BCRenal
Provincial Health Services Authority

BC TRANSPLANT
An agency of the Provincial Health Services Authority

Staff Education Session for Kidney Care Clinic Staff
Questions and Answers about Pre-emptive Kidney Transplants

- **November 30, 2017**
- **Questions: Carolyn Jarvis, Transplant First Coordinator**
- **Answers: Dr. Jagbir Gill, Nephrologist, St. Paul's Hospital**
- **Questions in RED, answers in BLACK.**

1. ABO incompatible transplant - What is it, when is it used and when is it not a good option?

- (JAG) ABO incompatible transplantation basically is an option where you can use treatments where you remove the antibodies to allow transplantation across the barriers. Usually that's with an A to a B or an A to an O standard scenario. So, if you have a blood type A donor, otherwise healthy to donate, they're compatible from an HLA standpoint (a tissue type) and the only issue is to cross a blood type barrier, then you can do that in selected circumstances. We have not done this in a major way because when we have a patient that is incompatible, the plan "a" is still to do donation through the kidney paired exchange program. Outcomes with the paired exchange are still better to have an ABO compatible transplant as opposed to an ABO incompatible transplant. The advice we give all of our donors though, is when doing donor outreach, don't get hung up by your potential donor's blood type because there's kidney paired donation and in selected circumstances we can do ABO incompatible transplants. Without going into too much detail (with patients) we say "cast a broad net". We currently do a very small number of ABO incompatible transplants mainly because we think the best option is through kidney paired donation.

2. Given this, what would be some of the factors that would make you look at selecting a pair for ABO incompatible transplant? What makes it the better option than going through the paired exchange program?

- (JAG) It's never a better option unless someone is going to have a very tough time finding a match in paired donation. The scenario where the lowest risk of ABO incompatible transplant is when a donor has a certain sub-type of blood type A. So, if you're a blood type A, you can have a few different sub-types, and A1 is what they call the most common. There's something called A2 sub-type, which is available in about 10-15% of blood type A people, so if you have an A2 donor, an ABO incompatible transplant in that circumstance is a much lower risk and doesn't involve a whole lot extra for the recipient. Those are the selected scenarios in which we might say are they equivalent and to go ahead and do that instead of having someone wait for a year or two in kidney paired donation.

3. Do we do A sub grouping on donors?

- (JAG) Yes.

4. In higher risk groups (the elderly or the obese), why is it they do better with a living donor transplant? What are the medical reasons for that? And what are the risks for this population?

- (JAG) This is a good question because it highlights that the reasons why living donation is better varies depending on the patient's situation. In everybody, a living donor transplant will always last longer. You're getting a kidney with better kidney function and, the simplest way I explain it to patients is, that a donor has gone through a work up to make sure they can live with their one kidney a long healthy life, so a side effect of that is that the recipient ends up getting a really good kidney, much better than any deceased donor kidney would be. The benefits for living donation are, for example if you have a 20 year old patient, it's a huge benefit. You can do it faster and also the kidney will last longer. If you have a 70 year old patient whose life expectancy is much shorter though, then it might not matter so much if they have a live donor in terms of how long the kidney is going to last. The other major advantage of a living donor transplant is that the peri-operative period is much lower risk. With deceased donor transplants, about 20-30% of the time, patients need dialysis for the first week after surgery, because there are all the fluid shifts that are post-operative and that makes it much more complicated. So, if you have an obese patient or an elderly patient with a history of heart disease, then having that kidney work immediately and having the surgery done, not in the middle of the night but in the light of day where everything is optimized, that actually results in better surgical recovery and surgical outcomes and decreased mortality in that time period. So that's the major advantage for that population.
- (MONICA) Also what I would say from the KCC population, is that an elderly patient may be appropriate before they've had any dialysis burden to get a living donor transplant, but for those that would have to go on dialysis and wait for a deceased donor, by the time their time would come up for transplant they may no longer be a candidate. It may afford a group of people the ability to have a kidney that won't have a kidney if they take the route of waiting for a deceased donor transplant.

5. Can you comment on screening? How can KCC staff screen for who would be suitable out of these higher risk groups, and when should they assume that this is not a suitable person? Finally, when is it worth exploring or consulting with a transplant team?

