

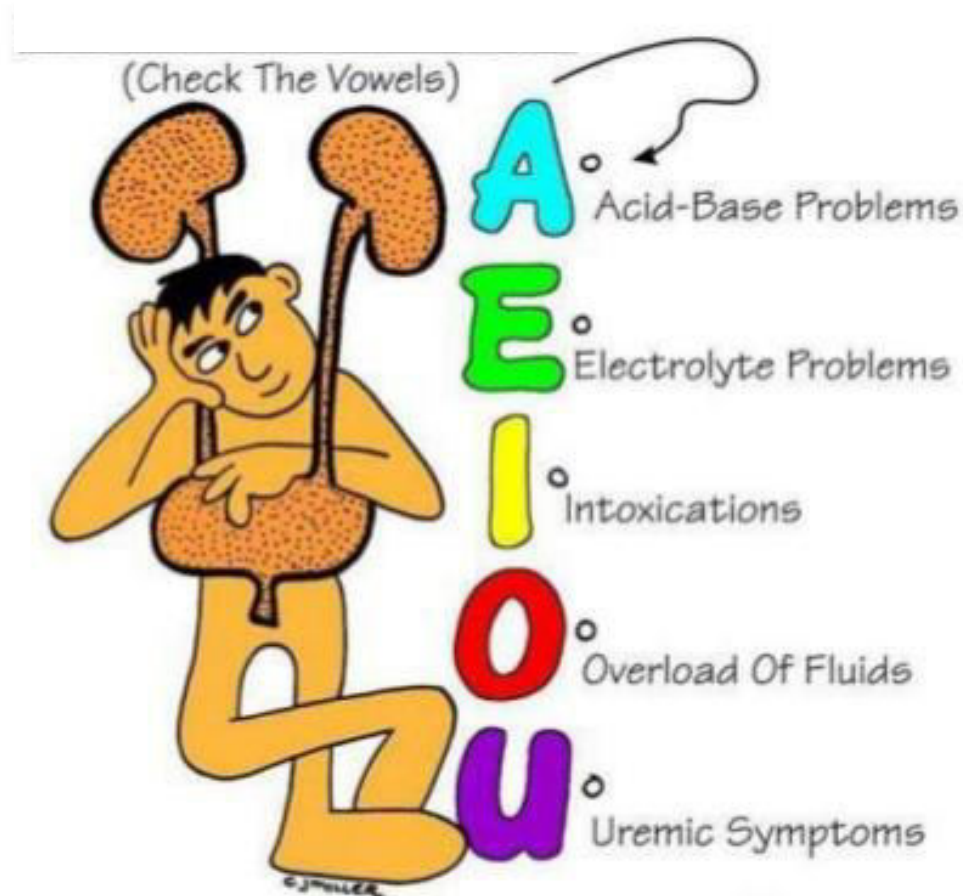
Klinika za nefrologiju- Klinički centar Niš

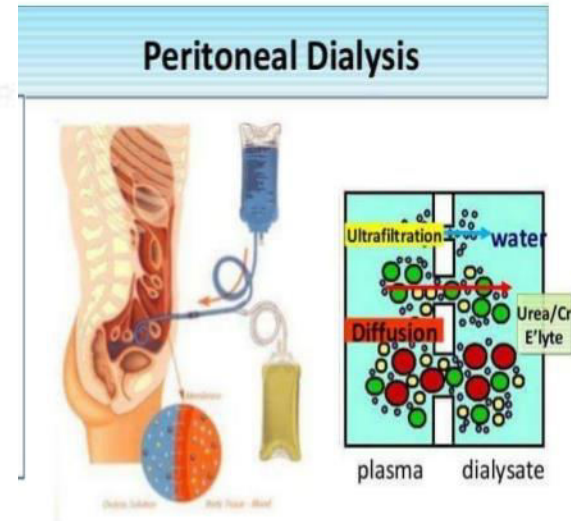
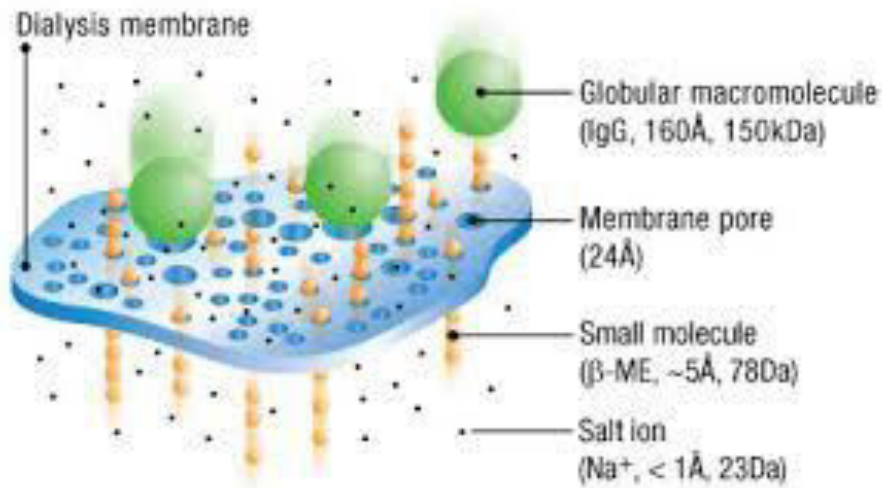
# **Prednosti i nedostaci transplantacije bubrega kao metode lečenja terminalne faze hronične bubrežne slabosti**

Branka Mitić

Niš, jun 2016.

# Kome je potrebna dijaliza ?





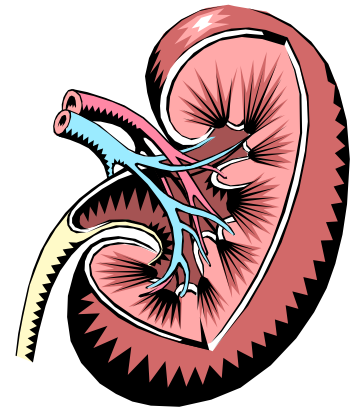
- Anemija
- Bolest kostiju
- Visok krvni pritisak
- Bolesti srca
- Oštećenje nerava
- Infekcije

Dijaliza, kao metoda zamene rada bubrega, obavlja samo 10% njegove fiziološke funkcije

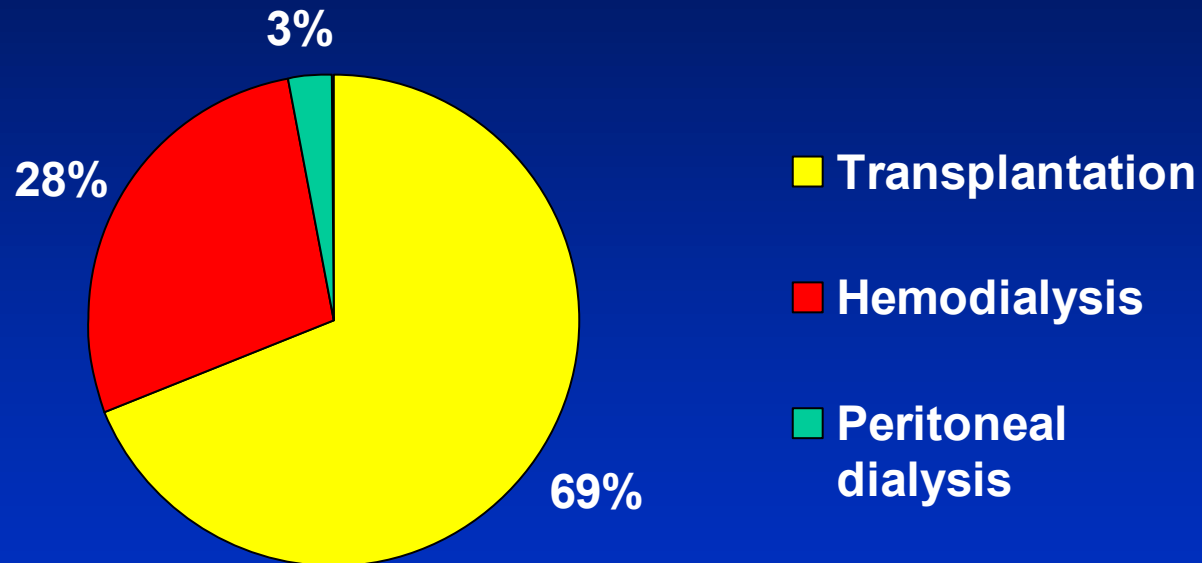
Kao rezultat toga, prosečan životni vek pacijenata na dijalizi je pet godina.

