

## Kidney Transplants Facilitated by a National Registry

### Can Save \$100 Billion in U.S. Healthcare Costs

#### Summary

“To those who say we have to choose between health care reform and fiscal discipline, I say that making investments now that will dramatically lower healthcare costs for everyone won’t add to our budget deficit in the long term; it is one of the best ways to reduce it” pronounced President Obama in his weekly address as reported in the New York Times on March 22, 2009. Facilitating well-matched living donor (WMLD)<sup>1</sup> kidney transplants through a national registry can save the U.S. government \$65 - \$116 billion from transplants performed over the next decade, delivering on the President’s vision. The technology and network already exist to achieve these results. All that is needed is funding to make this vision a reality.

#### Issue

It is common knowledge that there is a severe shortage of transplantable kidneys in the world. Over 4,000 patients die every year in the United States while waiting for a life-saving kidney transplant. Another 1,000 to 2,000 are removed from the wait list every year because they become too sick while on dialysis to go through transplant surgery<sup>2</sup>. The number of dialysis patients in the U.S. continues to grow each year, nearing 400,000 in 2009 with an estimated 100,000 new dialysis patients added annually<sup>3</sup>. However, only 16,514 kidney transplants took place in 2008 even though there are nearly 80,000 end stage renal disease (ESRD) patients on the national waiting list for a transplant.<sup>4</sup> Further, there are an estimated 130,000 additional patients currently on dialysis that have never been referred for transplantation<sup>5</sup>. Not counting the loss of life and human suffering, the cost of treating ESRD patients in the U.S. approached \$30 billion dollars in 2006<sup>6</sup> with the taxpayers picking up over two thirds of the cost. The cost of dialysis treatments make up the vast majority of the government’s ESRD program. Exhibit 1 below shows the explosive growth in Medicare dialysis costs<sup>7</sup>.

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<sup>1</sup> WMLD – age-compatible, 5+ antigen matched living donor

<sup>2</sup> UNOS - <http://www.optn.org/latestData/rptData.asp>

<sup>3</sup> United States Renal Data System - [http://www.usrds.org/2008/usrds\\_booklet\\_08.pdf](http://www.usrds.org/2008/usrds_booklet_08.pdf)

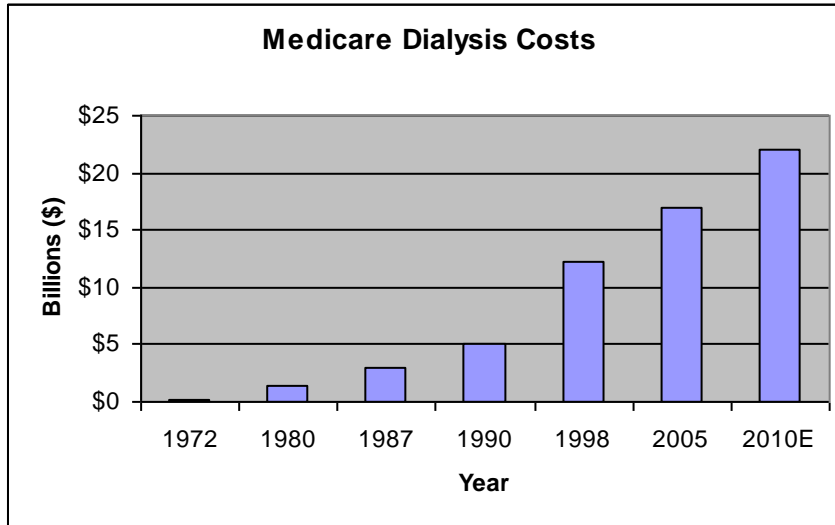
<sup>4</sup> UNOS - <http://www.optn.org/latestData/rptData.asp>

<sup>5</sup> Schold, American Journal of Transplant, January 2008

<sup>6</sup> United States Renal Data System - [http://www.usrds.org/2008/pdf/V2\\_11\\_2008.pdf](http://www.usrds.org/2008/pdf/V2_11_2008.pdf)

<sup>7</sup> When Altruism Isn’t Enough, Sally Satel, 2008

Exhibit 1:



ESRD costs accounted for 6.4% of the nearly \$355 billion of total Medicare spending in 2006, reaching \$22.7 billion. In addition, non-Medicare payers spent approximately \$7.2 billion on ESRD in 2006 bringing the annual U.S. ESRD cost to nearly \$30 billion dollars.<sup>8</sup> With national health expenditures expected to reach \$4.4 trillion and comprise over 20% of the U.S. Gross Domestic Product by 2018<sup>9</sup>, government and private payers are eager to invest in programs that reduce the cost while improving the quality of patient care.

