

# Expanded criteria donors offer hope for patients needing kidney transplant

When should patients with end-stage renal disease consider expanded criteria kidney donation, and how can you help them understand their options?

Lisa Vieira, PA-C, MS

The National Kidney Foundation says that “rates of chronic kidney disease (CKD) in the United States have increased by more than 20% over the [past decade, causing dramatic loss of life and sky-rocketing health care costs, according to the 2008 annual report by the US Renal Data System.”<sup>1</sup> CKD is now estimated to affect nearly 27 million adult Americans.<sup>1</sup>

Figure 1 shows that the waiting list for a donor kidney has grown from slightly more than 40,000 people in 1998 to about 80,000 in 2008.<sup>2</sup> The number of deceased donor transplants has increased as well, from about 17,000 in 1998 to 22,000 in 2007<sup>2</sup> (see Figure 2, page 34). Figure 3 (page 35) shows the number of deceased and living donors by year, with the number of deceased donors rising from fewer than 6,000 in 1998 to more than 8,000 in 2008.<sup>2</sup>

Patients receiving dialysis are usually quite discouraged by the lack of kidney donors and the length of transplant waiting lists. They realize that the longer they are on dialysis, the less likely the chance of transplantation and the poorer the transplantation outcome. Many patients on dialysis might

welcome the opportunity to inherit a donor kidney, which can become possible using an expanded criteria donor (ECD) organ. Patients willing to accept an ECD kidney—a kidney from an older donor or a donor with medical problems that precluded kidney donation in the past—can undergo transplantation more quickly than if they wait for a standard kidney. Accepting an ECD kidney offers many patients a chance at extended survival and a better quality of life than they might otherwise have.

Most PAs already know that there are not enough donor kidneys within the United States, but they should also understand that ECDs can increase the pool of available organs. This article discusses the specific criteria required to become an ECD, with emphasis on which patients with end-stage renal disease (ESRD) should be offered this option and why accepting this type of kidney should be seriously considered. PAs caring for patients with CKD should be able to educate them about expanded criteria donation and give them hope of gaining access to kidney transplantation.

## FACTS ABOUT RENAL TRANSPLANT

A foreign study by Mazzuchi and colleagues demonstrated that patients undergoing renal transplantation had much

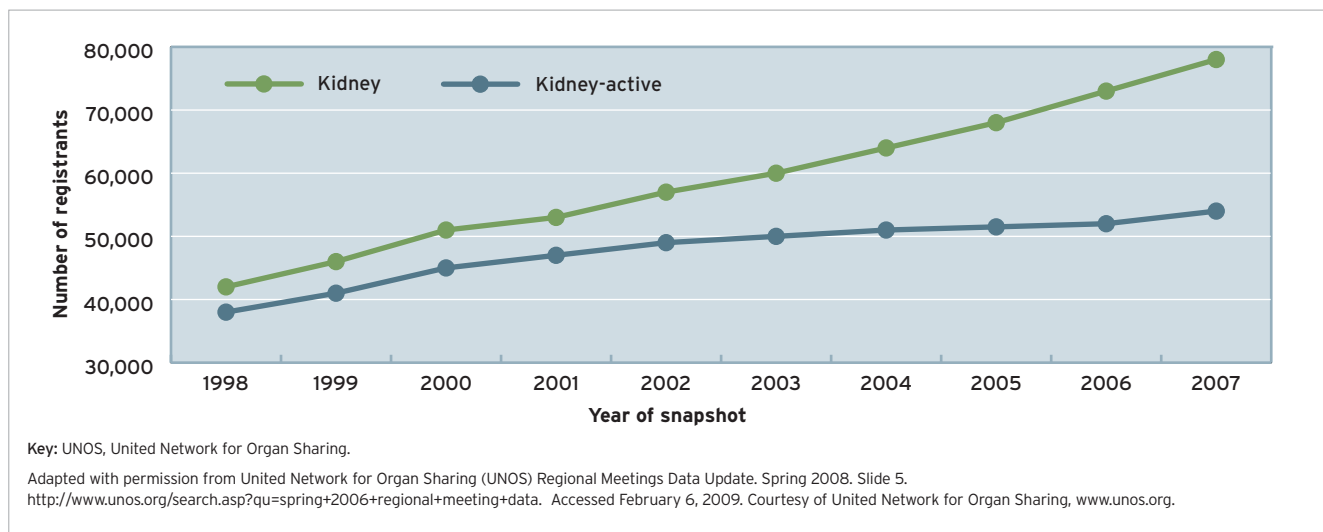
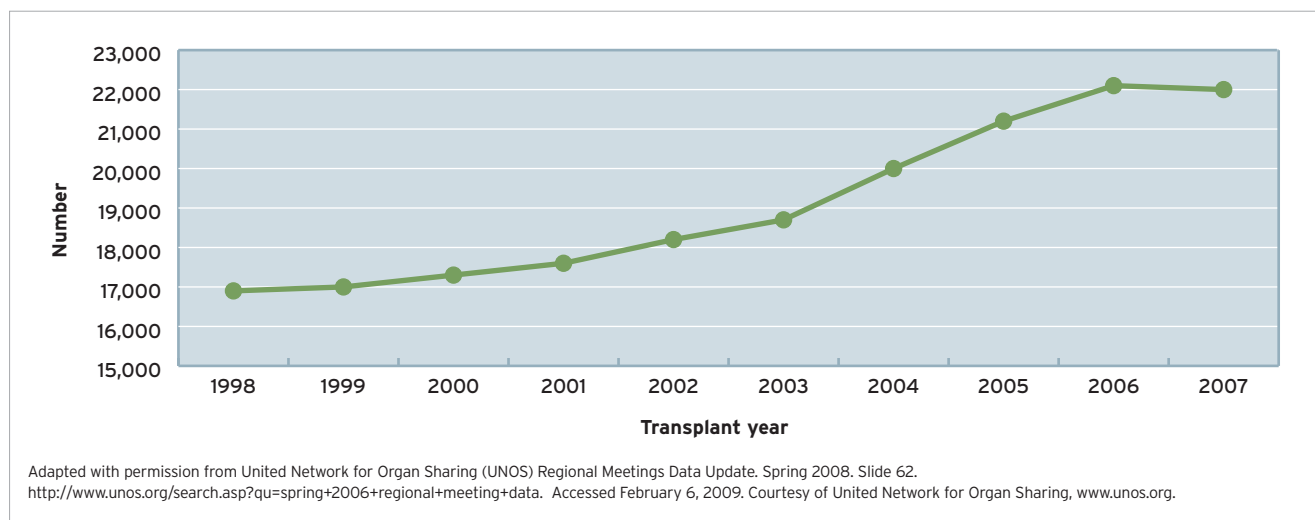