# Zašto transplantacija bubrega?

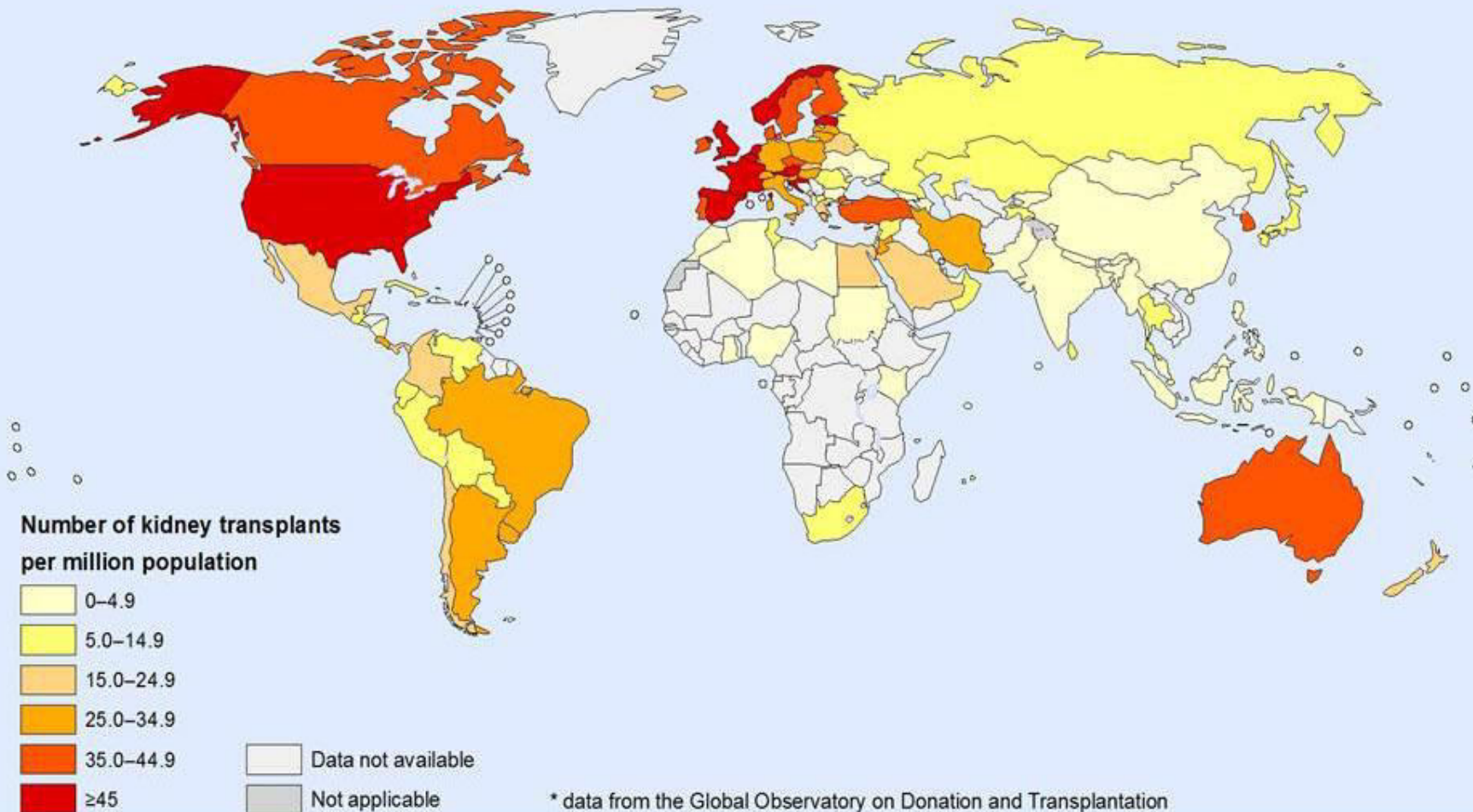
- Skupa je
- Nema dovoljno donora
- ? Kvalitet života



# 10-to godišnje preživljavanje pacijenata sa terminalnom HBI u odnosu na način lečenja



US Renal Data System. *USRDS 2000 Annual Data Report: Atlas of End-Stage Renal Disease in the United States*. Bethesda, Md: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases; 2000.



# Kidney Transplant Facts

- 16,894 Kidney Transplants in 2013
  - 34% Living Donor
  - 66% Deceased Donor
- Kidney Transplant Wait List – 106,566
- Current supply of kidney organs only serve less than 16% of wait list demand!

**2013 Kidney Donor Transplants**



# Transplantacija bubrega

## Ishod

- Jednogodišnje preživljavanje pacijenata > 95%
- Jednogodišnje preživljavanje grafta living donora ~ 95%
- Jednogodišnje preživljavanje grafta kadavera 85-90%
- Preživljavanje Tx pacijenata
  - Living: ~20 godina
  - Kadaverična Tx: ~10 godina



# Prednosti uspešne transplantacije

- “Oslobođeni” dijalize
- Manje restrikcije u ishrani
- Poboľšana krvna slika i simptomi uremijske intoksikacije
- Manja progresija neuropatije
- Povećane psihofizičke sposobnosti i životne aktivnosti
- Poboľšano zadovoljstvo životom fizičkim i emcionalnim oporavkom
- Potencijalna mogućnost povratka na posao ili školu, bez invaliditeta



# Prednosti uspešne transplantacije

- “Oslobodeni”  
dijalize



I don't care what day it is,  
Four hours is four hours.



I do sympathize with you, sir, but I'm afraid  
it cannot be viewed as 'carry on' luggage.

## Foods To Avoid In Kidney Disease - Kidney Failure

Avoid Food Items Which Are Rich In Potassium and Phosphorus



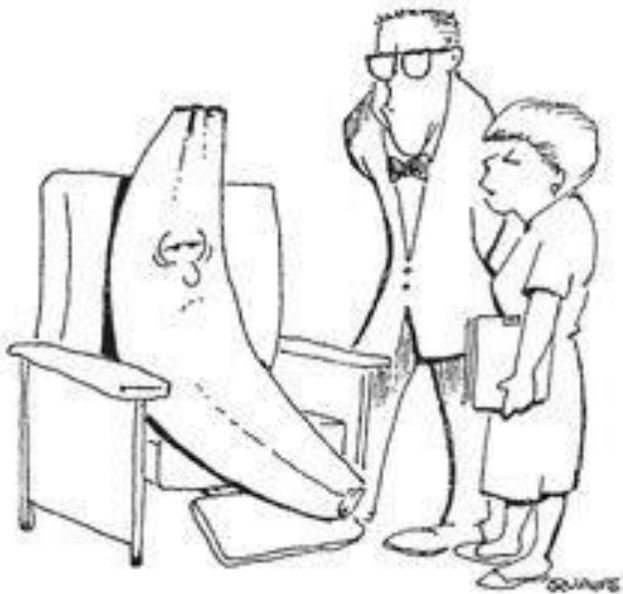
WWW.PLANETAYURVEDA.COM

# Prednosti uspešne transplantacije



- Manje restrikcije u ishrani

# Prednosti uspešne transplantacije



We're a little concerned  
about your potassium levels.

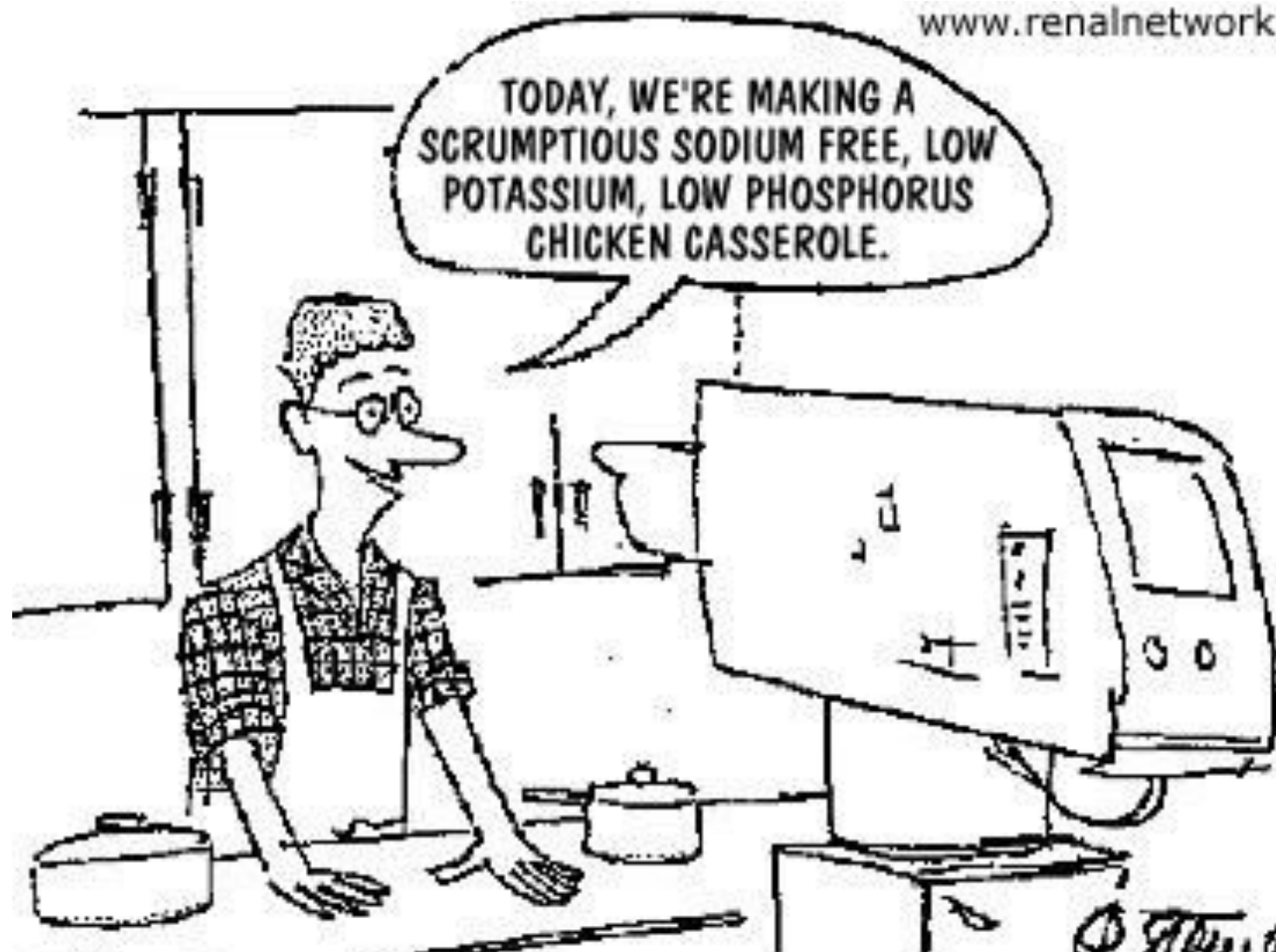


...and this dish is totally potassium-free!