Medicare’s cost of maintaining a kidney transplant recipient is approximately \$8,550 per year, a fraction of the cost of dialysis which is \$50,938 annually<sup>10</sup>. So an obvious answer to the exploding cost of Medicare’s ESRD program is to increase the number of deceased donor or living donor kidney transplants. However, given that the supply of deceased donor organs is not easily expanded and the average living donor kidney lasts nearly twice as long as a deceased donor kidney, 18 vs. 10 years respectively<sup>11</sup>, the goal should be to increase the number of WMLD transplants.

The positive outcomes achieved each time a dialysis patient receives a WMLD transplant are four-fold:

1. The patient lives longer and has a higher quality of life.
2. Medicare and private insurance saves over \$42,388 annually in dialysis costs<sup>12</sup>.

<sup>8</sup> United States Renal Data System - [http://www.usrds.org/2008/pdf/v2\\_11\\_2008.pdf](http://www.usrds.org/2008/pdf/v2_11_2008.pdf)

<sup>9</sup> CMS: <http://www.cms.hhs.gov/NationalHealthExpendData/downloads/proj2008.pdf>

<sup>10</sup> GAO Study 2007: [www.gao.gov/htext/d071117.html](http://www.gao.gov/htext/d071117.html)

<sup>11</sup> Terasaki, PI eds. Clinical Transplants 2005. Los Angeles.:UCLA Immunogenetics Center, ISBN No. 1-880318-14-8

<sup>12</sup> GAO Study 2007: [www.gao.gov/htext/d071117.html](http://www.gao.gov/htext/d071117.html)

3. The patient generally returns to work, and thus, pays taxes and comes off government disability. Less than one-tenth of dialysis patients are employed full or part time<sup>13</sup>.
4. The patient that received the living donor transplant comes off the deceased donor wait list, allowing another person to move up the list and receive a transplant sooner.

**Background Data**

There are three ways to view the annual cost of dialysis versus the much lower cost of a transplant. The first is to look only at the actual cost of dialysis versus the cost of post transplant immunosuppressive medications, which are required for the life of the kidney transplant to prevent rejection. This narrow view of the cost differential underestimates the true savings from a living donor transplant by not counting other significant dialysis related costs. A second perspective is to measure the government’s total cost of dialysis including disability payments and lost tax revenue. This approach gets closer to the true cost but does not account for very real patient costs, including lost wages and dialysis related out-of-pocket expenses. Exhibit 2 below is an accounting of these three costs perspectives showing the annual cost savings range of \$42,388 to \$83,887 every year that a patient is free from dialysis.

Exhibit 2:

<b>Annual per Patient Cost Savings of a Transplanted Kidney vs. Dialysis</b>			
Cost Description	Dialysis Cost Savings	Government Cost Savings	Societal Cost Savings
Dialysis Less Transplant Maintenance <sup>1</sup>	42,388	42,388	42,388
Disability payments <sup>2</sup>		13,000	
Lost taxes from not working <sup>3</sup>		5,500	
Patient out-of-pocket costs <sup>4</sup>			6,000
Lost wages <sup>5</sup>			35,499
<b>Annual Cost Savings per Patient</b>	<b>\$42,388</b>	<b>\$60,888</b>	<b>\$83,887</b>

<sup>1</sup> GAO study 10/29/2007 [www.gao.gov/htext/d071117.html](http://www.gao.gov/htext/d071117.html)  
<sup>2</sup> U.S. Social Security Administration <http://www.ssa.gov/policy/docs/statcomps/supplement/2008/5d.html>  
<sup>3</sup> 2006 Census - Individual Mean Income & IRS Tax Rates  
<sup>4</sup> Includes co-payments, co-insurance, travel costs, etc.  
<sup>5</sup> 2006 Census - Individual Mean Income

A kidney registry facilitates living donor transplants by enrolling recipients and their incompatible donors along with altruistic non-directed donors (NDDs) who are willing to donate their kidney to a stranger to save that person’s life. From this pool, donor chains are created whereby the NDD donates to a recipient (1<sup>st</sup> recipient) who has an incompatible donor. The incompatible donor from the first

<sup>13</sup> When Altruism Isn’t Enough, Sally Satel, 2008

recipient donates to the second recipient whose incompatible donor donates to a third recipient and so on. Each net, new WMLD transplant facilitated by the chain saves between \$867,876 and \$1,780,854 per transplant (see Exhibit 3). Every time an incompatible donor is utilized, that patient is removed from the deceased donor wait list and another patient moves up on the deceased donor wait list and gets transplanted sooner. None of the savings from the improved, less costly healthcare of the person on the wait list that gets transplanted sooner is included in the analysis below.