FIGURE 1. UNOS waiting lists for donor kidneys



**FIGURE 2.** Number of deceased donor transplants, by year

longer survival than patients undergoing hemodialysis.<sup>3</sup> The 1-, 5-, and 10-year survival rates were 95.2%, 88%, and 78.8% for renal transplant recipients, versus 90.6%, 62.7%, and 39.8% for dialysis patients.<sup>3</sup>

Kidney donors may be living or deceased. Although live donors are usually blood relatives, some donors are not related to the patient. Blood relatives are usually the best donors; however, both relatives and unrelated live donors are considered ideal because they can offer recipients the best quality kidney in the shortest period of time. The success rate for transplantation with live donors is high, and surgery is scheduled electively, allowing the recipient to begin immunosuppressant therapy in advance and thus decrease the risk of rejection.

With deceased organ donation, in which the donor has no heartbeat prior to organ procurement, delayed kidney function may occur after transplantation. The ideal deceased donor is someone who dies from a traumatic head injury, leaving the abdominal organs intact. Weber and colleagues compared long-term outcomes for patients receiving kidneys from donors with a beating heart and those receiving organs from donors without a heartbeat at the time of procurement.

Graft function was delayed in patients from the latter group, but long-term outcomes were similar for both groups.<sup>4</sup> Table 1 (page 36) shows patient and graft survival rates at 1 year, 3 years, and 5 years for both standard and ECD kidneys.

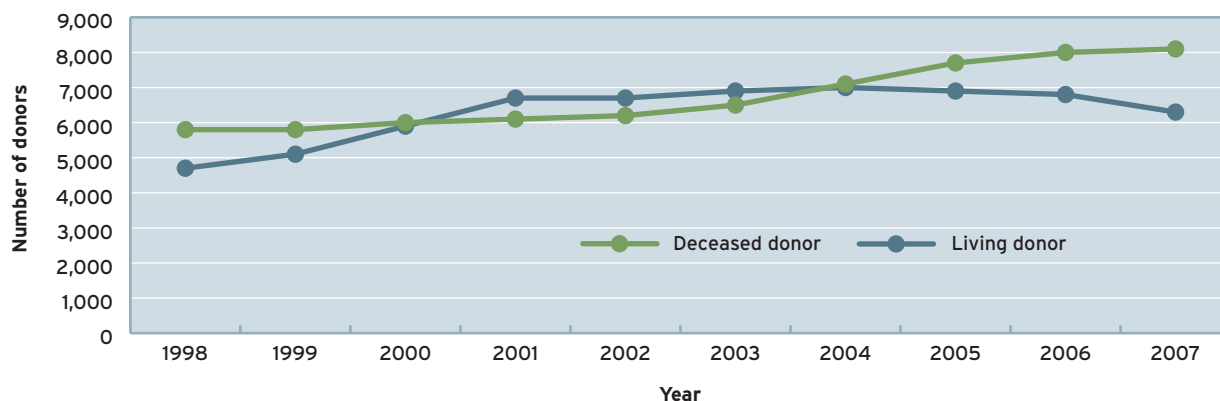
#### DATA ON EXPANDED CRITERIA DONATION

The Scientific Registry of Transplant Recipients performed an analysis of ECDs in order to promote use of ECD kidneys. As a consequence of this analysis, the United Network for Organ Sharing, (UNOS) developed a policy for using expanded criteria donors.<sup>5</sup>

