Factors Contributing to the Decline in Living Organ Donations

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1. Introduction

1 INTRODUCTION

One in ten Australian deaths in 2007 were related to chronic kidney disease (CKD). This includes end-stage kidney disease (ESKD), in which the function of the kidneys is not sufficient to sustain life, and ‘renal replacement therapy’ (renal dialysis or transplantation) is required.

In Australia, the number of individuals treated with dialysis or kidney transplantation for ESKD almost tripled between 1991 and 2009 and, in 2010, almost 19,000 Australians received renal replacement therapy for the condition (including 8,382 people living with a functioning kidney transplant, and the remainder receiving dialysis). Significant further increases in demand for renal replacement therapy are expected in the coming years driven primarily by an increase in new cases of ESKD in the older, non-Indigenous population.

Renal transplantation (from a living or deceased donor) remains the optimal and most cost-effective treatment for ESKD. In addition, ‘pre-emptive’ living donor kidney transplantation (LDKTx) – occurring before a patient begins dialysis – is an increasingly common approach where a living donor is available, because of the potential for better outcomes.

The high prevalence of CKD and ESKD, as well as a chronic shortage of donor kidneys, are worldwide phenomena, and there have been many varied attempts at increasing the available donor pool. Many of these, including the National Reform Package introduced in Australia in 2008, primarily aim to increase deceased organ donations and utilisation.

Since the introduction of this reform agenda in Australia, the number of kidney transplantations involving deceased donations has increased. However, over the same period, the frequency of LDKTx (in terms of both absolute numbers and proportion of total kidney transplantations) has decreased.
2. Aims

This document reviews the Australian and international literature to identify and describe key barriers to living organ donation and effective strategies for increasing living organ donation rates. Where possible, these are compared and contrasted with the Australian context. While a very small number of living donor liver transplantations are also performed in Australia, this review focuses exclusively on LDKTx because it is a much more common procedure, and also because of the greater availability and relevance of information to the Australian context.

The dynamics of organ donation vary greatly around the world, and are dependent on factors including local legislation, clinical capabilities, health systems and the local supply of and demand for both deceased and living organ donations. To highlight the information most pertinent to the Australian context, this review will focus on documented barriers to living kidney donation, and initiatives to increase LDKTx among countries with high-performing deceased donation rates (specifically Spain, Belgium, France and the United States of America, which are the highest-performing countries in this respect).10

This document does not represent a systematic review of the literature, but aims to inform recommendations for improving LDKTx rates in the Australian context.
3. Methodology

3 METHODOLOGY

Relevant clinical databases and a generic search engine (google) were probed for information about barriers to LDKTx and programs to address these, with a particular focus on countries with high-performing deceased donation rates (specifically Spain, Belgium, France and the United States of America) as well as Australia for the purposes of contrast. Where relevant information was found, evidence from other nations was also considered (e.g. Canada).

A broad review of the retrieved information was used to inform key issues and initiatives for discussion, and these are presented and illustrated with appropriate reference to the literature. Additional information about the search methodology is provided below.

3.1 Clinical databases

Two clinical databases were searched: CINAHL and PubMed (see below for specific details). Articles more than ten years old were excluded from review, as were those in languages other than English. Articles pertaining solely to deceased donation were not included.

3.1.1 CINAHL

This database has a nursing focus but also covers biomedicine, health sciences librarianship, alternative/complementary medicine, consumer health and 17 allied health disciplines. The key term ‘living donor’ was used to search for relevant abstracts (and ‘transplant donors’ to uncover articles published prior to 2007), further refined as required by the keywords ‘barriers’, ‘increase’, ‘improve’ and ‘facilitate’.

3.1.2 PubMed

The key term ‘living donation’ was used to search for relevant abstracts, again further refined as required by the keywords ‘barriers’, ‘increase’, ‘improve’ and ‘attitudes’. In addition, these terms were linked with ‘Australia’, ‘Spain’, ‘Belgium’ and ‘France’ to specifically search for information from these nations of particular interest.

3.2 Other relevant databases

The list of publications from the Cochrane Renal Group was reviewed and the NHS Centre for Reviews and Dissemination searched for relevant items.

3.3 Grey literature

A web search was also used to locate any relevant supporting documentation (with an emphasis on living donor programs in the countries of focus). Relevant documents made directly available to the project team were also considered.