Exhibit 3:

Incompatible Living Donor Transplant Savings						
	Annual Cost <sup>1</sup>	One Time Transplant Cost <sup>2</sup>	Kidney Life Years <sup>4</sup>			
			10 DD <sup>3</sup>	18 LD <sup>3</sup>	22 LD	28 LD
			Average Match <sup>5</sup>	Average Match <sup>5</sup>	WMLD <sup>5</sup>	Perfect Match <sup>5</sup>
Dialysis	42,388	64,660	359,220	698,324	<b>867,876</b>	1,122,204
Government	60,888	64,660	544,220	1,031,324	<b>1,274,876</b>	1,640,204
Societal	83,887	64,660	774,210	1,445,306	<b>1,780,854</b>	2,284,176

<sup>1</sup> Annual Cost of Dialysis over Kidney Transplant (Refer to Exhibit 1)  
<sup>2</sup> HICFA  
<sup>3</sup> Deceased/Living Donor - Refers to Source of Donated Kidney  
<sup>4</sup> Terasaki, PI eds. Clinical Transplants 2005. Los Angeles.:UCLA Immunogenetics Center  
<sup>5</sup> Average Match = 1-5 MM, WMLD = Age compatible 0-1MM, Perfect = 0 MM  
 Note: Assume no inflation & zero cost of capital

In addition to increasing the number of net, new transplants from incompatible donors, there is significant additional savings that is realized by upgrading the compatibility from an average match to a WMLD or perfect match. WMLDs are defined as age compatible, 5+ antigen matched kidneys and perfect matches are defined as 6 antigen matched kidneys. The most efficient way to facilitate such cost-saving match upgrades is through pooling all living donors in a national registry. By trading up from an average match to a WMLD or perfect match, an estimated 4-10 additional kidney life years can be created for these transplants saving between \$339,104 and \$671,096 per transplant because the transplanted kidney lasts longer (see Exhibit 4). Additionally, when a person receives a perfect match kidney, they will not create antibodies against the unmatched antigens, because there are none. This will not only extend the longevity of the transplanted kidney, but will reduce the amount of immunosuppressive drugs required by the recipient and improve the recipient's probability of receiving

a subsequent kidney transplant should their transplanted kidney ever fail. 19% of the patients on the deceased donor kidney wait list are on their second, third or fourth transplant. No savings from taking less medications or the improved probability of subsequent transplants are included in this analysis.

Exhibit 4:

<b>Additional Savings from a Average to a Perfect Transplant Upgrade</b>						
	Annual Cost	Annual LD* Transplants <sup>1</sup>	LD* Perfect Match Rate <sup>2</sup>	LD* Perfect Match Transplants	Additional Kidney Life Years <sup>3</sup>	Savings per Upgrade
Dialysis	42,388	6,000	50%	3,000	8	<b>339,104</b>
Government	60,888	6,000	50%	3,000	8	<b>487,104</b>
Societal	83,887	6,000	50%	3,000	8	<b>671,096</b>

