testimony at the public meeting about the benefits of treatment for the whole family **helped shape ICER's recommendations** for policy makers to provide equitable access to treatments.

The Institute for Clinical and Economic Review (ICER) is an independent nonprofit organization that does research on how well new treatments work and what a fair price should be. Patients and families should always talk with their doctor to make shared decisions about the best treatment option for them.

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