3.4 Snowballing

Where relevant, additional articles were sought by reviewing the reference lists of key articles.
4. Results

4 RESULTS

4.1 Barriers to living organ donation

The search identified four key themes relating to barriers to living organ donation. These related to clinical contraindications, financial considerations, demographic and cultural issues and societal attitudes.

4.1.1 Clinical contraindications

There are a number of contraindications to both donating and receiving a living donor kidney, and the clinical decision must consider the potential benefit against likely outcomes of LDKTx and alternative options (e.g. need for dialysis, suitability and likely timing of a deceased donor transplantation). Judgements regarding these contraindications vary significantly between health systems and services, and are evolving with the emergence of newer techniques and drug agents (e.g. to overcome antibody incompatibility between donor and recipient or better manage a comorbidity) and the worsening shortage of donor organs. However, some contraindications are becoming more, rather than less, problematic. A prime example is the rising incidence of diabetes in Australia (and, in particular, the increasing incidence of diabetes-related ESKD) that may mean LDKTx is less frequently appropriate. A 2006 survey found that Australian nephrologists are far less likely to recommend living kidney donation to a potential related donor if the recipient’s ESKD is attributable to diabetes and there is a strong history of diabetes in the family.

4.1.2 Financial barriers

The financial effects and disincentives of living kidney donation are well-documented. The non-medical costs – including unpaid leave, travel and accommodation – can be significant and prohibitive, particularly for donors in non-metropolitan areas. The inherent costs involved may, in part, explain the fact that, in a study of non-Indigenous patients who commenced renal replacement therapy between 2000 and 2010, individuals from the most socioeconomically advantaged areas were more likely to receive a LDKTx and a pre-emptive transplantation than those in the most disadvantaged areas. Although differences in the prevalence of co-morbidities may be a key factor in this phenomenon (i.e. a higher prevalence of multiple comorbidities, smoking and obesity in disadvantaged areas), financial barriers (particularly for the potential donor) are likely to play a part. There was no such disparity in rates of deceased donor transplantations in this analysis, suggesting that any effect of clinical contraindications is likely to be related to potential donors, rather than recipients.

4.1.3 Demographic and cultural barriers

In addition to the documented financial barriers discussed above, there may be other barriers to LDKTx related to socioeconomic status and ethnicity.

Of particular relevance to the Australian context is evidence that while Aboriginal and Torres Strait Islander people are more likely to have ESKD than other Australians, they are far less likely to have a kidney transplantation. The reasons for this are likely to be extremely complex: relating to comorbidities, geography, other socioeconomic factors and clinicians’ views. In particular, there may be a greater risk to Indigenous donors due to higher rates of kidney disease and other relevant co-morbidities in these populations.
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Older age has also been associated with a lower likelihood of having a potential donor among transplantation-suitable patients, potentially related to the higher incidence of diabetes-related ESKD (which may make relatives less suitable donors) and/or protective attitudes among older individuals for younger relatives. A recent international multivariate analysis found that LDKTx rates in the countries analysed correlated with the proportion of the population over 80, as well as the nation’s GDP.

4.1.4 Societal attitudes

The attitudes of a society in general will affect the acceptability and therefore frequency of LDKTx. Attitudes towards LDKTx may vary between potential donors, recipients and clinicians, and, in particular, various concepts of risk are likely to shape groups’ and subgroups’ attitudes. While LDKTx may result in superior outcomes for the recipient (compared with deceased donation transplantation), the risks to the donor are difficult to determine, and will depend on the particular characteristics of the individual donor. In particular, the CARI guidelines note the lack of data available to describe the long-term outcomes for donors who do not meet the strict criteria for suitability (e.g. those who are overweight, mildly hypertensive, smokers and those with minor urinary abnormalities). Some estimates suggest LDKTx is associated with a perioperative risk of death to the donor of about one in 3,000, and a risk of perioperative complications of around 2-4%. However, a number of studies report no significant disadvantage (in terms of morbidity or mortality) over the long term. Psychological risk is also an important consideration, although there may be psychological benefits inherent in living organ donation and, conversely, psychological risk associated with failure to donate.

A recent review suggests that general acceptability of the concept of living organ donation, particularly for individuals related to an intended recipient, is high.