Copyright © Jazz Communications Ltd 2004. All rights reserved

<http://KidneyKorner.com/AK/Comics.html>

- Manje restrikcije u ishrani



*The Renal Gourmet*

*Stewie*

Lori James-Hartwell

## Savršeni pacijent?!



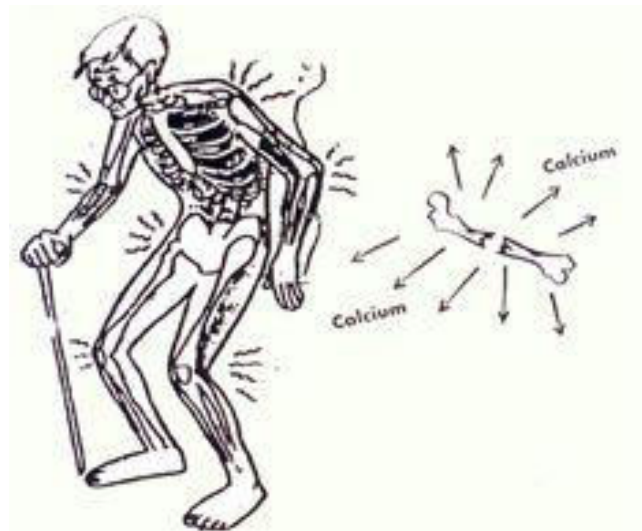
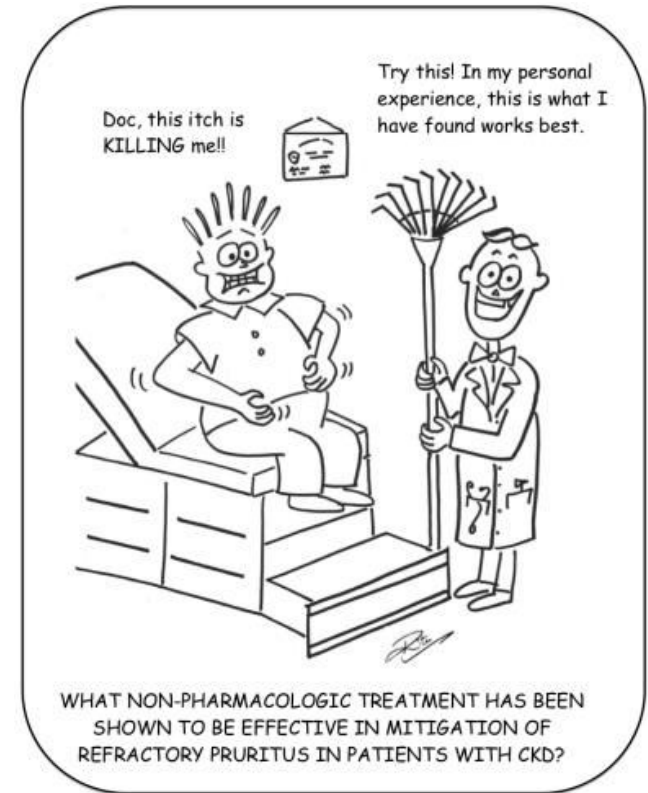
Meet Mr. Bates, our perfect patient. He controls his fluid levels by not drinking and his potassium, cholesterol and phosphates by not eating.

- Manje restrikcije u ishrani



# Prednosti uspešne transplantacije

- Poboljšana krvna slika i simptomi uremijske intoksikacije
- Manja progresija neuropatije i bolesti kostiju



# Prednosti uspešne transplantacije



" Snap out of it. "



" WELL?! DON'T YOU NOTICE ANYTHING  
DIFFERENT? I GOT A NEW KIDNEY! "

- Povećane psihofizičke sposobnosti i životne aktivnosti
- Poboljšano zadovoljstvo životom fizičkim i emcionalnim oporavkom
- Potencijalna mogućnost povratka na posao ili školu, bez invaliditeta





"Well... I think we should run a pregnancy test. Just to make sure!"

- Uspešno začeće je retko
- Amenoreja, nepravilni menstrualni ciklus, anovulatorni ciklusi, hiperprolaktinemija
- Povećan je rizik za pojavu preeklampsije i prevremeni porođaj



**Uspešna trudnoća na dijalizi je retka**

- ▶ The first successful pregnancy occurred in a kidney transplant recipient from an identical twin sister performed in 1958
- ▶ Later, The twin had successful full term pregnancies



# Trudnoća i transplantirani bubreg?

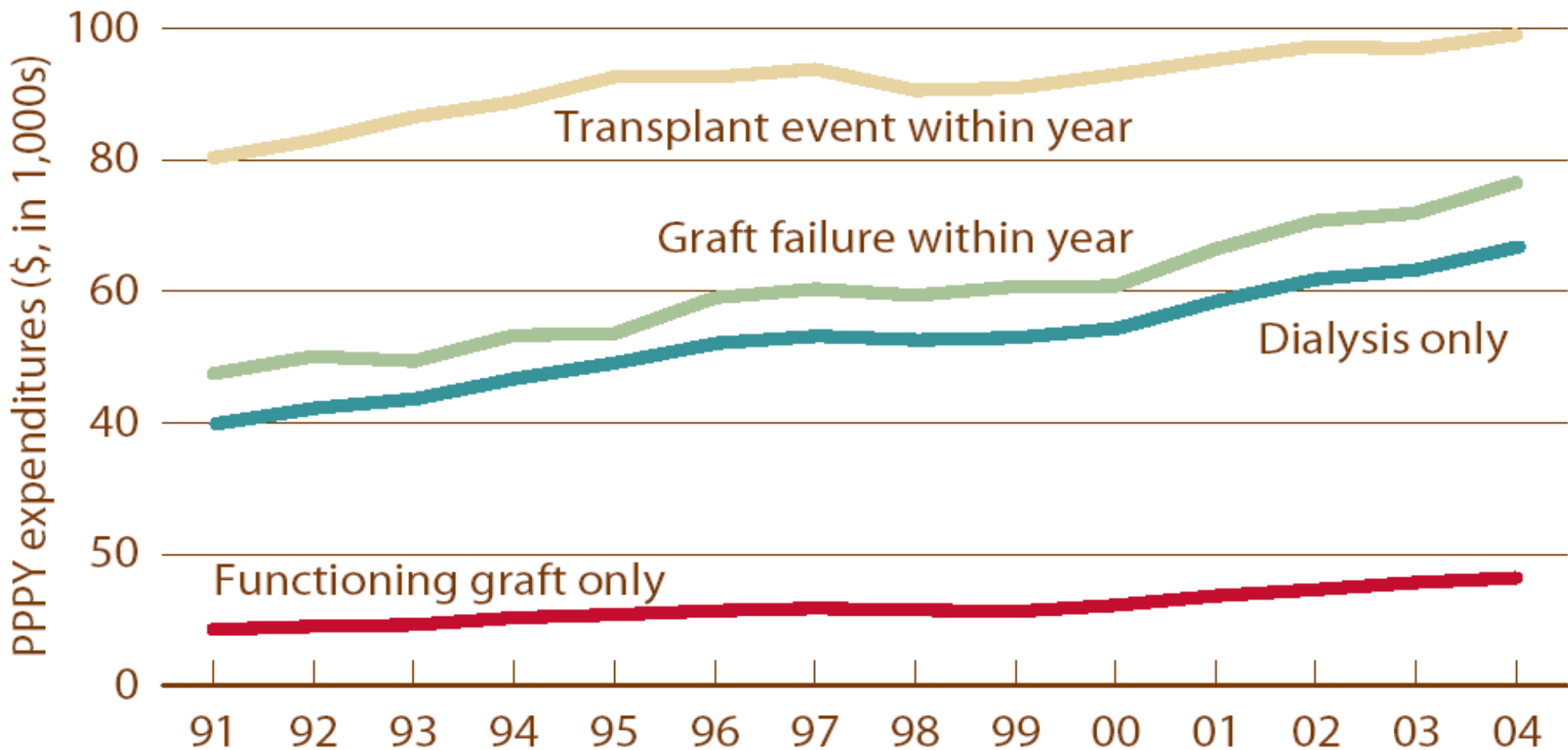


- Fertilitet je normalan
- Preporučeni period začeća je dve godine od Tx
- Bez ranijeg ili skorašnjeg odbacivanja
- Normotenzivna ili sa minimalnim dozama antihipertenziva
- bez ili sa neznatnom proteinurijom
- bez dilatacije pijeločastičnog sistema na UZ



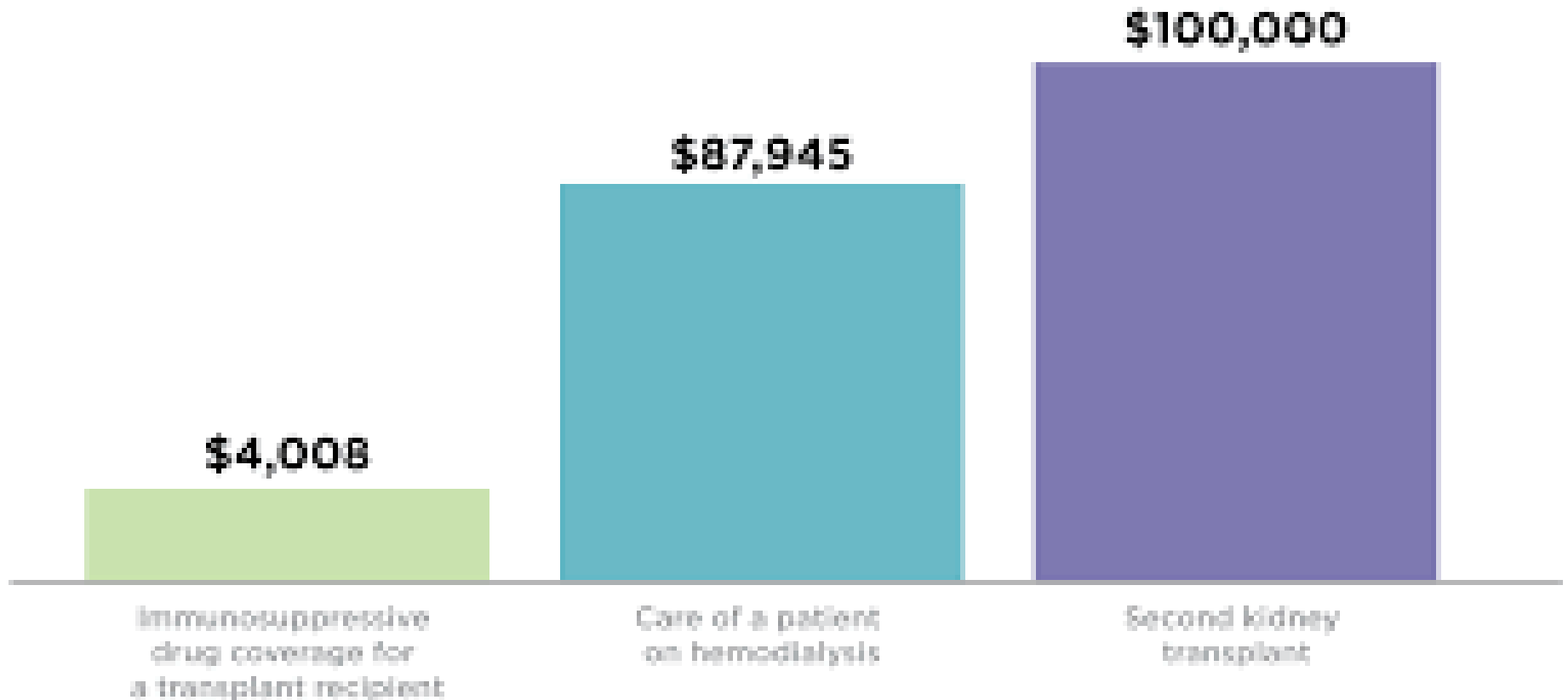
Tx bubreg pokazuje normalan porast veličine i JGF