- (JAG) That's a tough question because it really boils down to case by case basis a lot of the time. The general rule that we tend to use, for elderly patients for example, is if we think this person has a five year life expectancy or greater, and that's hard to guess but you kind of have to make a bit of a guess, and the whole team would get together and say does this person have a reasonable life expectancy of five years or more, if that's what we think then it's reasonable to consider them for transplantation. If we think someone's life expectancy is less than that, then it's probably not worth the early period of trauma the patient's going to have to go through after the surgery to justify that. That's the general rule we go by. Now the specifics are always tricky because it's case by case (we have all met 78 year old patients that look better than some of our 55 year old patients depending on comorbidities) and so we go down to our usual kinds of questions like "What's their cardiovascular burden? How much peripheral vascular disease do they have? What other comorbidities are going to make the transplant complicated or limit their quality of life?" For example, if someone has a debilitating quality

of life because of something that has nothing to do with kidney disease, but it's just another comorbidity, the transplant is not going to help that piece. It'll make their life a bit better because they won't have to contend with dialysis but it's not going to take away their chronic pain from whatever other cause they've got (debilitating arthritis or something like that). So those are the two considerations. We want to say can we improve your quality of life because I think the most critical thing is that the survival benefit of transplantation in the more marginal patients is not huge. There's a statistical benefit there but we're not adding many years to someone's life if they're 70 years old. What you are doing is improving their quality of life. So, if we think they'll have a five year life expectancy or greater and we think there's an opportunity to improve their quality of life by taking away the notion of dialysis, then I think we should consider it. A lot of the time these people will have to be referred because they're in a grey zone, but those are the big criteria we look at.

6. Are you able to talk a bit about absolute contraindications? And where there may be some grey area? The staff was looking at how to be screening, and when to be referring and when not to refer.

- (JAG) The absolute contraindications are tricky in the sense that if someone has a recent or active malignancy, then that's a showstopper. If someone has an active infection (diabetic, etc.), that's an absolute contraindication. We can't, in these examples, do anything with these lingering or active infections or malignancies. The ones that are in the grey zones are more the social issues such as difficult social situations like non-adherence, inability to comply with showing up for visits, etc. Those are very difficult but also becomes an opportunity to see what we can do to facilitate transplant in those cases. These kinds of issues usually need a bit more consultation. But if something is obvious, like a patient just had an MI and they're not a candidate for revascularization, this is a no go for transplantation. Having said that, if there is one glaring issue and that's the only issue, then that can sometimes push other care providers (like cardiothoracic surgeons, etc.) to do something about it. It really becomes case by case. My advice from a KCC perspective is to cast a broad net in terms of who is eligible and with the discussion with the team, you can usually get to a good sense of who is a good candidate and who is clearly not a good candidate and who is in the grey zone. For the grey zone ones, we field calls from teams across the province and we're happy to field those and consult. It'll take some time to get more comfortable with what the grey zones are and my advice is that it's safer to be inclusive than to be exclusive to begin with. If you're not sure, check. And over time it will become clearer.

7. Any hard and fast BMI criteria?

- (JAG) Generally over 50 is an absolute contraindication. Usually we encourage patients to get to a BMI of 40-45 so they can even be looked at. If that is the only issue, then options can be considered (bariatric surgery, etc.). We are working with some of the bariatric programs in the lower mainland to see if our patients can be fast-tracked.

8. What are the medical aspects that cause shorter graft functions in deceased donor transplants? Can you comment on what factors make a deceased donor transplant different from a living donor transplant in respect to outcomes, and the medical aspects between the two?

- (JAG) In general the time they have to spend on dialysis before the transplant is different between a living and deceased donor. People who get a

deceased donor transplant have generally spent a longer period of time on dialysis and then have more dialysis-related comorbidities, which impacts your post-transplant outcomes and survival. Time on dialysis is the first big difference. The second big difference is the quality of the organ. With a deceased donor there's a much broader range of kidneys that we'll accept because we're not worried about the donor's long term health, we're only concerned with "can we use this kidney and will this add some graft function". There's a very broad range of kidney function there. This is not the case with a live donor. We're not going to take a kidney from somebody who doesn't have great kidney function. The third difference is that the process of donation is much smoother with living donation. The living donor has their surgery in the morning and within two hours the organ is implanted into the recipient. With a deceased donor, that time can range anytime between 10 to 20 hours before that organ makes its way into the recipient, and the organ is on ice during that time. All of those things impact long term outcomes.

