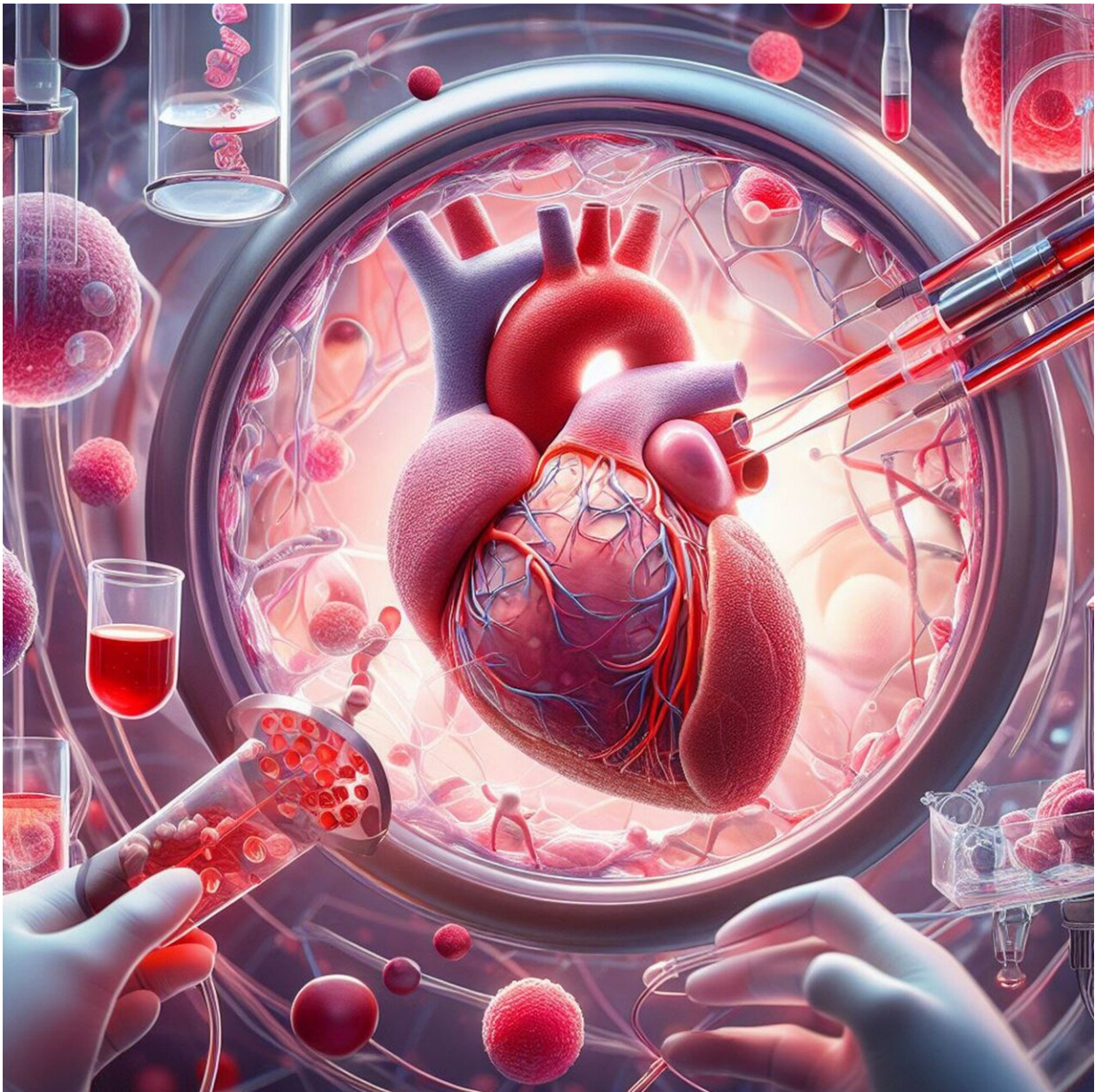


# Study documents stunning impact of poverty on cell function, transplants

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A surprising University of Minnesota study of stem cell transplants found that cancer patients were more likely to die if the cells they received came from donors who lived in poverty or low socioeconomic neighborhoods.