# Godišnji troškovi modaliteta zamene funkcije bubrega



# Annual Per Patient Cost:

Immunosuppressive Drugs vs. Dialysis or Second Transplant

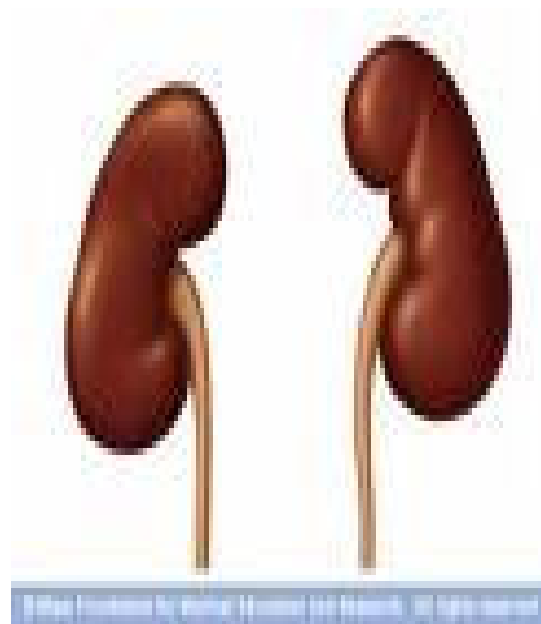


# Nedostaci transplantacije bubrega

- Dugo čekanje na listi za kadaveričnu Tx
- Morbiditeti vezani za hirurški zahvat
- Doživotna primena imunosupresivne terapije u prevenciji akutnog i hroničnog odbacivanja grafta
- Lekovi su veoma skupi
- Negativni efekti imunosupresivne terapije
  - Kardiovaskularne bolesti
  - Infekcije
  - Malignitet
  - Bolesti kostiju

# Nedostaci transplantacije bubrega

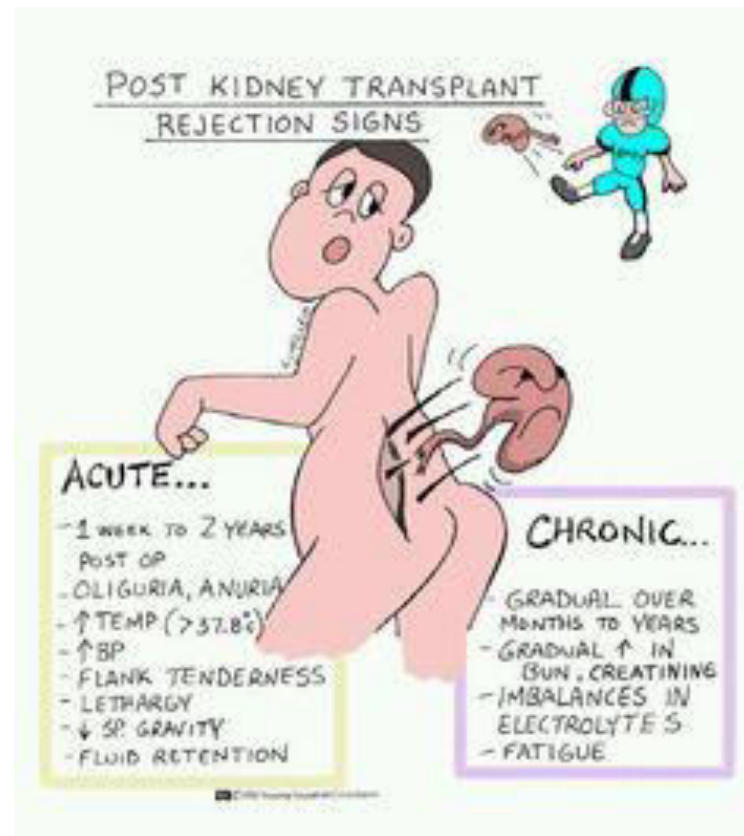
- Česte posete lekaru
- Pogoršanje postojećih zdravstvenih problema
- Graft možda "ne proradi"...



Nažalost, nema garancija u transplantacij

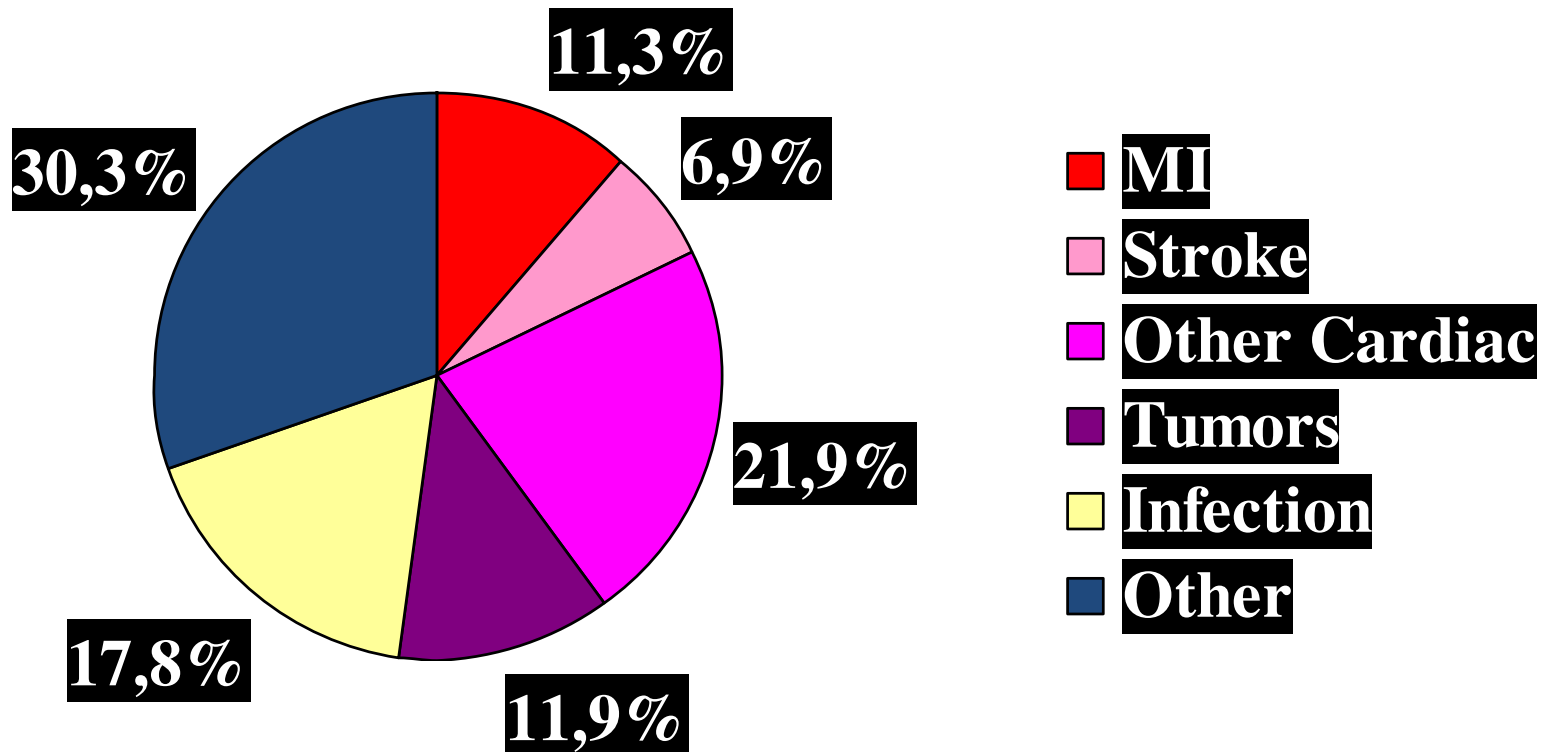
# Komplikacije kod recipijenta

- Odbacivanje
- Infekcije
- Neoplazme
- Hipertenzija



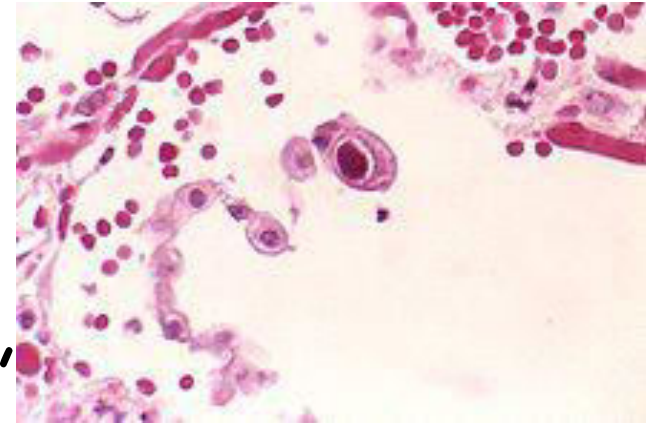


# Uzroci smrti posle Tx bubrega



# Infekcije

- Sve vrste infekcija se mogu javiti u post Tx periodu
- Virusne infekcije imaju poseban, naglašen značaj:
  - CMV,
  - BK-virus,
  - varicella zoster,
  - parvovirus B19,
  - herpes virus<sup>1,2</sup>