Potential donors’ views

A Canadian study by Young and colleagues found that potential donors were significantly more willing to accept greater long-term risks to themselves (as a donor) than were clinicians or intended transplant recipients – with the last group appearing to be the most risk-averse. There is evidence that Australian donors’ concerns primarily relate to psychosocial dynamics, psychosocial health, financial and work issues, the benefits and costs associated with donation and physical health expectations.

Potential recipients’ views

While general views towards living kidney donation may be favourable and donors may be willing (see above), international studies suggest that a significant proportion of ESKD patients may not be prepared to raise the subject or directly ask their relatives for a kidney donation. They may be unwilling to burden a loved one with the request, or be fearful of resulting psychosocial issues such as feelings of guilt, the potential for disappointment if the transplantation fails, and negative changes in their relationship with the donor. Even when a relative offers to donate a kidney, ESKD patients may be reluctant to accept.

As previously outlined, there is evidence to suggest that potential LDKTx recipients are primarily concerned about the potential risk to the donor – perhaps to an extreme degree. In the study by Young et al, 22% of potential recipients would not allow a donor to undertake any risk to achieve the outcomes presented. The authors speculate this may relate to having a more real and personal understanding of the impact of chronic illness, guilt, feelings of unworthiness, or a lack of understanding of the motivations of a living donor. Ultimately, the decision to seek a living donor may come down to the individual recipient’s analysis of risk (to the donor) versus benefit (to him- or herself).
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Clinicians’ views
As the ‘gatekeepers’ of relevant information and advice regarding living kidney donation, clinicians’ views and practices are vitally important influences on the LDKTx rate. While there is evidence to suggest that the vast majority of Australian nephrologists and trainees are supportive of living kidney donation and would recommend it to a suitable donor, key concerns remain around comorbidities, particularly diabetes, and donor risk.39

The emergence of LDKTx has raised considerable ethical concerns arising from the introduced risk to an otherwise healthy donor, running contrary to the ethical principle of ‘doing no harm’. The CARI guidelines emphasise that, in order to justify LDKTx, “the risk of harm to the individual donor should be very low and the potential benefit to the recipient should be significant, with a reasonable likelihood of success”.40 The 2007 National Health and Medical Research Council (NHMRC) guidelines specifically note that “the rapidly evolving culture of transplantation contributes to the complex ethics of living organ donation. Living organ and tissue donation and transplantation are constantly changing, in both medical and social terms. Ethical guidance needs to reflect long-standing principles, which have to be re-examined to encompass new technologies.”41

In Spain, the fact that clinicians were not informing patients of LDKTx as an option, let alone recommending it, has been identified as a key barrier, although the extent to which this occurred varied greatly between jurisdictions. A 2004 survey of dialysis patients found that 83.4% claimed they had not been informed of LDKTx as an option.42 This situation may have changed significantly over time, and the rate of LDKTx in Spain has risen substantially over the years since.43 However, a more recent survey suggests that 87% of Spanish transplant hospital personnel are in favour of living kidney donation,44 comparing unfavourably with data from other countries of interest. For example, Canadian45 and UK46 surveys found that 100% of medical and nursing staff in a transplant centre considered LDKTx ethically acceptable between blood relatives. In a 2006 survey, 95% of Australian nephrologists indicated they would recommend LDKTx to suitable donor, and 97% would be willing to become a living kidney donor for an immediate family member.47

4.2 Initiatives to improve rates of living kidney donation
The search identified four broad categories for improving living kidney donation rates: broadening the pool (overcoming clinical contraindications); financial reimbursement programs; strategies to address cultural/demographic disparities; and education/awareness-raising initiatives. These are described in the following sections.

4.2.1 Broadening the pool (overcoming clinical contraindications)
There are a number of common themes internationally that relate to ‘broadening the pool’ of potential living donor kidneys.