**The ECD kidney** The directors of UNOS developed the requirements for becoming an ECD donor, and these requirements are based on the relative risk of graft loss. The requirements are (1) age 60 years and older; (2) age 50 to 59 years with at least two of three medical criteria (history of hypertension, stroke as a cause of death, final organ preprocurement creatinine >1.5 mg/dL); or (3) donation after death (see Table 2, page 36). Kidneys from ECDs are associated with a 70% or greater risk of graft failure. Although this number seems high, the recipient of an ECD kidney is given

#### KEY POINTS

- Patients willing to accept an expanded criteria donor (ECD) kidney—a kidney from an older donor or a donor with medical problems that precluded kidney donation in the past—can undergo transplantation more quickly than if they wait for a standard kidney. Accepting an ECD kidney offers many patients a chance at extended survival and a better quality of life than they might otherwise have.
- The requirements for becoming an ECD donor are based on the relative risk of graft loss and include the following: (1) age older than 60 years; (2) age 50 to 59 years with at least two of three medical criteria (history of hypertension, stroke as a cause of death; final organ preprocurement creatinine >1.5 mg/dL); or (3) donation after death.
- The success rate for transplantation is highest with live donors. With deceased organ donation, in which the donor has no heartbeat prior to organ procurement, delayed kidney function may occur after transplantation. Nevertheless, long-term outcomes are similar for patients receiving live and deceased donor kidneys.
- Kidneys from ECDs are associated with a 70% or greater risk of graft failure. Although this number seems high, the recipient of an ECD kidney is given time away from dialysis if transplantation is successful. In addition, the risk of dialysis complications may be reduced in recipients of ECD kidneys, and psychological factors improve for patients when dialysis has ceased.



Adapted with permission from United Network for Organ Sharing (UNOS) Regional Meetings Data Update, Spring 2008, Slide 33. <http://www.unos.org/search.asp?qu=spring+2006+regional+meeting+data>. Accessed February 6, 2009. Courtesy of United Network for Organ Sharing, www.unos.org.

**FIGURE 3.** Deceased and living donors, by year

time away from dialysis if transplantation is successful. In addition, the risk of dialysis complications may be reduced in recipients of ECD kidneys,<sup>6</sup> and psychological factors improve for patients when dialysis has ceased.

Metzger and colleagues state that “kidneys transplanted from older donors are considered to be from the ECD pool. Recipients who receive kidneys from this pool have a higher incidence of delayed graft function. There is a higher incidence of graft failure, or rejection, and a decreased long-term graft function.”<sup>6</sup> Although these are negative factors, if recipient age, length of waiting lists, and duration of time already spent on dialysis are taken into consideration, accepting an ECD kidney can have added survival benefits. Studies by Ojo and colleagues have confirmed the benefits of additional years of life in recipients of ECD kidneys, compared to persons who remain on dialysis.<sup>7</sup> Furthermore, “in the face of a critical kidney shortage, it is unrealistic to hope for pristine organs for all patients.”<sup>8</sup>

**Dual renal transplant** For various reasons, many kidneys are discarded prior to transplantation. Efforts have been made to increase the pool of available donor kidneys by taking organs that normally would be discarded as nontransplantable individually and submitting them for evaluation as part of a possible dual renal transplant. The assumption is that ECD kidneys have some degree of kidney malfunction prior to transplantation; so why not transplant two donor kidneys as opposed to one, so that renal nephron mass is increased and can create much better kidney function in the recipient?

Sanchez and colleagues reported a successful dual transplant using ECD kidneys.<sup>9</sup> Similar work by Stratta and colleagues demonstrated success using ECD kidneys from deceased donors that would ordinarily have been discarded.<sup>5,10</sup> Stratta states, “The limits of donor acceptability continue to evolve, as excellent short-term outcomes can be achieved in kidney transplants from [expanded criteria donation]. Patients are waiting less time to receive a life-saving kidney transplant and become dialysis free.”<sup>10</sup>

Studies published from 2001 to 2007 “determined if there was a net lifetime survival benefit in recipients of marginal kidney function, compared to those still on dialysis. Based on the recipient’s characteristics, studies demonstrated that it was possible to calculate a survival benefit ratio in these patients. These calculations were based on survival curves for patients with similar characteristics utilizing the Cox regression model. This model provided an estimate of the treatment effect on survival after adjustment for other explanatory variables. It allowed for the estimation of risk of death, or other event of interest, for individuals, given their prognostic variables.”<sup>8</sup>

#### **BENEFITS AND RISKS OF TRANSPLANT WITH AN ECD KIDNEY**

An ECD kidney is offered to any patient who wishes to accept one. Even after a patient chooses to be on an expanded donor list, switching to the standard transplant list is always an option.

