ADDRESSING THE TRANSPLANT WAITLIST – A NOVEL FORMULA FOR SUCCESS

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OBJECTIVES:

1) Re-Introduce Transplant Waiting Times And Organ Allocation Issues
2) Introduce The Concept Of Operations Research And Discrete Event Simulation
3) Foster Dept of Urologic Science – UBC Operations & Logistics Synergies

RENAL TRANSPLANTATION – EVALUATING SUPPLY AND MEETING DEMAND

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Problem Statement

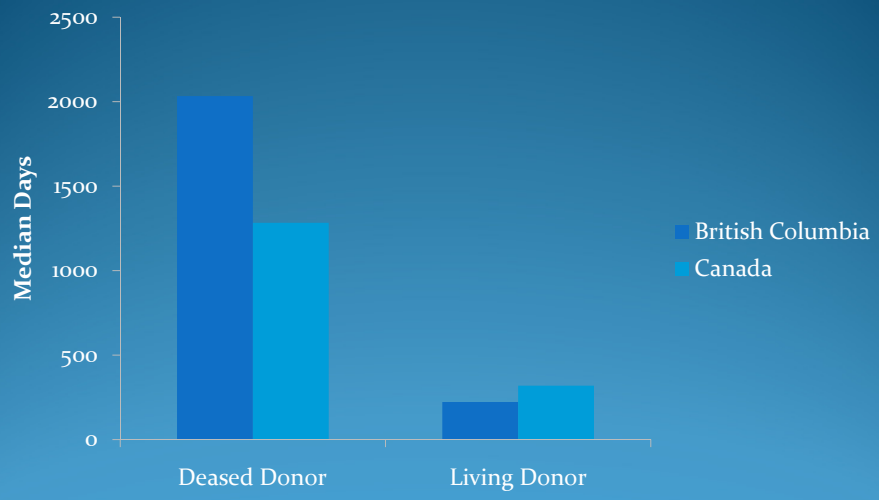
- Rising demand for kidney transplantation
- Short supply – the number of transplants being done remains fairly constant
- Long wait times on dialysis
- Dialysis foreshadows high morbidity/mortality

Rising Demand – Looking at Canadian Statistics

- 5,321 newly diagnosed patients with ESRD in 2006
- Increase of 34% in the number of cases since 1997
- As the largest number of incident ESRD patients are younger than 75 years of age, the majority of these patients will be eligible for transplant assessment.

Canadian Institute for Health Information, *2008 Annual Report—Treatment of End-Stage Organ Failure in Canada, 1997 to 2006 (Ottawa, Ont.: CIHI, 2008).*

TIME ON DIALYSIS PRIOR TO FIRST TRANSPLANT (2004-2006)



Canadian Institute for Health Information, *2008 Annual Report—Treatment of End-Stage Organ Failure in Canada, 1997 to 2006 (Ottawa, Ont.: CIHI, 2008).*

So What?

- Mortality rates of dialysis patients reported to be as high as 20% per year in the US [3]
- 70 deaths in patients waiting for a kidney transplant in 2006 in Canada [1]
- The average wait times for kidneys from deceased donors in the USA ranging from 5 to 7 years [2]
- Waiting times exceeding average life expectancy of most middle-aged and older persons with ESRD. [2]

[1]Canadian Institute for Health Information, *2008 Annual Report—Treatment of End-Stage Organ Failure in Canada, 1997 to 2006 (Ottawa, Ont.: CIHI, 2008).*

[2]Renal Data System. *USRDS 2008 annual **data report: atlas of** chronic kidney disease and end-stage renal disease in the United States. Bethesda, MD*: National Institute of Diabetes and Digestive and Kidney Diseases, 2008.

[3]Tan J et al. *Cautious Optimism Regarding Long term Safety of Kidney Donation.* NEJM 360 (5); pg 522-23

A Look at Supply – How many transplants are we doing?

- 23 active kidney transplant programs in seven provinces
- Between 1997 and 2006, 9,937 kidney transplant procedures registered in CORR.
  - (11.8%) were retransplants
  - 62.1% utilized deceased-donor kidneys
- The number of living related donations have doubled nationwide in the last decade
- The number of cadaveric transplants show very little increase over the last decade

Canadian Institute for Health Information, *2008 Annual Report—Treatment of End-Stage Organ Failure in Canada, 1997 to 2006 (Ottawa, Ont.: CIHI, 2008).*

COMPARING PROVINCES – Deceased Donor

Table 10 Deceased Donor Kidney Transplants* by Year and Province of Treatment, Adult Recipients, Canada, 1997 to 2006 (Number)

Province of Treatment	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
British Columbia	77	52	64	60	59	46	53	52	40	61	564
Alberta	90	74	72	84	85	81	67	67	83	78	781
Saskatchewan	16	35	35	19	28	18	29	18	15	21	234
Manitoba	16	14	14	28	11	17	17	13	6	22	158
Ontario	220	238	173	213	184	196	192	208	206	243	2,073
Quebec	149	165	194	209	207	187	218	196	173	198	1,896
Nova Scotia	[illegible]	36	57	79	70	63	51	35	49	67	[illegible]
Total	654	614	609	692	644	608	627	589	572	690	6,299

Note
* Excludes simultaneous kidney–pancreas transplants. See Section 6. Includes first transplants and retransplants.