Antibody-incompatible transplantation
Historically, some potential donor kidneys could not be used in a particular recipient because antibodies present in the recipient’s bloodstream would cause rejection of the organ. New drugs and protocols allow ‘desensitisation’ of the recipient in order to avoid this, resulting in ‘antibody-incompatible’ transplantation. Greater use of antibody-incompatible donations has the potential to increase the number of LDKTx performed,48 and the UK has published specific guidelines to direct this practice.49 The guidelines state that the practice is cost-effective when compared with dialysis, but should be performed as part of an ‘ongoing structured program’ within a transplant unit (rather than occasionally)
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to ensure appropriate support, expertise and protocols are in place. According to the guidelines, antibody-incompatible transplantations may account for up to 20% of the total living donor transplantation program in the UK.\textsuperscript{50}

**Expanding donor criteria**

With both improved methods and available drugs and increasing demand for donor organs, many transplant centres internationally are relaxing the criteria against which they assess a potential donor for LDKTx. These ‘expanded criteria’ (e.g. acceptance of donors who are obese or have proteinuria) vary widely between and even within countries and are not universally applied or accepted.\textsuperscript{51} While they represent a relaxing of historical clinical contraindications and effectively increase the potential pool of organs for transplantation, there is a lack of evidence for the comparative effectiveness of using such donors\textsuperscript{52} as well as long-term donor outcomes.\textsuperscript{53}

**Paired kidney donation exchange programs**

Paired kidney donor exchange programs now operate in a number of countries including the United States, UK, Spain, Netherlands, Canada and, since 2010, Australia.\textsuperscript{54} As well as identifying appropriate non-compatible pairs, these programs often enable donation chains to occur (in which a non-directed donor sets off a chain of donations among pairs within the program), facilitating a number of LDKTx that may otherwise not have been possible.

It is assumed that such programs increase the number of LDKTx occurring in the jurisdiction in which the program operates, and there is some evidence to support this.\textsuperscript{55} However, experience from the US (and early Australian experience – see below) suggest that such schemes may not have a significant impact on LDKTx rates.\textsuperscript{56}

The Australian Paired Kidney Exchange program (AKX) allows searching of registered donor/recipient pairs for combinations in which the donor in an incompatible pair can be matched to a recipient in another incompatible pair. The program commenced in late 2010 and was expanded in 2011, and during that year the program resulted in an additional 23 transplantations that would not otherwise have occurred.\textsuperscript{57} Although there is evidence that the program may significantly decrease time spent waiting for a transplantation (compared with a deceased donor transplantation),\textsuperscript{58} the frequency of LDKTx in Australia has continued to decline.\textsuperscript{59}

**Increasing altruistic (non-directed) living kidney donation**

A survey of Australian nephrologists found that, while 97% would be a live kidney donor for an immediate family member, only 4% would donate a kidney to a matched stranger.\textsuperscript{60} However, this type of donation has become significantly more common in the United States over recent years.\textsuperscript{61} A recent review that found a wide variation in acceptability of altruistic living kidney donation; however, overall, 33% of subjects in the four studies identified would consider living kidney donation to an unknown recipient.\textsuperscript{62}

In Australia, altruistic kidney donation is possible through the AKX program, and some information is available online.\textsuperscript{63} However, it is not widely publicised on the websites of Australian transplant hospitals.\textsuperscript{64}

4.2.2 **Financial reimbursement programs**

Many countries have some type of government-funded expense reimbursement program for live donors; including Belgium, Canada, France, New Zealand, the United Kingdom, the United States and Australia.\textsuperscript{65} A selection of these are described below. While such initiatives presumably were
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introduced to overcome a perceived key barrier to living kidney donation (as described above) and are thought to be likely to improve the mobility of potential donors (which may become increasingly important with the Australian paired kidney exchange program), there is little empirical evidence available to confirm that they do, in fact, increase rates of LDKTx.

Canada
Canada’s Living Organ Donor Expense Reimbursement Program (LODERP) allowed living donors for potential recipients in British Columbia to access reimbursements for certain expenses relating to donor assessment, surgery and recovery up to a maximum of CAD$5,500 per donor. The items covered by the scheme are comprehensive, and include travel, accommodation, meals, parking, loss of income and child- or elder-care. At the time of evaluation, the LODERP had disbursed CAD$282,557 to 269 applicants over three years – less than anticipated. While extremely well-received by both healthcare professionals and living donors, the authors of the evaluation concede that it is difficult to ascertain whether such a program increases donation rates, particularly in the short term.66

United Kingdom
While the UK guidelines recommend that reimbursement of expenses incurred by living donors occurs through local jurisdictions,67 these principles may not be applied uniformly.68 The guidelines, published in 2011, stated that a national reimbursement scheme for England was under development at that time.