The findings could one day influence how donors and recipients are matched, if other studies verify the link between [donor](#) poverty and transplant mortality, said Dr. Lucie Turcotte, a U. of Minn assistant professor who researches cancer treatment outcomes.

But the findings already show the dramatic impact that socioeconomic status has on personal health. If poverty can degrade [stem cells](#) enough to undermine the success of transplants, then imagine its impact on the everyday health of the donors, she said.

"It's much more than just a transplant analysis," Turcotte said. "It's sort of this whole idea that poverty is impacting people down to the level of their stem cells, and that's a pretty profound way to think about it."

The study analyzed outcomes over three years for 2,005 people who received transplants for blood cancers such as leukemia. It found 6.6% more deaths among recipients whose stem cell donors lived in low-income areas than among recipients whose donors lived in wealthy areas.

Whether the transplant recipients themselves were rich or poor didn't change the results. The disparity existed even after factoring out differences such as race and health insurance status that already are known to affect transplant outcomes.

Prior research has linked poverty to poorer diets, increased exposure to pollutants and higher stress, which can overactivate the [immune system](#) and cause unhealthy levels of inflammation in the body.

"When your mental energy and your physical energy needs to go to constantly playing Whac-a-Mole—which crisis needs addressing, which child needs what, which bill do I pay first?—that is a different kind of stress," said Marna Canterbury, vice president of community health and partnerships for HealthPartners.

The Bloomington, Minnesota-based clinic and hospital provider has responded by routinely asking patients about poverty-related issues such as food access, housing and safety in order to connect them with charitable programs that can offer relief.

This latest study takes the understanding of poverty's influence to another level, beyond causing more episodic or chronic illnesses. Low socioeconomic status was associated with a reprogramming of cells in a way that endured, even if they were infused in other people.

"This study suggests that there is a biological effect of poverty," said Dr. Jeff Auletta, a senior vice president of health equity for the National Marrow Donor Program. Also known as NMDP, the Minneapolis-based agency matches patients worldwide to the most suitable donor bone marrow and stem cells for transplants.

NMDP maintains a research database of transplant patients in partnership with the University of Wisconsin, and both participated in the U-led study.

Turcotte said it was a challenge to get the findings published until they were accepted by *Proceedings of the National Academy of Sciences*. Reviewers worried about whether the findings could fuel discrimination,

she said, or discourage minorities who are disproportionately affected by poverty from serving as much-needed donors.

Transplants are key steps in the treatment of blood cancers, allowing regenerative stem cells to rebuild patients' immune systems after they have been wiped out along with cancer cells by chemotherapy or radiation. Odds of success improve substantially when recipients are closely matched by key biological and demographic markers to their donors. Otherwise, the transplanted stem cells can view the patient's unfamiliar body like it would a virus and attack it—a risk known as graft-versus-host disease.

But even with NMDP's global pool of 41 million potential adult donors, including 9 million American donors, it can be hard to find suitable matches, especially for patients of certain racial and ethnic minority groups. White recipients have a 79% chance of finding an ideal match, but black recipients only have a 29% chance, according to NMDP.

New medications and transplant protocols are improving outcomes from less-than-perfect matches, but Auletta said the priority right now is finding the best donor stem cells as quickly as possible. So while the finding is significant, he said it shouldn't deter [cancer patients](#) from pursuing transplants when needed, regardless of donors' socioeconomic status.

"The risk from delaying a transplant is going to far exceed anything revealed in this paper," he said.

One limitation of the study is that it analyzed transplants that occurred on or before 2013, so it didn't account for recent improvements in transplant safety. U researchers also didn't have detailed enough data on donors to know for sure if they were rich or poor. Instead, they separated out donors in the analysis by the ZIP codes in which they lived and their



local levels of unemployment, housing stability, education and household income.

Auletta said the takeaway message for now is that communities need to confront poverty, because it is changing people who endure it at a cellular level. If the link with transplant survival is further verified, he said, then tackling poverty will improve the donor pool and [transplant](#) outcomes as well.

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