<sup>1</sup>Kim HC et al. Transplant Proc 2003;35:302

<sup>2</sup>Egbuna O et al. Am J Transplant 2006;6:225

# Malignitet posle transplantacije

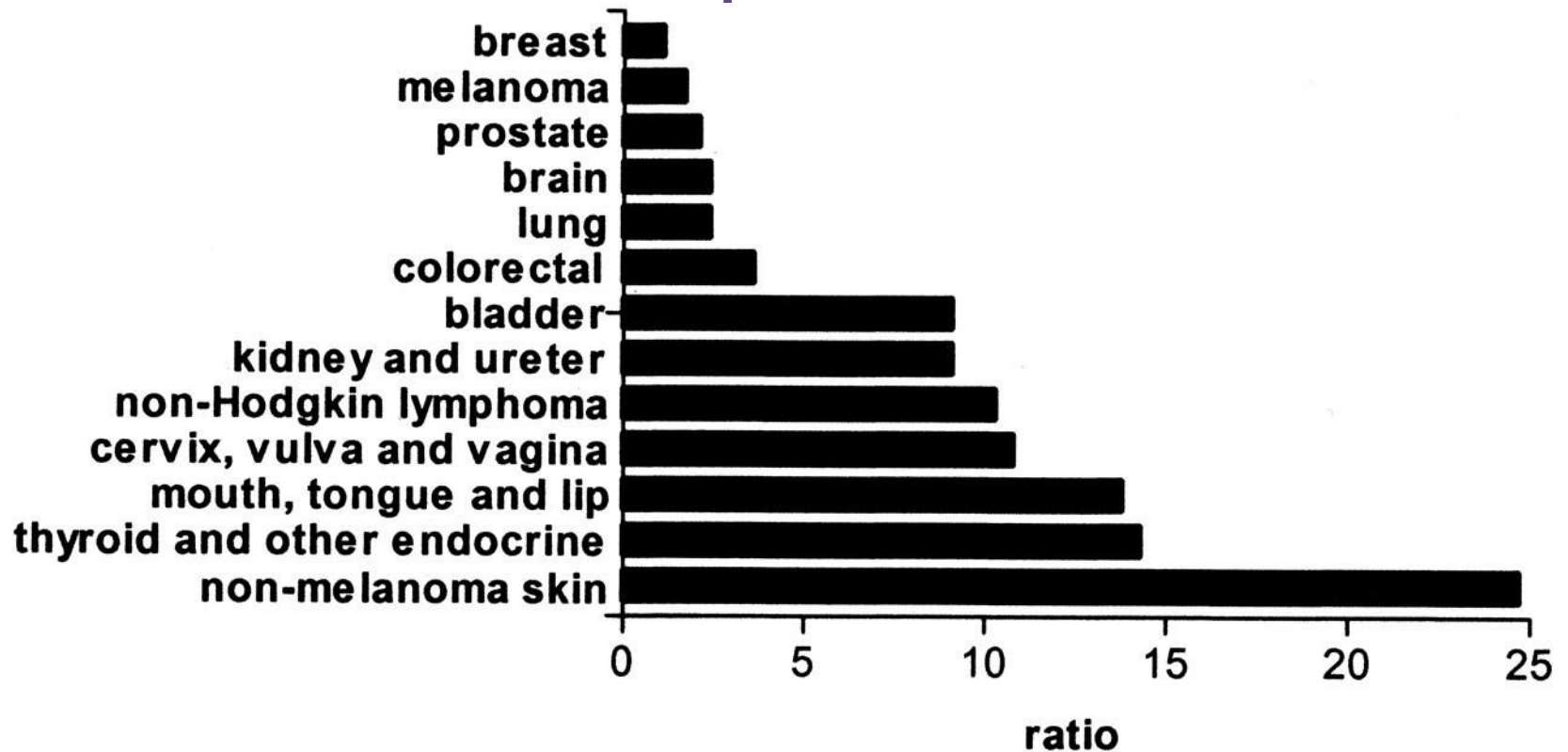
- treći najčešći uzrok smrti kod primalaca

može da se razvije u tri različita načina:

- De novo pojavljivanje u primaoca
- Rekurentni maligniteta u primaoca
- Transmisioni maligniteta od donatora

Imunosupresivna terapija može da izazove malignitet održavajući onkogenezu prouzrokovanu određenim virusima ili narušavanjem imunog nadzora, što omogućava brži rast tumor

# Ratio observed/expected malignancies in graft recipients

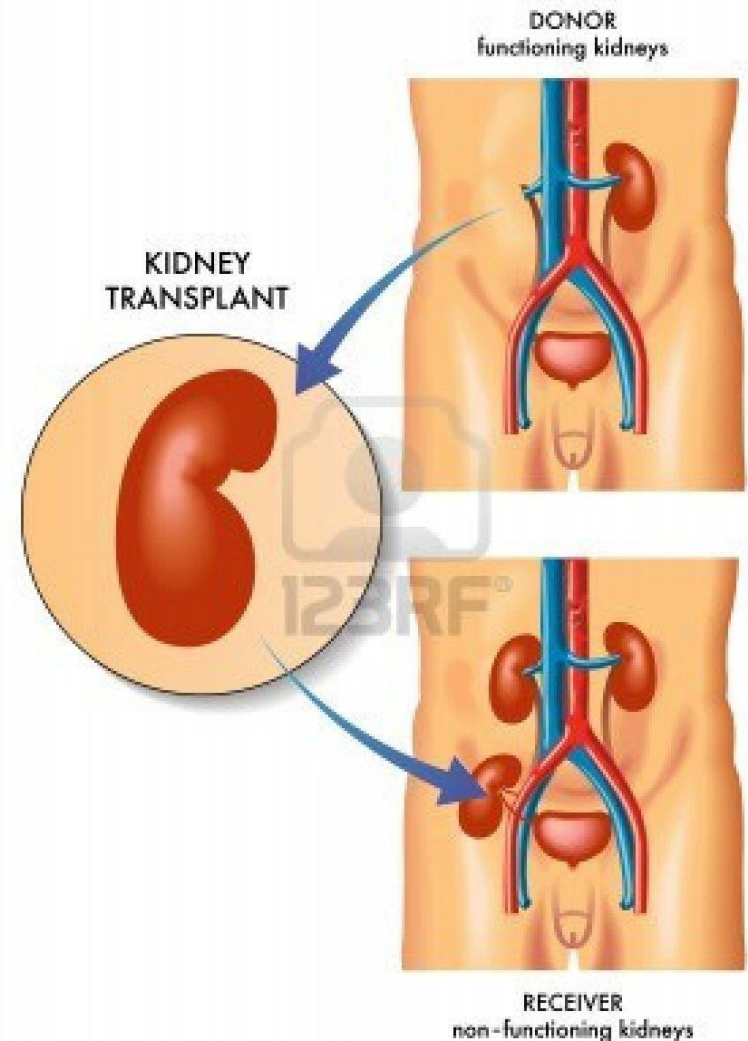




Kaposy sarcoma

# Transplantacija bubrega je najbolja terapijska opcija za pacijente sa terminalnom HBI

- ...ali, transplantiran je *jedan bubreg, redukovana* masa renalnog tkiva, smanjena JGF, prisutni neželjeni efekti HBI.
- Prevalenca anemije u *transplantiranih* pacijenata je *veća* u poređenju sa pacijentima sa HBI i istom JGF