9. Can you comment on how the retrieval process works, how deceased donors are assessed and the differing factors? There is interest in understanding the retrieval process and timing of things.

- (JAG) Firstly we have to be careful when we're talking to potential recipients. The first point to clarify is that as nephrologists and as the transplant team, we are completely divorced from the donor side of things. We aren't allowed in the OR, we don't know the name of the donors. We have nothing to do with that. BCT takes care of all of that and it's very separate from us. It's intentional because we could potentially have a conflict-of-interest because we want our patients to get those organs. Patients often ask what happens with the donor, etc. and the first thing I do is remind them that we are very separate from that and we're not involved in that process at all. For the interest of staff, what ends up happening is that once someone in an ICU is declared brain dead or the decision has been made independently by the family to withdraw life support, at that point, organ donation is considered and offered to the family. If the family consents, then a series of testing is done, mainly blood and urine tests. If all that checks out okay, then they will cross match that against our existing list of patients on the wait list and figure out who the kidney should go to. They'll offer those then they call us in the transplant department and say we have this organ for your patient, is this an organ you're interested in. The one piece that people are asking a lot about right now is how well do we screen donors for things like HIV, Hepatitis, etc. Those tests are done on every deceased donor. Once all that testing happens, the organ is retrieved at whichever hospital the donor is at, the organ is transported on ice in a proper solution to the transplanting centre and that's when the transplant happens. That's the general process. I personally don't share too much of that with the patients, it can be tough information for the patient to receive (a person is dying and they're getting their organ), so I think the main point you want to get across is that the process is separate, we're not involved in it. The second point is that donation only comes up in a situation when a person has already passed away or the decision to withdraw life support has been made. The third point is that donors are thoroughly screened to rule out all kinds of details around any issues. You can give them more detail when they have been activated to the list.

10. Can you comment on death due to cardiovascular death versus a neurological death? Are there differences in outcomes, and how that impacts

deceased donor transplants and outcomes?

- (JAG) About 80% of our deceased donors have met the strict criteria that they can be labelled as brain dead or neurological death. About 20% have a severe injury to their brain that is not recoverable but they don't meet the strict criteria definitions for brain death. In those circumstances, if the family and team have decided they're going to withdraw support, then they can donate and that's called a DCD (donation after cardiac death). In terms of long term outcomes, there's no difference. Lots of studies have shown that graft survival and patient survival is no different in those types of donors. The only difference is that the logistics are more complicated for the donor after a cardiac death, and there's more injury to the kidney because you have to withdraw life support. When you do that someone's blood pressure might be low for a period of time while they pass away and that results in a kidney being a bit slower to open up. There's a much higher chance that patients who get those kidneys (after cardiac death) will likely need dialysis for the first week or so after transplant. Whereas the brain death organs, that happens much less frequently. But long term outcomes are the same.

11. In terms of dialysis, there's a question around post-transplant outcomes and success related to recipients who are on PD versus hemodialysis. Are there differences in this?

- (JAG) No. It's been studied and there doesn't look to be any difference in terms of long term graft survival whether a patient's been on PD or hemo before. There are some advantages though; if someone's on PD, they often have some residual kidney function, so sometimes, even if the kidneys have been slow to open up, that's actually helpful that they've got some residual kidney function. It does make sense to have people choose PD first, but we do that anyways. But in terms of long-term outcomes? Not a big difference.

12. In terms of recipients receiving a second or third transplant – can you comment a bit on the risks and the outcomes? Comment on some of the challenges, graft function, etc. when it's a second or third transplant?

- (JAG) The biggest challenge with a second transplant is actually getting a donor. There's no question that depending on why people lost the first transplant, people who get a repeat transplant are a much more selected group of patients. Their outcomes are reasonably good. They're fairly similar to first transplants, if you account for the challenge in getting the transplant. The biggest difficulty is that when you have already had a transplant, your immune system is kind of revved up, you develop a lot of antibodies, and that makes it harder to find a match the second time around. The other issue is that your risk of rejection is slightly higher the second time around because your immune system is already kind of woken up by the first transplant. Those are the major challenges that we face. Having said that, we have really good success with second and third transplants so we'll routinely offer second and third transplants and sometimes even fourth transplants as well (in selected circumstances).