- Ontario has 6 adult renal transplant programs (London, Hamilton, Toronto{2}, Ottawa and Kingston). In 2006, Mean Number of transplants per program is approximately 40.
- In comparison, in BC, mean number of transplants per program is approximately 30.

Canadian Institute for Health Information, *2008 Annual Report—Treatment of End-Stage Organ Failure in Canada, 1997 to 2006 (Ottawa, Ont.: CIHI, 2008).*

COMPARING PROVINCES – Living Donors

Table 11 Living-Donor Kidney Transplants by Year and Province of Treatment, Adult Recipients, Canada, 1997 to 2006 (Number)

Province of Treatment	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
British Columbia	35	38	70	77	83	74	69	74	70	98	688
Alberta	29	55	48	37	50	47	52	61	50	46	475
Saskatchewan	16	26	15	6	8	14	10	12	11	9	127
Manitoba	9	6	14	10	12	15	18	12	19	23	138
Ontario	123	144	140	151	144	149	156	157	185	206	1,555
Quebec	12	29	24	22	43	38	43	38	45	47	341
Nova Scotia	36	37	38	40	31	25	24	23	29	31	314
Total	260	335	349	343	371	362	372	377	409	460	3,638

2006 Summary:
Ontario → 34 per program (mean)
BC → 48 per program (mean)

Canadian Institute for Health Information, *2008 Annual Report—Treatment of End-Stage Organ Failure in Canada, 1997 to 2006 (Ottawa, Ont.: CIHI, 2008).*

Where does BC stand in comparison?

- In 2008, 167 kidney transplants were done (80 Living Donor, 87 Deceased Donor)[1]
- Average wait time for adult cadaveric kidney transplant in BC is 60 months. (national average ~40 months) [1, 2]
- 229 patients in BC are waiting for a cadaveric kidney transplant [1]
- In 2007, at VGH, the median turn around time for living related recipients from referral to transplant was 351 days (87 days from referral to clinic and 215 days from clinic to transplant)[3]

[1] www. transplant.bc.ca

[2] Canadian Institute for Health Information, *2008 Annual Report—Treatment of End-Stage Organ Failure in Canada, 1997 to 2006 (Ottawa, Ont.: CIHI, 2008).*

[3] *BCTS Living Donor Kidney Transplant Assessment Rapide ImPROVE Event.* British Columbia Transplant Society. Nov, 2007

Why are the waitlists so long?

Cadaveric donation

- rates of patients with ESRD on the rise, yet the number of transplants being done remain fairly constant
- Decline in donors with brain death
- Lack of education to general public regarding importance of organ donation
- Lack of education amongst health practitioners
- No program for non- heart beating donors until recently
  - SPH recently began this
- Cultural beliefs / misconceptions

Living related donation – fundamentally different reasons for wait-times

- Long processing time!
  - **skills shortages :**
    - transplant nephrologists for donor/recepient assessment
    - skilled transplant surgeons / OR time
    - social workers / psychologists / allied health
    - nurses
    - transplant coordinators
  - Long waitlists for special tests, specialist referrals , etc.
    - Cardiac evaluation (ECHO, MIBI, Stress test, Angio)
    - Access to Specialist Consultation (Cardiology, Vascular, Endocrine)
    - No dedicated resources for transplant patients
  - Lag time between recipient referral and donor referral
- Lack of OR resources [1]
- Lack of common protocol / clinical path for evaluation of patients entering the assessment process
- ? Rigorous exclusion criteria with variable threshold: hypertension, age, low GFR, Obesity

[1] *BCTS Living Donor Kidney Transplant Assessment Rapide ImPROVE Event.* British Columbia Transplant Society. Nov, 2007

Strategies to overcome long wait times on Deceased donor waitlist:

- encourage donor finding in recipients
  - ✓Earlier patient education to inform recipient of treatment options and to facilitate more donor pairs
- expanded criteria donors
  - advanced age (age >60) or
  - age > 50 with at least two of the following:
    - abnormal donor kidney function (SCr >1.5 mg/dl)
    - history of hypertension,
    - cause of death from a cerebrovascular accident
- non heart beating donors
- Education amongst health care practitioners
- Utility based allocation

Live Donor Kidney Transplant Programs

- Active in BC:
  - living anonymous donation
  - paired exchange
  - Pre emptive transplant
- Proposed in BC:
  - centralized streamlined processing and assessment of donors and recipients (consolidation of programs)
  - MORE RESOURCES (nephrologists, transplant surgeons, psychologists, social workers, etc)
  - ? leniency in eligibility criteria for living related donors
  - Timing of evaluation of donors and recepients

Addressing Wait times in BC for Renal Transplantation

- Daunting task
  - Decentralized program (3 sites, 2 hospitals, 2 health authorities, and all respective multi-levels of internal administration)
  - Any change to admittedly inefficient current-state processes is extremely costly to review, much less implement (previous attempts at which have met with little success).
- Need a method of studying transplant operations from global to granular, modeling it, and changing multiple simultaneous components, all in a rapid, cost effective manner.