USA
In the USA, a ‘National Living Organ Donor Assistance Package’ used both donor and recipient income to determine eligibility, with preference given to low-income pairs.69 Tax deductions and credits have also been made available in a number of states, but do not appear to have translated into an effect on living kidney donation rates.70 It is worth noting that a lack of universal access to healthcare in the US may mean that there are significant differences in the systems and barriers at play compared with the Australian context.71

Europe
Sickland and colleagues outline a number of reimbursement schemes throughout Europe, including those in France and Belgium.72 Of these, the French program is more comprehensive, incorporating payment of non-medical expenses, while the Belgian initiative covers lost income only. Spain did not have a reimbursement scheme in place at the time of publication of this article (2009).

Australia
There have been few, and isolated, schemes for compensating living donors in various parts of Australia in the past such as travel assistance for donors in country areas of Western Australia.73 Significant financial barriers remain, and generic state- and territory-administered patient accommodation and travel schemes may not be sufficient to support LDKTx.74 A new national paid leave scheme has been recently announced, which will be evaluated over the coming years.75

4.2.3 Improving cultural and socioeconomic disparities

Other than the new Australian paid leave scheme, this search retrieved no information about initiatives that specifically aim to address disparities in LDKTx rates between different cultural and socioeconomic groups in Australia. However, although its focus is more broadly on improving Indigenous Australians’ access to kidney transplantation in general (as opposed to LDKTx in particular), the IMPAKT study may provide important insights to direct improvement initiatives.76 The study included analysis of nephrologists’ attitudes and practices, patients’ knowledge, attitudes and decision-making processes and transplantation ‘work-up’ requirements. The Royal Australian College of Surgeons has suggested
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further research and policy development to address the disparities in care of ESKD between Aboriginal and Torres Strait Islander people and other Australians.\textsuperscript{77}

In a significantly different context (improving LDKTx rates in African American patients), it has been suggested that culturally-sensitive, home-based education may reduce racial disparities in terms of living donor inquiries and donor suitability evaluations.\textsuperscript{78}

\subsection*{4.2.4 Education and awareness-raising}

A number of educational and awareness-raising campaigns aiming to increase rates of LDKTx have been documented around the world. These may target health professionals, potential donors or potential recipients; however, in many cases the nature of the relationship between clinician, patient and donor in this context makes it difficult to determine whether any observed effect is due to changes in any single group. For example, a Spanish ‘living kidney donor program’, aimed to increase the overall donor pool by improving communication and education by clinicians for patients and their relatives. While the program (run by dialysis nephrologists through chronic kidney failure clinics) was deemed successful, with the LDKTx rate rising from 0.8% to 4.4%,\textsuperscript{79} it is unclear whether the authors attribute the success to changes in clinician behaviours or donor or recipient knowledge, awareness and attitudes.

\subsubsection*{Donor education}

Donor education is not only deemed essential from an ethical standpoint, but has been cited as a potential intervention to improve LDKTx rates.

It has been postulated that, while it is theoretically possible to improve knowledge about living kidney donation among relatives of patients with ESKD, there may be no effect on LDKTx rates. A Canadian survey of previous donors and non-donor relatives of transplantation-waitlisted patients found that most donors appeared not to deliberate extensively or research LDKTx before committing to donation. Although only 20% of non-donors in the study felt well-informed about LDKTx, the authors concluded that educational efforts should focus, at least initially, on the potential recipient because of the strong relationship observed between the knowledge and beliefs of an ESKD patient regarding LDKT and those of his/her family.\textsuperscript{80}

For potential donors seeking knowledge on the internet, a 2007 study found 86 unique international websites on living kidney donation; most created by transplantation programs and organisations. Although the content of the sites was generally accurate, the vast majority were written above the recommended patient reading level and covered, on average, just over one third of the recommended information. Information regarding potential long-term risks, psychological risks, and expected benefits to the donor were often absent, and the most popular websites were often not ranked among the best sites to provide information.\textsuperscript{81} Although ten years old, an analysis of written information from around the world identified similar issues, with five of 16 brochures reviewed considered to cover all essential information. When donor risks were mentioned, interpretations of the risks and examples given were dissimilar, potentially reflecting legislative and clinical practice differences.\textsuperscript{82} In Australia, there is a distinct lack of information on living kidney donation available online.\textsuperscript{83}