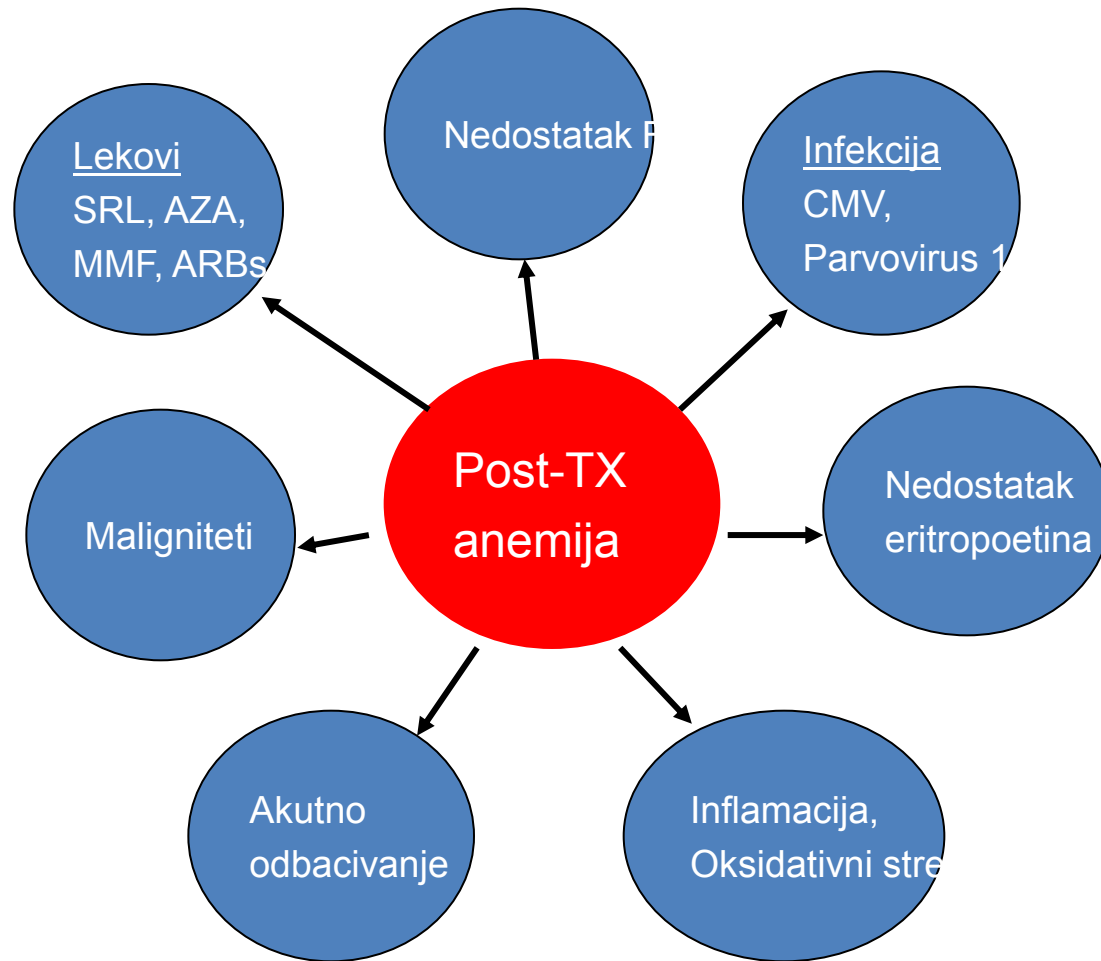


# Anemija nakon Tx bubrega pokazuje dvofazni karakter

- *Koncept "rane" i "kasne" PTA<sup>1,2</sup>*
- Sa obnovom funkcije bubrega tokom prva 3 meseca, koncentracija Hb raste i dostiže normalan nivo u prvoj godini nakon Tx
- Pad funkcije grafta praćen je porastom javljanja anemije

Ipak, i pored dobre i stabilne funkcije grafta, anemija je prisutna u 10-42% pacijenata posle prve godine transplantacije

# Post-Tx anemija - faktori rizika





# "Rani" post Tx period

- Snižen pre-Tx nivo Hb kod pacijenata ne hroničnom programu dijalize



x18815593 fotosearch.com

Gubitak krvi tokom  
hirurške intervencije Tx

Često uzimanje uzoraka krvi  
za analizu neposredno  
nakon Tx



# "Kasni" post - Tx period

## *Funkcija alografta*

- Funkcija bubrega posle Tx se ne obnavlja u potpunosti (kod većine pacijenata dostiže *JGF*  $< 60\text{ml/min}$ )
- Tokom prvih 6 meseci nivo S-kreatinina je nezavisni prediktor za pojavu anemije u prvoj godini Tx<sup>1</sup>
- Pacijenti sa  $\text{eJGF} < 41\text{ml/min}/1,73\text{m}^2$  12 meseci posle Tx imali su veću verovatnoću da dobiju anemiju)<sup>2</sup>

<sup>1</sup>Kamar N. et al. Transplantation 2008;85:120

<sup>2</sup>Kolonko A et al. Transplant Proc 2009;41:3046

# Terapija u Tx bubrega

- Cyclosporine
- Tacrolimus
- Sirolimus
- Azathioprine
- Mycophenolate Mofetil
- Prednisone
- OKT3
- Antithymocyte Ig (ATGAM)

# Cyclosporin (Neoral)

- Neželjeni efekti: hirzutizam, hipertrofija desni, lezija jetre, umor, hiperlipidemia, mučnina, hipertenzija

# Tacrolimus

- Visoka stopa javljanja dijabetesa, gastro simptomi i neurološki simptomi
- Ista stopa rizika kao kod cyclosporina za infekcije i post transpl. malignitet

# Komplikacije

- Tacrolimus i cyclosporin su praćeni hroničnom alograft nefropatijom (CAN)
- Acutno odbacivanje kod cyclosporina moguće je rešiti prevođenjem na tacrolimus

# Azathioprine

- Koristi se u kombinaciji sa cyclosporinom ili tacrolimusom ili sirolimusom
- Neželjeni efekti: raš po koži , mijalgija, groznica, glavobolja, povraćanje

# Mycophenolat

- Može da se primenjuje umesto Azathioprina
- 1995
- Neželjeni efekti: dijareja, konstipacija, mučnina, loše varenje, retencija tečnosti



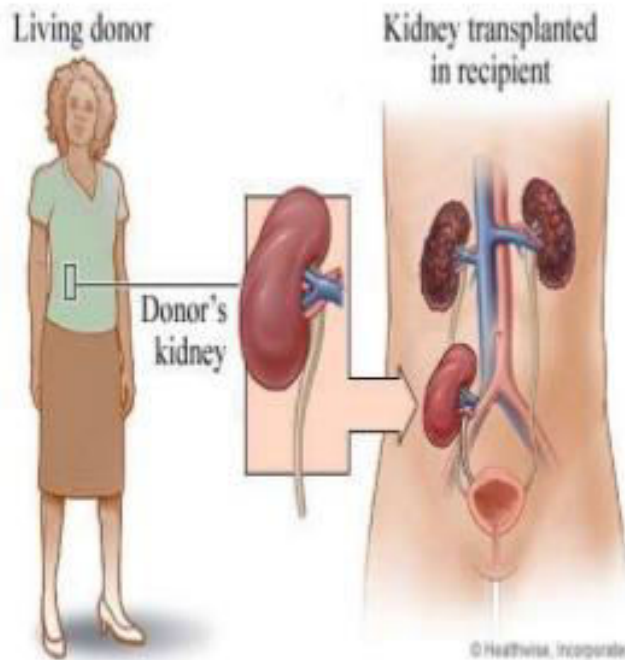
# Prednisolon

- Steroid
- Inicijalno visoke doze ,
- Neželjeni efekti: gojaznost, povećani apetit, visok nivo šećera, D.Mellitus, odloženo zarastanje rana, gubljenje mišićne mase, osteoporoza