Why should a dialysis patient accept an ECD kidney, with its accompanying risk of delayed kidney function, over a standard kidney with perhaps better kidney function? Taking the patient’s age into consideration, with increased time spent on dialysis and the chances of receiving a standard kidney being low, patients may opt to accept an ECD kidney in order to prolong their life and increase their chances of resuming normal living.

The benefits of ECD transplantation include decreased waiting time for transplantation, decreased risk of the complications that can occur while the patient is receiving dialysis, and being able to stop dialysis if transplantation is successful. The risks include the chances of delayed graft function and decreased duration of graft survival. Delayed graft function is frequently encountered with transplants from deceased organ donors. Poor function of the transplanted organ can also occur from damage to any part of the organ during the transplantation process. If the kidney cannot function soon after

transplantation, the risk of rejection increases and dialysis may become necessary. Dialysis may last from days to months, with no certainty that it will end.

As with any transplant, rejection is also a risk. The types of rejection include

- Hyperacute, a complement-mediated response in recipients with preexisting antibodies to the donor. Onset of this type of rejection is usually within 24 hours of transplantation.
- Acute, mediated by T-cell responses to proteins from the donor organ, which differ from those in the recipient. Onset is usually within the first week and is highest within 3 months of transplantation. The risk of occurrence is decreased when immunosuppressant agents are taken in a maintenance dosage.
- Chronic, which occurs within months to years following transplantation. This type is caused by graft occlusion due to smooth muscle cell proliferation and the production of collagen. Chronic rejection is the major cause of graft loss. Treatment is immunosuppressant therapy taken for life.

**TABLE 1. National patient and graft survival rates**

	Donor	1 year	3 years	5 years
Patient	Live	98%	95%	90%
	Non-ECD	96%	90%	83%
	ECD	90%	81%	62%
Graft	Live	95%	88%	80%
	Non-ECD	91%	81%	70%
	ECD	82%	68%	53%

Data compiled on Organ Procurement and Transplantation Network. <http://www.optn.org/latestData/rptStrat.asp>.

**TABLE 2. Criteria for expanded criteria donation**

Donor condition	Donor age categories	
	50-59 y	≥60 y
Stroke + HTN + Creat >1.5	×	×
Stroke + HTN	×	×
Stroke + Creat >1.5	×	×
HTN + Creat >1.5	×	×
Stroke		×
HTN		×
Creat >1.5		×
None of the above		×

Key: stroke, stroke was cause of death; HTN, history of hypertension at any time; creat >1.5, creatinine >1.5 mg/dL.

Adapted with permission from United Network for Organ Sharing. <http://www.unos.org/downloadables/ExpandedCriteriaDonorKidneyPolicyBrochureProf10072002Final.pdf>. Accessed February 6, 2009. Courtesy of United Network for Organ Sharing, [www.unos.org](http://www.unos.org).

- Hyperacute vascular rejection, which is associated with xenograft transplantation. It occurs 4 to 8 days after transplant. The end result is transplant failure secondary to thrombosis and graft rejection.<sup>11</sup>

The signs and symptoms of rejection include pain and tenderness over the transplant site, fever, decreased urinary output, hypertension, and flulike symptoms.

**Frequent complications** associated with transplantation are bleeding and organ rejection. Others are kidney clotting, infection, and urine leakage. A return to the operating room in the event of injury to blood vessels, nerves, and organs within the abdominal cavity associated with the transplant procedure is considered a complication. Stroke, cardiac events, and the possibility of death exist, even though the risks are low.

## CONCLUSION

We may safely assume that the number of patients with CKD requiring dialysis or renal transplantation will continue to increase, and the national pool of kidney donors will certainly need to increase in response. Patients with ESRD and in need of transplantation in order to survive must be properly informed of the advantages of using potential donor organs from the expanded pool. The length of time that patients have been waiting for a donor organ and their weakening, fragile states on dialysis can be deciding factors for many of them. Quality of life and rehabilitation will improve if transplantation is successful, and the number of waiting list deaths will decrease. **JAAPA**

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**Lisa Vieira** specializes in surgical oncology and is PA supervisor, Department of Surgery, North Shore University Hospital, Manhasset, New York. She has indicated no relationships to disclose relating to the content of this article.

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