13. Is there a time when someone wouldn't be suitable to be considered for a second or third transplant?

- (JAG) Depending on what happened the first time. If somebody loses their kidney due to a thrombosis for example, they clot off their kidney very urgently, and the reason for that hasn't been treated, and we believe that it's going to happen again, then that person is not a candidate any longer. But that needs a lot of evaluation. What happens with our failed transplant patients is that as they're failing,

we're now doing a better job than we have in the past of making sure we see them, and have a plan to see them irrespective. So, again, cast a broad net for repeat transplant patients because it's an evolving field, and there are many considerations in terms of the immunology and understanding what happened the first time around. So I think most of them should be considered potential candidates and then we would sort out the details.

- (MONICA) From the kidney clinic side, at SPH when we do transition rounds and we talk about all the people with GFRs less than 15, it's very interesting that it's the patients that are having a failed transplant, whose GFR is lower, that are the most active with respect to donor outreach. They're really empowered, they really understand the benefits of their first transplant and it's always interesting that even with all those risks that Jag outlined, those patients are actually quite successful in not only getting a donor, but having a second pre-emptive transplant versus going on dialysis, because they "drank the koolaid" and saw the success of the first one. So when we're educating our patients, it's important that they know that of the patients that already have a transplant, by far and away, they are looking for their second transplant versus waiting on dialysis.

14. Questions about the HSP registry: Can you comment on highly sensitized patients, and to understand better about the HSP patient and organ allocation in general, the equitability and decision making which happens in relations to them. Can you comment on how waitlists are handled, because sometimes potential recipients are further down the waitlist and they're being considered? Maybe provide some feedback on how all that works?

- (JAG) The highly sensitized patient (HSP) registry is a national registry of all patients that have a PRA of 95% or greater. What that means is this is a group of people who have been tested and we know will match less than 5% of the donor pool. Those people get put on a national list and out of every organ donor in Canada, one kidney is offered to the HSP list. It really does significantly increase the potential of these people finding a match. It's been active for about 2.5 years now. What happens in terms of allocation in general is: when we get an organ, there is a series of priorities (This should all be on the BC Transplant website, if it's not, it should be. It's meant to be very transparent and algorithmic in terms of how we allocate organs). The people that go right to the top of the list are kids; people aged 18 and younger automatically go to the top of the list. People who are highly sensitized (people who match less than 5% of the potential donor pool), are prioritized. The third group of people are people who are listed for multiple organ transplants at the same time (for example, patients who need both a liver and a kidney, and they need them from the same donor, without the liver, they won't survive to wait for the kidney). The last group is people that are medically urgent. For example, if someone is on dialysis and they're running out of vascular access and they imminently need a transplant, they get prioritized. First, all organs get cross-referenced against those groups of people in all blood types. If nobody is matched there, then we go to the waitlist which is organized based on how long people have been on dialysis. So the person at the very top of the list has been on dialysis the longest, the person at the bottom has just started dialysis; that's how it's ranked. Within that, we then age match. We don't want to give the 20 year old donor's kidney to the 80 year old, and we don't want to give a 70 year old donor's kidney to a 20 year old because in both scenarios you're getting inequity. The 20 year old should get a kidney from a younger donor.

And the 70 year old doesn't need a kidney from a 20 year old but would do fine with a kidney from a 60 year old. All donors are broken into three buckets: young, middle-aged or old. The same thing happens with recipients (they are broken into young, middle-aged and old.) The young donors get allocated to "young" only, the "old" to older only and the "middle-aged" (about 40% of all donors) is first come first serve to everybody. We do shunt the younger kidneys to younger patients and the older kidneys to older patients, but everybody, irrespective of their age, gets access to kidneys from donors between the ages of 35-59, which is still pretty young but we refer to them as the "middle-age" group. That's how we do the allocation and we just go down the list. It's important for people to understand there's not a whole lot of cherry-picking that happens on the list. We go with whoever is next. If they meet those criteria, they get it.