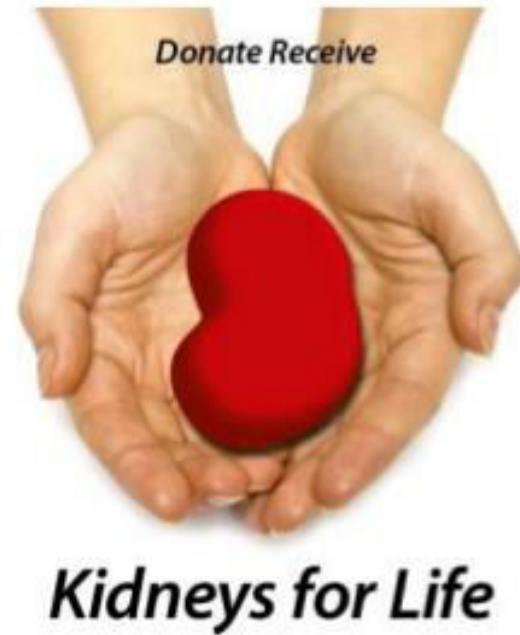


# TYPES OF DONORS

## LIVING DONOR



## DESEASED DONOR

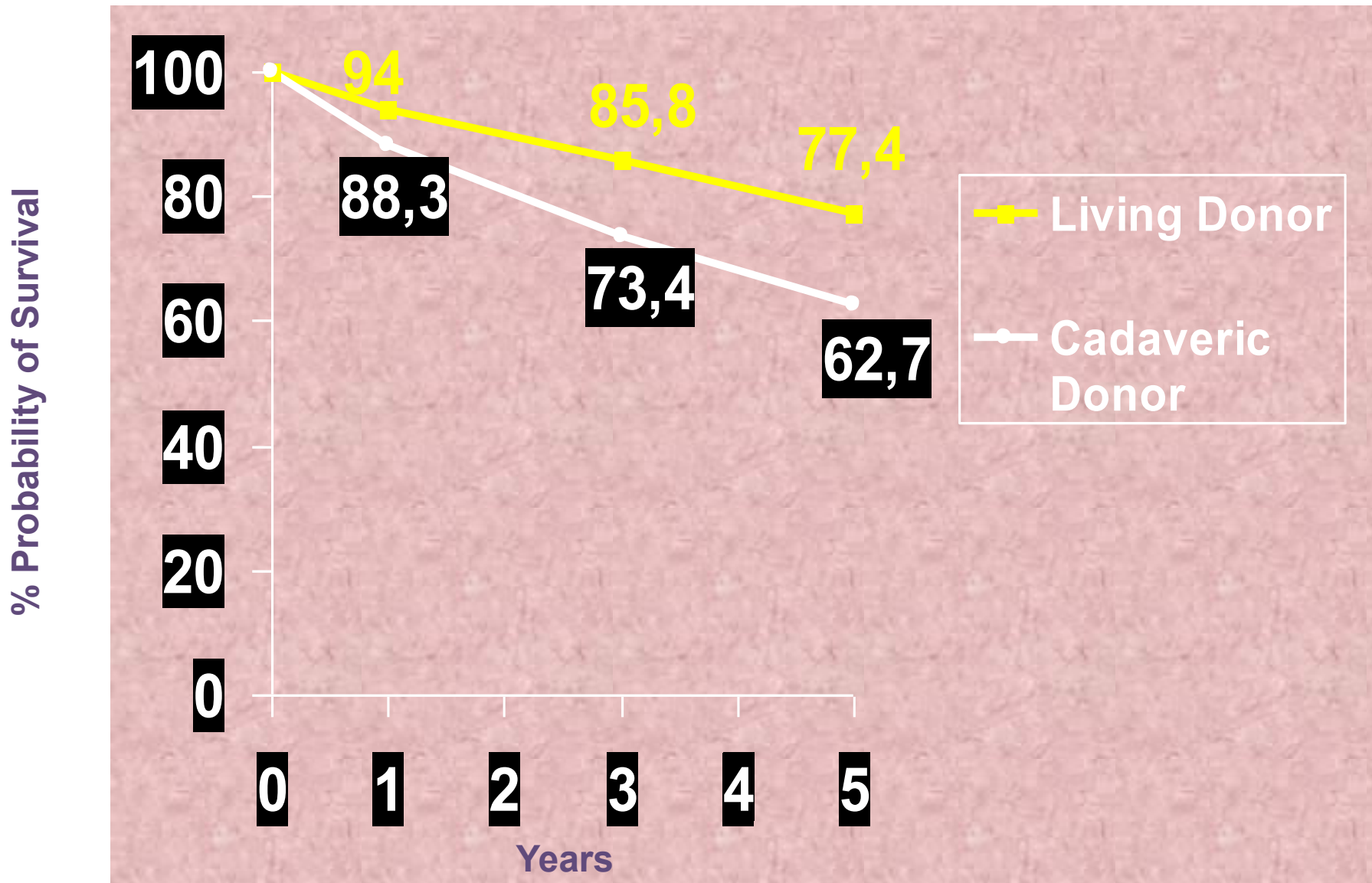


# Koliko je uspešna transplantacija i da li zavisi od tipa donora?

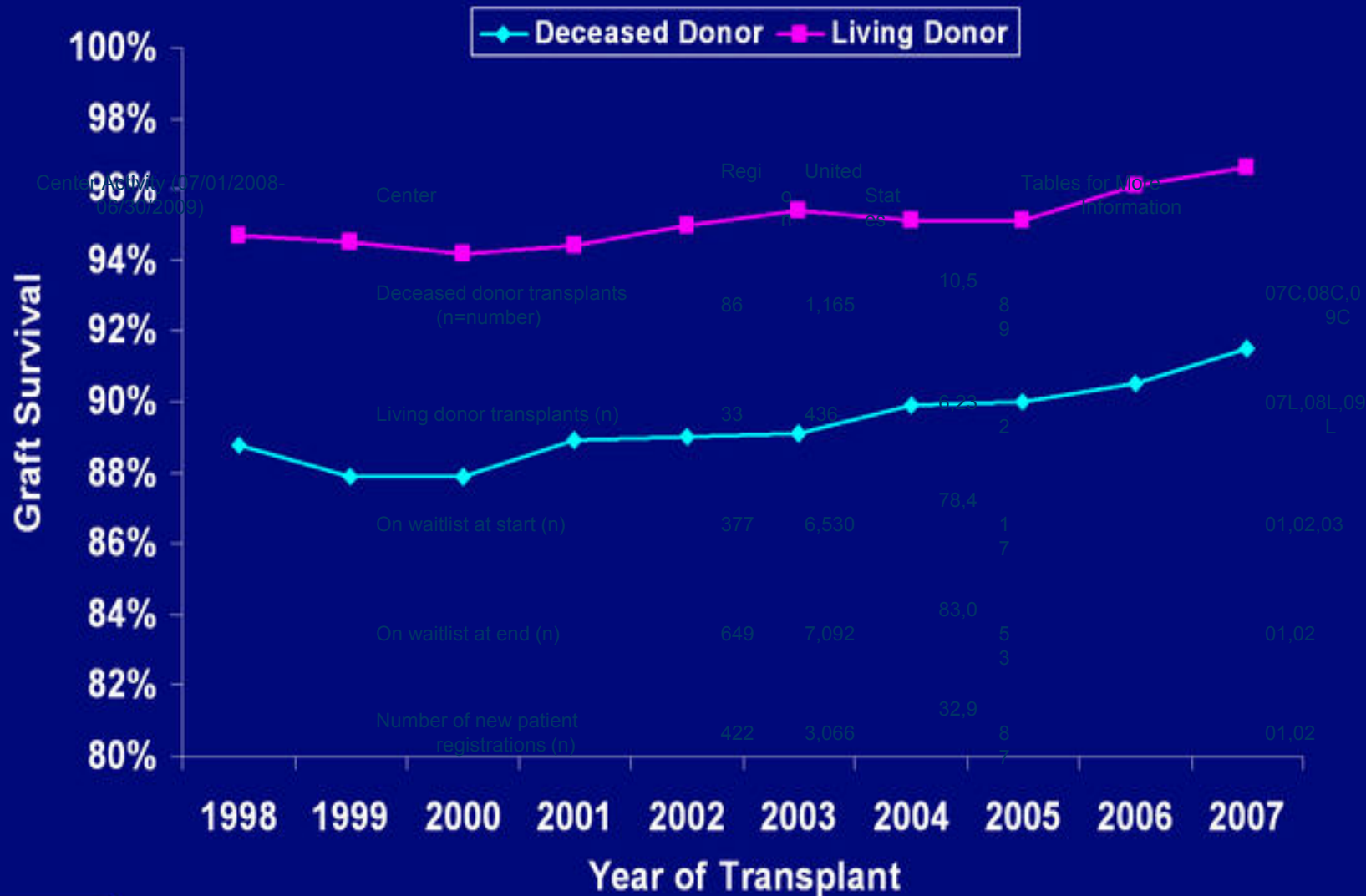


|                |                             |       |
|----------------|-----------------------------|-------|
| Deceased Donor | Graft Survival @<br>1 year  | 90.4% |
| Deceased Donor | Patient Survival<br>@ 1 yr. | 95%   |
| Living Donor   | Graft Survival @<br>1 year  | 95.6% |
| Living Donor   | Patient Survival<br>@ 1yr   | 98.2  |

# Preživljavanje alografta bubrega u odnosu na tip donora



# One Year Unadjusted Graft Survival by Year, Living and Deceased Donor Kidney Transplants



# Prednosti žive donor Tx

- Bolji rezultati
- Dugo čekanje na kadaverični bubreg
- Oslobođeni stresa od dobijanja kadaveričnog bubrega
- Mogućnost planiranja

# Nedostatak žive donor Tx

- Operativni mortalitet 3 od 10 000
- Velike post op komplikacije 2%
- Male post op komplikacije 50%
- Rizik od traumatske povrede jednog bubrega



# Komplikacije kod donora

- Pnemothorax
- Primena transfuzija krvi
- Thrombosis – DVT, PE
- Pneumonia
- Infekcije – rane, urina
- Insuficijencija bubrega – kasnije
- Druge – AMI, Ileus

# Nedostatak žive donor transplantacije

Psychological Stress



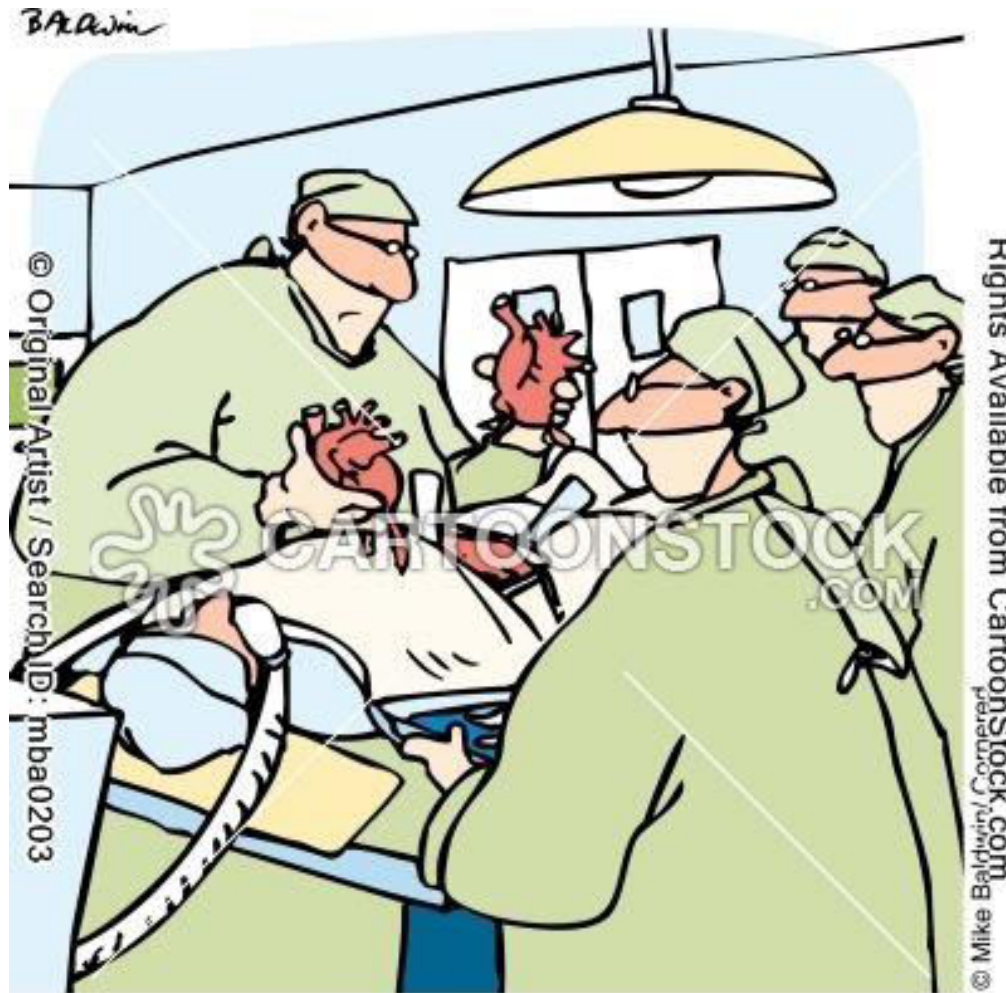
© Original Artist  
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© Mike Baldwin / Corbis



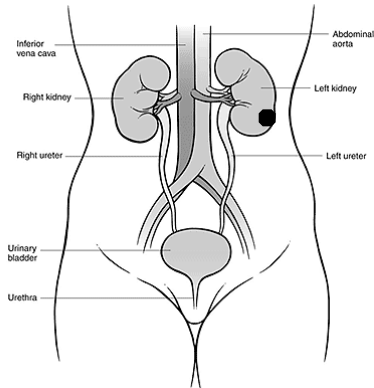
"I'm afraid the shark got your arms and legs. It's probably not a good time, but your brother's here. He needs a kidney."