\subsubsection*{Recipient education}

There are a number of published articles describing educational interventions to increase living kidney donation that are aimed at potential recipients. One found that an educational intervention including a specific discussion with a health educator (about LDKTx risks and benefits, how to identify a potential donor and overcoming barriers in approaching potential donors) increased the proportion of patients
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considering LDKTx and asking a donor for a kidney in some (but not all) patient groups.\textsuperscript{84} Another found evidence that interventions aimed at increasing the likelihood that patients will actively seek a donation can facilitate discussion and increase patient ‘pursuit behaviours’.\textsuperscript{85} However, it is unclear whether these results are likely to translate to an increase in LDKTx. Another US study has suggested that home-based education, involving the recipient and ‘guests’ (including potential donors) selected by the recipient led to increases in the presentation of potential donors, evaluations for LDKTx and LDKTx itself – although whether this is related to an effect on recipient attitudes, donor attitudes or both is unclear.\textsuperscript{86}

While greater ‘self-efficacy’ – a measure of a patient’s belief in his/her ability to attract a donor – may be associated with a greater likelihood of a potential live donor presenting for assessment, a patient’s knowledge about LDKTx may not.\textsuperscript{87}

\textbf{Education/awareness-raising among health care professionals}

It is clear that the attitudes of health professionals play a vital role in the rate of LDKTx performed within an institution, a jurisdiction, and a country. However, there are very few examples of initiatives (beyond publication of clinical guidelines) that aim to alter these attitudes. Nevertheless, there may be some scope to influence them, particularly at the early training stage: for example, in Canada, a 20-minute PowerPoint presentation addressing statistics of organ and tissue need and donation and an audiovisual presentation resulted in increased awareness of living kidney donation among health and allied health students.\textsuperscript{88}

While it has been suggested that the vast majority of Australian nephrologists do recommend LDKTx to relevant patients,\textsuperscript{89} the variation in practice evidenced by state and territory LDKTx statistics\textsuperscript{90} suggests there may be some scope to influence professionals’ attitudes and/or clinical practice to increase LDKTx rates.
5. Discussion

This review illustrates the complexity of factors that are likely to influence LDKTx rates within a given system. While there is a significant body of literature relating to observed or theoretical barriers to living kidney donation, there is relatively little describing effective interventions to overcome these barriers. What evidence exists may be strongly influenced by local legislation and guidelines, community attitudes and demographics, limiting its interpretation in the Australian context.

Interestingly, a number of initiatives that would appear to logically lead to increased LDKTx rates have not necessarily been shown to do so. Key examples include financial reimbursement schemes in the US and Canada, and paired kidney exchange programs (including the Australian initiative).

Of the identified countries with high-performing deceased donation rates, the United States clearly leads the way in terms of LDKTx. This may be, at least in part, due to the fact that altruistic (non-directed) donation has become increasingly common in the US. However, it is worth noting that the US kidney transplantation rates are higher across the board and, in fact, a similar proportion of living donor to deceased donor kidney transplantations are performed when compared with Australia.91

Altruistic donation may also be of most concern in terms of legal and ethical issues, as the psychosocial wellbeing of potential donors and capacity to consent must be carefully considered. The low ‘acceptability’ of this approach among Australian nephrologists92 and current lack of information provided by transplant hospitals93 suggests that a similar phenomenon may be difficult to replicate in this country, at least in the short to medium term.

In contrast, while the rates of LDKTx in European countries with world-leading deceased organ donation rates (Spain, Belgium, France) are increasing, they remain comparatively low.94 This review found no clear explanation for this phenomenon, although the language bias in the methodology for this study that means this analysis is incomplete. There is some evidence to suggest that clinicians’ attitudes in these countries, though still favourable, may not be as positive as in other parts of the world. Although it may be argued that a strong deceased donation record may lessen the need for LDKTx, an international analysis has found no relationship between the two factors, and noted that the factors influencing deceased donation are entirely different to those influencing living kidney donation.95

In principle, increases in LDKTx can be achieved by either:

- increasing the overall motivation of a society and health care system to use LDKTx as a treatment option for ESKD and/or
- identifying and removing obstacles that prevent those who wish to proceed to LDKTx from doing so (i.e. facilitating living kidney donation by those motivated and willing to donate).

While efforts to overcome known barriers continue to be important, the complexity of psychosocial, ethical and communication issues that affect potential donors, potential recipients and clinicians (and the interactions between these elements) are likely to provide the key challenges in increasing LDKTx rates in Australia.
6. References


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