15. Question from (FHA pre-transplant) re highly sensitized program: When we refer patients, if they are blood group B or O, without a donor, they can wait a year to two years before they're seen. My understanding is that it's not until they're seen that the HLA and PRA are done. So, would it not be something to consider to have us do their HLA and PRA at the time that we first see them because that would alert us to the fact that they are highly sensitized, instead of waiting a year to two years to be seen? They could actually be seen sooner and get put on the highly sensitized list?

- (JAG) Absolutely. The limiting factor has been the immunology labs ability to do that. We've been pushing for that for a while. What I would say is right now, what they're agreed to is: if we risk stratify people. If someone has a sensitizing event, (a blood transfusion or a pregnancy or a previous transplant – those are the main ones), if those things exist in the history, then we can't get the PRA done at the time of referral. And the labs want the nephrologists to order it because the immunology lab won't do it unless we approve it at the transplant site because they get inundated with PRA requests. But at the time of referral, you just have to say that they've had a sensitizing event and that gets flagged and we'll order it right at the time of referral. We won't wait until we see them to check.
- (MONICA) That's a great question. That's why we tried to put it in the algorithm (the PRA up front). But because of everything Jag said we couldn't. But if you do put in, we ask everyone to talk about those sensitizing events. Hopefully we'll get to a stage where we'll be able to do it without the transplant program, but this is step one.
- That is the goal. The goal will be the ABO and PRA and everybody in at the early stage so you can really plan accordingly and that wouldn't have to be done by the transplant program.

16. How do you advise recipients who want to go to other countries for a transplant in terms of the risks, medical issues etc? Could you comment on the post-transplant care here once they've returned?

- (JAG) The experience we've had with people travelling overseas has largely been negative. There are circumstances where people go and get legitimate transplants in another country (because they've got a sibling that can't come, for example) but most of the experiences we've seen, have unfortunately been illicit (people buying organs). Illicit transplants from other countries have decreased lot in the last number of years but it still happens, we still see it in about three to five people every year. We're working hard to try to capture everyone who does this. The

advice we give patients is that it is illegal in every country (with the exception of Iran) to go and pay for organs. As a result, if you're going to go to that country and get a quick kidney transplant there, it's going to be done through an underground mechanism and there's no accountability for donor evaluation or recipient safety in that matter. We've actually got data to back up the outcomes of patients when they come back, and it is quite poor. The kidney function may be okay but the risk of rejection is higher. The risk of infections is significantly higher. The risk of multi drug-resistant infections is higher and hospitalizations related to it are higher. There have been studies to show that the graft survival is actually lower, as well, in those circumstances. So the outcomes are not good when people go and get kidneys from other countries. We pretty strongly advise people not to do that – to the point where we say if you go and do that, we would actually have to transfer their care to a different transplant program. The way we do that is if we tell someone at SPH, we'll have them taken care of at VGH. The easiest thing is to remind people it's just not safe for them. Obviously the ethics of it are questionable. I personally don't get into the ethics of it a great deal because it's hard for the patient to understand the ethical nuances of it when they're facing end-stage renal disease but from a safety perspective, it's not in their best interest. We've had patients come back with active hepatitis, etc. so it can get pretty bad. I highlight the fact that because it's not legal in those countries, the way they're going to get a fast transplant is going to be an illicit mechanism and that has no accountability and that's why the outcomes are bad. Now, there are patients who say "I want to go to a legitimate program in another country, can I do that?" That's fine, but before we hand over support to facilitate that, we need to be assured about where they're going. What I usually say is have that program contact us and then we can work with them to do whatever facilitation needs to happen. Or we can connect them with a program that we know is legitimate.

17. In terms of people who have donors in another country, say a family member that does want to donate, are you able to comment on how hard it is to have initial medical testing in their home country done?