## Marginalni donori?

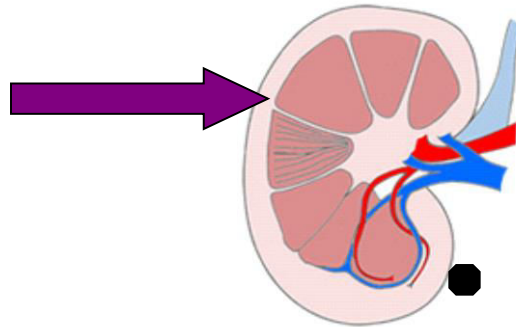


"OK, the old one's in my right hand,  
the donor's in my left. Right?"

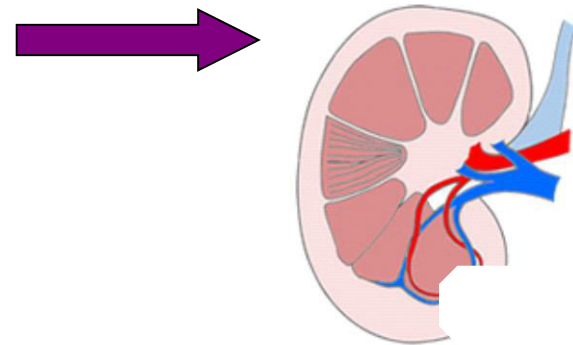
# ALTRUIŠTIČNI DONOR



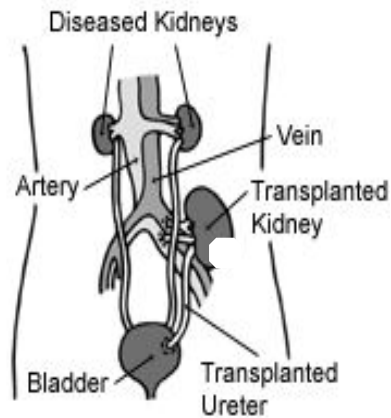
REMOVED KIDNEY  
(WITH TUMOUR)  
FROM DONOR



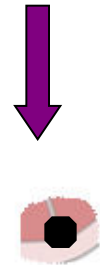
TUMOUR REMOVED  
FROM KIDNEY PRIOR TO  
TRANSPLANTING  
INTO RECIPIENT



HEALTHY KIDNEY  
TRANSPLANTED INTO  
RECIPIENT

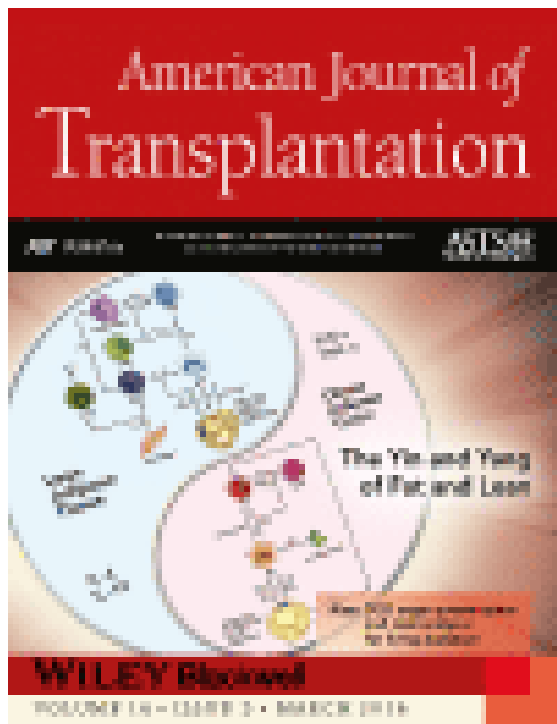


TUMOUR SENT FOR  
MICROSCOPIC  
EXAMINATION





**KIDNEYS FOR SALE**

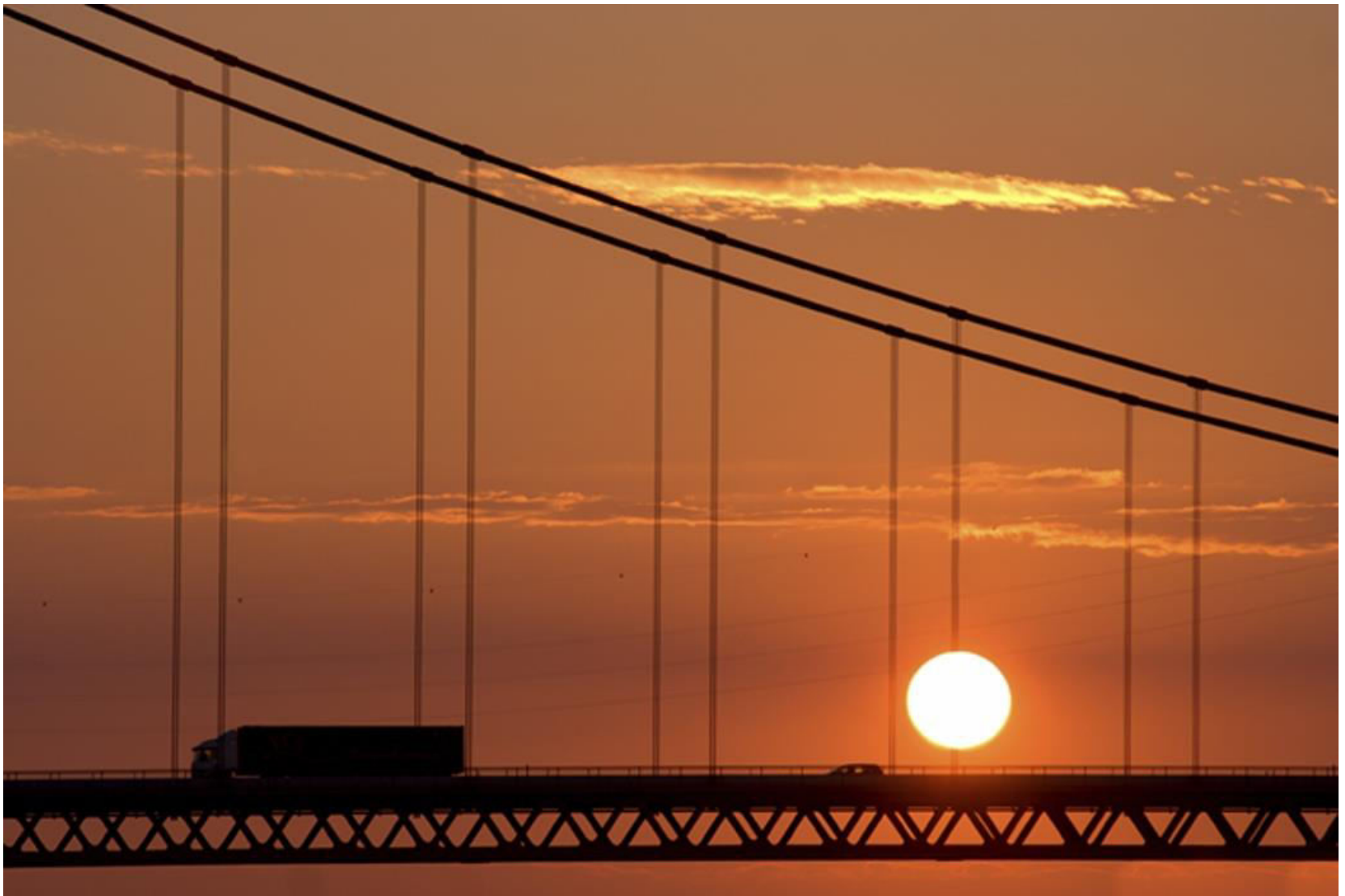


## A Cost-Benefit Analysis of Government Compensation of Kidney Donors

P. J. Held<sup>1,†,\*</sup>,  
F. McCormick<sup>2,†</sup>,  
A. Ojo<sup>3</sup> and  
J. P. Roberts<sup>4</sup>

In June 2014, the American Society of Transplantation and the American Society of Transplant Surgeons held the joint Workshop on Increasing Organ Donation in the United States. They recently released a meeting report [\[1\]](#) on the workshop that concluded, “

This paper is a response to that invitation. It provides a comprehensive cost-benefit analysis of a proposed change to NOTA, that is, moving from our current kidney procurement system in which compensation of donors is legally prohibited to one in which the government (not private individuals) **compensates living kidney donors \$45 000, and deceased donors \$10 000**. Such compensation would be considered an expression of appreciation by society for someone who has given the gift of life to another. It could include an insurance policy against any health problems that might develop in the future as a result of the donation, including disability and death. Compensation for living donors could be paid in a delayed form, such as tax credits or health insurance, so people who are desperate for cash would not be tempted to sell a kidney. Compensation for *deceased* donors would be paid to their estate. All other aspects of the kidney procurement and allocation process would continue exactly as they are under the current system. In particular, living donors would continue to be carefully screened and informed of possible hazards associated with kidney donation. Kidneys would be allocated as the organs from deceased donors are now—by the federally funded and managed Organ Procurement and Transplant Network (currently administered under contract by United Network for Organ Sharing). (Satel [\[3\]](#) and Beard et al. [\[4\]](#) have made similar proposals for government compensation of donors.)



Pacijent prelazi most od čekanja na bubrege do života posle transplantacije



# Zašto transplantacija bubrega ?

- Bolje preživljavanje pacijenata
- Bolji kvalitet života
- Isplativost



