

TALKING ABOUT TRANSPLANTATION

*Questions & Answers*

*for* Transplant  
Candidates *about*  
**MELD** *and* **PELD**



UNITED NETWORK FOR ORGAN SHARING

The United Network for Organ Sharing (UNOS), a non-profit charitable organization, operates the Organ Procurement and Transplantation Network (OPTN) under federal contract. On an ongoing basis, the OPTN/UNOS evaluates new advances and research and adapts these into new policies to best serve patients waiting for transplants.

As part of this process, the OPTN/UNOS developed a system for prioritizing candidates waiting for liver transplants based on statistical formulas that are very accurate for predicting 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 will explain the system and how it affects those needing a transplant.

### **What is MELD? How will it be 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 three 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; and
- creatinine, which measures kidney function. (Impaired kidney function is often associated with severe liver disease.)

The only priority exception to MELD is a category known as Status 1. Status 1 patients have acute (sudden and severe onset) liver failure and a life expectancy of hours to a few days without a transplant. Less than one percent of liver transplant candidates are in this category. 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.

### **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 there is a Status 1 category for highly urgent patients, representing about one percent of those listed.

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; and
- 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 status of his or her disease. 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.

### **What Led To the MELD/PELD System?**

Until 2002, patients needing liver transplants were grouped into four medical urgency categories. The categories were based on a scoring system that included some laboratory test results and some symptoms of liver disease.

One concern with using symptoms in scoring was that different doctors might interpret the severity of those symptoms in different ways. In addition, this scoring system could not easily identify which patients had more severe liver disease and were in greater need of a transplant.

Research showed that MELD and PELD accurately predict most liver patients' short-term risk of death without a transplant. The MELD and PELD formulas are simple, objective and verifiable, and yield consistent results whenever the score is calculated.

OPTN/UNOS committees developed the liver policy based on MELD and PELD, with key support from transplant patient/family advocates. It was approved by the OPTN/UNOS Board of Directors in November 2001 and went into effect in February 2002.

### **How are livers offered through MELD and PELD?**

Livers are offered first to urgent and compatible patients in the donor's local area (often defined as a state or large metropolitan area), then to a larger region of the country (the OPTN/UNOS has 11 allocation regions in the U.S.), then nationwide. Because Status 1 candidates are most medically urgent, each liver is first offered to local Status 1 candidates, then regional Status 1 candidates. The sequence of offers after Status 1 patients depends on the donor's age.

If the donor is younger than 18, after any Status 1s are considered the liver would next be offered to candidates in the region age 11 or younger. The organ would then be considered for local and then regional candidates with a MELD of 15 or higher. Any patients age 12 to 17 would be considered ahead of adult patients.

If the donor is 18 or older, the liver would be offered first to local and regional Status 1 candidates. If not accepted for any of these patients, the liver is then offered to candidates with a MELD/PELD score of 15 or higher, first locally and then regionally.

If the liver is not matched to any candidates with a MELD/PELD of 15 or higher, it may then be considered for local, then regional candidates with a MELD/PELD of 14 or less. Finally the liver would be offered for any compatible candidates nationwide, beginning with Status 1 candidates and then to those with the highest MELD/PELD scores.

### **How 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 with the same blood type and the same MELD or PELD score.

If a patient's MELD or PELD score increases over time, only the waiting time at the higher level will count. (For example, if you have waited 40 days with a score of 12, and 5 days with a score of 15, you would only get credit for 5 days of waiting time at the score of 15.) However, if the patient's MELD or PELD score decreases again, he or she would keep the waiting time gained at the higher score. (Using the earlier example, if your score goes from 12 to 15 and back to 12, you would have 45 days of waiting time at the score of 12.) Patients initially listed as a Status 1 also keep their waiting time if their condition improves and they later receive a MELD/PELD score.

Patients with higher MELD/PELD scores will always be considered before those with lower scores, even if some patients with lower scores have waited longer. (For example, a patient waiting for one day with a score of 30 will come ahead of a patient with a score of 29, even if the patient with a 29 has waited longer. This is because the patient with a score of 30 has a higher risk of dying without a transplant.)

### **What if I had been on the waiting list when the system changed?**

For the first year of the MELD and PELD system, a transition plan was in place for liver candidates awaiting a transplant at the time of the change to maintain their priority gained under the previous policy. After the transition period ended, those candidates still awaiting a transplant were prioritized only by their MELD or PELD score.

If you were listed for transplant at the time the policy became effective (February 27, 2002), your transplant team would best be able to address any questions about the transition and/or your current medical status.

All patients newly listed for a liver transplant since February 2002 receive priority only by their MELD or PELD score, based on their current lab results.

### **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 a review board and request a higher score. The review board 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 already been 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.

### **What if I have more questions?**

If you have any further questions or concerns, you should contact your transplant team for further information. Additional details about the OPTN, UNOS, allocation policy and patient informational resources are available on the following websites:

[www.optn.org](http://www.optn.org) • [www.unos.org](http://www.unos.org) • [www.transplantliving.org](http://www.transplantliving.org)

*The UNOS mission is to advance organ availability and transplantation  
by uniting and supporting its communities for the benefit of patients  
through education, technology and policy development.*



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