- (JAG) It's challenging. We can do it. We have a process where if someone has a donor outside the country, that donor has to independently contact us first and provide some background as to why they're doing this, and we'll remotely get them to do the bloodwork. Depending on which country they're in, there's an expense associated with doing blood tests. So if it's a country where the donor's going to have to pay to get all the testing done, that gets challenging. Ultimately they do have to come to Vancouver. When they come here we'll have to do the final evaluation and then we'll see them physically in person. Immigration to come here can be challenging depending on which country they're coming from. Getting the bloodwork done in their country is not usually the big barrier but it can be if money is an issue. The biggest barrier is actually immigration. We have had success in some instances but it can be a lengthy process at times. We do encourage people to explore their local donor outreach as well as other countries. If you have a local donor, the process is much faster. We do provide letters to immigration if necessary. If someone is coming from the UK or the States, it's not a problem. If someone is coming from certain parts of Asia or Africa, we've had a tough time with that. It's very out of our hands when it comes to immigration.
- (CAROLYN) For people that are coming from a country where the visa is not the issue, but they

would have to pay for some initial tests which can be expensive, in their own country, then they are able to have the initial tests done in Canada, under the recipients MSP, so that's another way to do it. That's another way to help them avoid the cost if the visa isn't the issue.

Questions from Kidney Care Clinics:

18. (SURREY): Can you comment regarding the donor matching sites (Matchingdonors.com)?

- (JAG) Our opinion has changed on this over time. Historically we haven't supported it but now we've come to the understanding that people will find donors the way they'll find donors and we're obligated to work up any donor that comes forward. We don't encourage people to do matchingdonors.com because there's a higher risk of money exchanging hands the further out people get, but that's a general thing we tell people. So if someone does find a donor that way, we'll work them up. But we do have to assess the relationship, as we always would with anybody, but we'll work them up.
- (CAROLYN) We had talked a little bit about unsolicited donors, because in a sense those websites are a little like an unsolicited donor in that the relationship is unknown. Some of the same kinds of risks can exist, and so it's important to educate recipients about that.

19. (PRINCE GEORGE): Recently, as a result of some questions from our pharmacist and dosing out medications, when looking at creatinine clearance versus GFR and when we print out our GFR priority reports, we get the creatinine clearance reported for us. As an example, we have a young man who is quite a body builder, who is being looked at now for transplant with a GFR of 18 but a creatinine clearance of 41. Is that a consideration as far as timing for transplant?

- (JAG) That's a very good question. I think we tend to go off the GFR but I'll let Monica handle this one, she has a better sense of GFR vs creatinine clearance issue.
- (MONICA) Great question - if you can view in your program an actual measured GFR, sometimes that's when we do it. And a measured GFR is done through nuclear medicine, to give a really precise measure. It sometimes helps if the patient says "well how bad is it really?" to give you an idea, that's with extremes of weight or size so that is one option. Really we take a look at the symptoms, look at the actual creatinine and kind of split the difference and stay somewhere in the middle. So 18 would probably be too early in that person to do the transplant and their true GFR, if we measured it, would probably be closer to 25 or 30, so especially in a young person, you wouldn't want to do the transplant earlier than you had to. Sometimes we take a look at the more measured true GFR but other times we just go on symptoms and know that that person still had some time to go but it doesn't mean they can't be referred and donor outreach done, but we tend to go somewhere in the middle.
- (JAG) I think the issue with the GFR is always tricky in terms of at what point do we start to bring up transplant? The consensus is probably that it's never too early to bring it up, that doesn't necessarily correlate with when you're going to do it so even if we have people with GFRs of 15 or even 14, and if we evaluate them and then they have a potential donor, or if they're asymptomatic, we'll just park it and we'll wait and get direction from the primary team and from the patient to see if symptoms are starting to develop because they may linger for years before they actually need renal replacement therapy. It's not an issue to work them up and park the situation. It's hard for the donors if that period drags on for a really long time but we discuss all those issues when we work up

the donor.

- (MONICA) You can reassure your person they likely have a little more time but they should still look for donors.
- (MAUREEN, PG) we've been pondering this a lot because he's been very asymptomatic.
- (MONICA) You're probably doing the right thing by just watching and waiting.

20. (KAMLOOPS) With regards to recipients with diabetes, is there an actual number for their A1C where they would be excluded as a potential recipient?

- (JAG) No, nothing in terms of their A1C. The biggest issue with diabetic patients is the complication burden; if they've got vascular disease in general that precludes it from happening, then in those, but we don't have a cut off in terms of how well their diabetes is controlled. Obviously we want to try to optimize that when we review it but it's not a contraindication.

