



*Questions and Answers
for Transplant Candidates about*

Liver Allocation

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United Network for Organ Sharing (UNOS) is a non-profit, charitable organization that serves as the Organ Procurement and Transplantation Network (OPTN) under contract with the federal government. The OPTN helps create and define organ allocation and distribution policies that make the best use of donated organs. This process involves continuously evaluating new advances and discoveries so policies can be adapted to best serve patients waiting for transplants.

All transplant programs and organ procurement organizations throughout the country are OPTN members and are obligated to follow the policies the OPTN creates for allocating organs.

As part of this process, UNOS developed a system for prioritizing candidates waiting for liver transplants based on statistical formulas that are designed to predict who needs a liver transplant most urgently. The MELD (Model for End- Stage Liver Disease) is used for candidates age 12 and older and the PELD (Pediatric End-Stage Liver Disease Model) is used for patients age 11 and younger.

This document explains the system and how it affects those needing a transplant.

What is MELD? How is it used?

The Model for End-Stage Liver Disease (MELD) is a numerical scale, ranging from 6 (less ill) to 40 (gravely ill), used for liver transplant candidates age 12 and older. It gives each person a 'score' (number) based on how urgently he or she needs a liver transplant within the next three months. The number is calculated by a formula using four routine lab test results:

- bilirubin, which measures how effectively the liver excretes bile
- INR (prothrombin time), which measures the liver's ability to make blood clotting factors
- creatinine, which measures kidney function (Impaired kidney function is often associated with severe liver disease.)
- serum sodium, which measures the severity of conditions such as portal hypertension.

The only priority exceptions to MELD are the categories known as Status 1A and 1B. Status 1A patients have acute (sudden and severe onset) liver failure and a life expectancy of hours to a few days without a transplant. Status 1B is reserved for very sick, chronically ill pediatric patients (age less than 18). Less than one percent of liver transplant candidates are in these categories at any one time. All other liver candidates age 12 and older are prioritized by the MELD system.

A patient's score may go up or down over time depending on the status of his or her liver disease. Most candidates will have their MELD score assessed a number of times while they are on the waiting list. This will help ensure that donated livers go to the patients in greatest need at that moment.

MELD has been shown to rank patients on the waiting list reliably in terms of their short-term risk of death. The MELD formulas are simple, objective and verifiable, and yield consistent results whenever the score is calculated.

What is PELD? How does it differ from MELD?

Candidates age 11 and younger are placed in categories according to the Pediatric End-Stage Liver Disease (PELD) scoring system. Again, a small group of urgent patients may be listed as a Status 1A or 1B. All other candidates in this age range receive priority through PELD.

PELD is similar to MELD but uses some different factors to recognize the specific growth and development needs of children. PELD scores may also range higher or lower than the range of MELD scores. The measures used are as follows:

- bilirubin, which measures how effectively the liver excretes bile
- INR (prothrombin time), which measures the liver's ability to make blood clotting factors
- albumin, which measures the liver's ability to maintain nutrition
- growth failure
- whether the child is less than one year old

As with MELD, a patient's score may go up or down over time depending on the degree of his or her disease severity. Most candidates will have their PELD score assessed a number of times while they are on the waiting list. This will help ensure that donated livers go to the patients in greatest need at that moment.

How are livers allocated?

First, transplant candidates that are not compatible with the donor based on a number of characteristics (blood type, height, weight, etc.) are screened from the match run that determines the order a liver is offered. The remaining candidates on this match run are prioritized based on the following factors:

- the donor's age
- their medical urgency
- their geographical proximity to the donor (local—defined by the Organ Procurement Organization's service area; regional—UNOS has 11 allocation regions in the U.S.; national—all remaining candidates in the nation)

Livers from adult donors are allocated first to the most urgent candidates located in the same region as the donor; Status 1A candidates, followed by Status 1B candidates. The allocation sequence provides broader access to those most in need of a liver (those with scores higher than 35) and those who would receive the most benefit (those with scores higher than 15). Therefore, after regional Status 1A and 1B candidates, liver offers are then made to

- candidates with MELD/PELD scores 35 and higher within the donor's region, with offers first made locally, then regionally (i.e., local 40 regional 40, local 39, regional 39, etc.)
- local candidates with scores greater than 15
- regional candidates with scores greater than 15
- national candidates in Status 1A or 1B
- national candidates with scores greater than 15
- candidates with scores less than 15 locally, regionally, then nationally

If a combined liver-intestine is being offered, candidates waiting for a liver-intestine anywhere in the country may be offered the combination (based on their MELD/PELD score) after local candidates with MELD/PELD scores of 29 or higher.

Partly because pediatric transplant candidates need smaller organs, they will receive priority in the liver offer sequence if the donor is younger than 18.

Liver offer process for donors 0-10 years of age

1. Offers are first extended to all compatible pediatric Status 1A candidates located in the same region as the donor.
2. Next, the liver is offered to the remaining Status 1A candidates across the nation that are 0-11 years old.

3. If the liver has not been accepted yet, it is offered to local adult Status 1A potential transplant recipients then to Status 1A adults in the same region.
4. Next, all pediatric Status 1B candidates in the region receive the liver offer, followed by all candidates 0-11 years old in the region in order of decreasing PELD score.
5. If no one has accepted the liver at this point, it is offered to adolescent (12-17 years old) candidates that are local to the donor and have a MELD score greater than or equal to 15, then to local adults that have a MELD score greater than or equal to 15.
6. That same adolescent/adult MELD score greater than or equal to 15 sequence of offers would then be made to those potential transplant recipients in the region.
7. Following these offers, candidates with a MELD score less than 15 are offered the liver using the same adolescent/adult progression locally, then regionally.
8. If not accepted for any of these patients, the liver is then offered to potential recipients nationwide, with similar pediatric priority and those most urgent patients being offered the liver first.

Is waiting time counted in the system?

Various studies report that waiting time is a poor indicator of how urgently a patient needs a liver transplant. This is because some patients are listed for a transplant very early in their disease, while others are listed only when they become much sicker.

Under the MELD/PELD system with a wide range of scores, waiting time is not often used to break ties. Waiting time will only determine who comes first when there are two or more patients in the same allocation classification with the same MELD or PELD score.

Do MELD and PELD account for all conditions?

MELD/PELD scores reflect the medical need of most liver transplant candidates. However, there may be special exceptions for patients with medical conditions not covered by MELD and PELD. If your transplant team believes your case qualifies for an exception, they may submit information to their regional review board (RRB) and request a higher score. The RRB will consider the medical facts and determine whether or not to grant a higher score.

Is this system likely to change?

Liver allocation policy based on MELD and PELD has changed as transplant professionals have applied and learned from the system, and future changes will likely be required to better meet patients' needs. In fact, this system is designed to be flexible and allow improvements. In transplantation, as in all scientific fields, new studies are taking place all the time to learn how to save more lives and help people live longer and better.

For more information

Start with your doctor or the medical team at your transplant center. They know the most about your specific medical condition and treatment. Don't be afraid to ask questions. It will help you to have a detailed understanding of all your treatment options.

UNOS' Patient Services phone line (888-894-6361) can provide information about the OPTN allocation policy and other resources available to you. Additional information is available online on the following websites:

<http://www.transplantliving.org>

<http://optn.transplant.hrsa.gov>

<http://www.unos.org>

<http://www.srtr.org>

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and transplant community to save lives.*



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