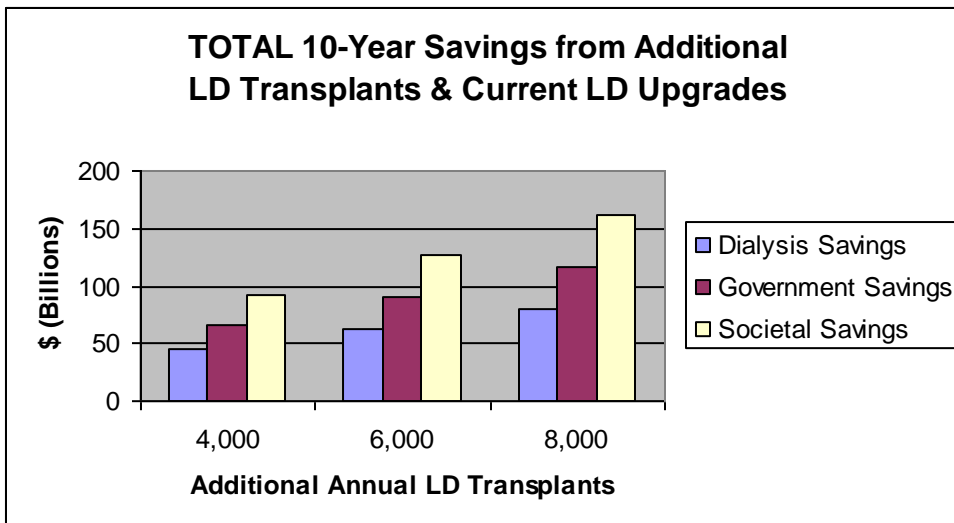
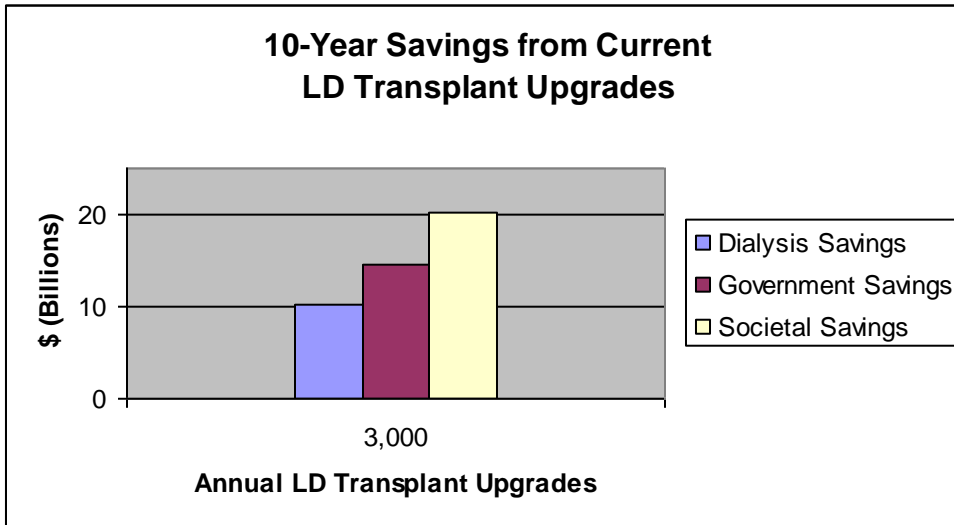
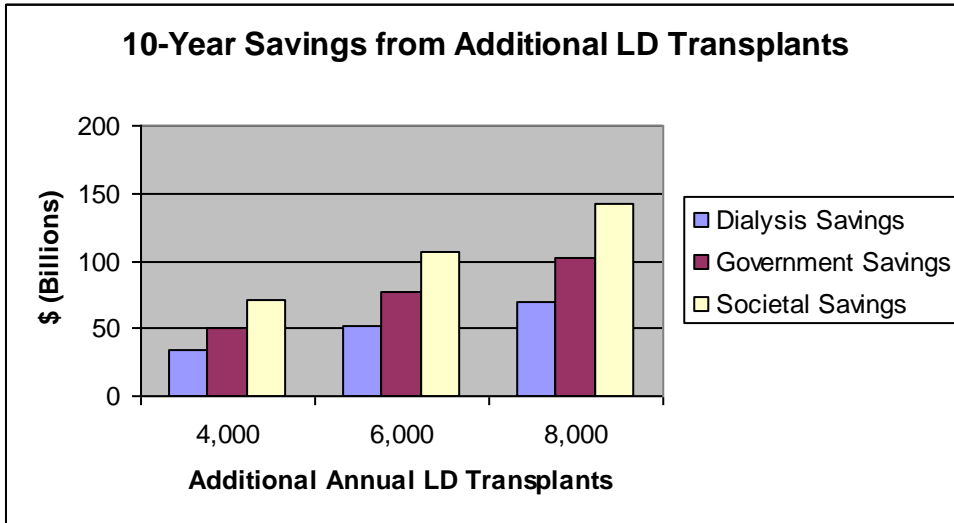
<sup>1</sup> Estimate of Additional Annual LD Renal Transplants Facilitated by a National Paired Donor Matching System  
<sup>2</sup> U.C.L.A. paired donor pool simulation  
<sup>3</sup> Terasaki, PI eds. Clinical Transplants 2005. Los Angeles.:UCLA Immunogenetics Center  
\* Living Donor - Refers to Source of Donated Kidney  
Note: Assume no inflation & zero cost of capital

There are an estimated 6,000 kidney recipients currently on the deceased donor wait list that have willing but incompatible donors<sup>14</sup>. There are an estimated 130,000 additional dialysis patients that have not been referred to transplant<sup>15</sup> and another 100,000 new patients going on dialysis annually. With the appropriate resources for outreach, education and enrollment, it is reasonable to assume that between 4,000 and 8,000 additional living donor transplants could be performed annually through a national registry. Add to that another 3,000 living donor transplants that could be upgraded to 6-antigen matched transplants among the current living donor transplants occurring annually and the potential cost savings are staggering - between \$44B and \$162B from transplants performed over the next 10 years (see Exhibit 5).

<sup>14</sup> Montgomery et al. JAMA 2005

<sup>15</sup> When All Truism Isn't Enough, Sally Satel, 2008

Exhibit 5:



## **Conclusions**

The governmental cost savings and societal benefits of expanding well-matched living donor kidney transplantation for patients with ESRD are overwhelming. The expansion of living donor transplantation is immediately possible with appropriate funding from the payers of ESRD care, mainly Medicare and private health insurers, who will save billions from such a program. With no simple solutions on the horizon to contain the growing cost of healthcare in the U.S. and Medicare's rapidly growing dialysis expenditures, the potential to save \$100 billion dollars in dialysis related healthcare costs cannot be ignored.