21. (KAMLOOPS) Do you have any information on increased risk of end stage renal disease for the donor past the fifteen years?

- (JAG) Good question. Past the 15 years is a bit of a question mark. They've modeled it beyond that. But the most robust data we have is 15 years which is why we say that. The general process and the general consensus right now in terms of risk is that there is a slightly increased risk to end stage renal disease in living donors. It's hard to quantify what that risk is. It really boils down to what is their baseline risk of end stage renal disease. There are risk calculators that will allow us to calculate that – they're not perfect, as any risk calculator, but they can give us a pretty decent sense. To give you a sense, most living donors when we put them into the risk calculator, if you're trying to calculate their 15 year risk of end stage renal disease, if they don't donate, just based on their risk factors, they're usually less than 0.1. If you then multiply that by a factor of 5, say it went up five-fold with the donor, that's still a pretty low number at that point. That calculator does give you a lifetime projection as well, but I wouldn't put too much stock in that. We're pretty honest with donors to say that if you don't have any renal insults in your life, then the active donation isn't going to cause any problems. But if you have a second insult; if you develop hypertension, if you develop diabetic-related kidney disease, if you develop the GN at some point later in your life then, yes, you're going to be disadvantaged because you have one kidney and a lower GFR to start with, so you will likely progress faster and require renal replacement therapy sooner. But there's no good quantification beyond what happens after 15 years. Other than the original studies that looked at overall outcomes, we still know donors do way better than the general population in terms of their mortality risk and in terms of their risk in end stage renal disease but they obviously should because they are a healthy sub-set of the population.

22. Donors do get priority in the future if they develop renal failure for transplants?

- (JAG) They do. It's interesting that you bring that up because we're actually in the process of trying to understand across the country how standardized that is. Every province has a policy, but the detail around the policy, to be honest, is a bit vague. I can tell you what we do here. For us, it means you go to the top of the list. We've done that twice. In both of those circumstances the patient had kidney disease that actually wasn't directly attributable to donation; they had other insults that happened along the way. It was many years out; these people were both in their early 70s, but they were good, eligible candidates. In one instance, one person was on dialysis before we saw them, and they

went to the top of the list. The second person, we pre-emptively listed this individual; so they got a pre-emptive deceased donor transplant, which we don't typically do. But for living donors, there was consensus that if we were going to offer a priority, and this person basically said he wasn't going to go on dialysis, so the priority went to him. Priority is pretty significant in BC. I don't know what it's like in other provinces.

23. (KELOWNA) What is the medical follow up for donors and how does that happen?

- (JAG) Really good question. That's very topical on our minds right now. Right now, what happens is that every donor sees the transplant surgeon two weeks post-op and gets blood work done, then does blood work at six months, one year, and then annually thereafter. Because everyone's captured in PROMIS, at the anniversary of their donation date, an automatic letter gets generated and sent to the GP and to the patient along with a PROMIS requisition to check renal profile and ACR. In the letter we tell them to go and get a blood pressure check and review the results of those tests with their GP. So we send the reminders, if they use that requisition, that data gets uploaded into PROMIS so we actually have the lab results but then the follow up really has to be with the GP. We don't make people come back and see us. There are patients now, some donors, who have some borderline risk factors that we're asking them to come back and see us. If the GP or patient calls us we fit them right into the transplant program. We tell the GP they don't have to refer to the local nephrologist, that's going to take too long, they can just send them straight back and we'll see them. We are working, hopefully in the next year or two, to have a more formalized role where we would more actively follow up with patients to make sure they've done their follow up because when we've looked at it, about 70% do their blood work in the first year and then it falls off to about 50%. Especially among young people. Young males in particular aren't doing their follow up. So I think we need to beef that up but that's the policy right now.

24. If you have living donors from overseas, how long do you want them to be in the country before you safely say they can return home?

- (JAG) About a month. Usually we tell them two months but many people leave after about a month. It is safe for them to go at that point. That is one of the challenges though. One of the things we assess when we do international donors is their ability to get follow up. If they don't have health insurance in their country, it becomes an issue for us and for them if they can't arrange their follow up. If they don't have the means to do it then that becomes part of the challenge in terms of when we're evaluating them for donation and we may not approve them.