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Kidney Health Education and Research Group

# Substance Use Among Potential Kidney Transplant Candidates and its Impact on Access to Kidney Transplantation: A Canadian Cohort Study

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Authors have nothing to disclose.

- 35 yo, African Canadian male
- ESKD due to GN
- On PD x 3 yrs, recently switched to HD
- No major comorbidities
- Lives with common law partner, stable relationship
  
- Recurrent problems with non-adherence to dialysis, drug seeking behavior, use of recr. drugs, narcotic analgesics
- Non-adherence to HD, no-show for several appointments
  
- Pt. was declined to be waitlisted – he accepted this decision

### PATIENT INFORMATION

VIEW AS

- Mortality Risk
- Survival Summary

AGE (18 - 80)

GENDER

- Male
- Female

RACE

- White
- Black or African American
- Other

ETHNICITY

- Hispanic
- Non-Hispanic

TIME ON DIALYSIS

- 0 - 6 months
- 6 - 12 months
- >1 year

PATIENT HISTORY

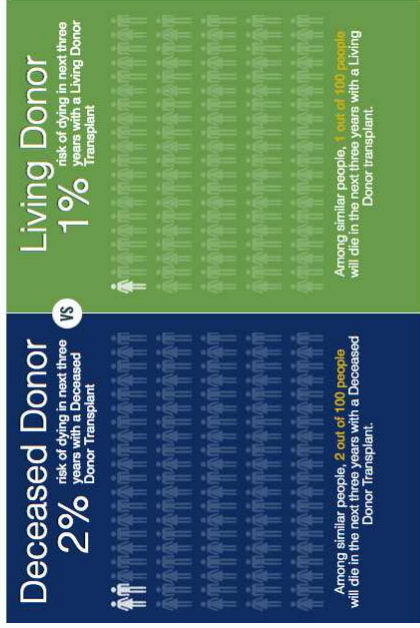
(select all that apply)

- Hypertension
- Diabetes
- Low Albumin (<3.5 g/dL)
- Cardiovascular Disease

### 3-YEAR RISK SUMMARY



You are about **5 times** more likely to die on Dialysis than die with a Kidney Transplant in the next three years.



You are about **2 times** more likely to die with a Deceased Donor Transplant than die with a Living Donor Transplant in the next three years.



## Why are we **selecting** patients?

- **Assess and minimize peri-op risk**
  - CV assessment
  - Hemostasis
  - Obesity
  - Rehab potential
  - **Cognitive/psychiatry issues**
- .
- **Optimize post-Tx outcomes**
  - Infection
  - Rejection
  - Malignancy
  - Recurrence
  - **Mental health, adherence**
- **Utility** – survival – whose decision is it?

# Background

- Concerns about substance use (alcohol, tobacco, recreational and prescription drugs) among patients after solid organ transplant include:
  - non-adherence to transplant medications
  - exacerbation of underlying mental health conditions
  - interactions between substance use and transplant medications
  - general health consequences of substance use
- Negative outcomes associated with tobacco use have been demonstrated. Thus, tobacco use is discouraged but not a contraindication for kidney transplant; however, it is a contraindication for some other solid organ transplants in some centers.
- Active drug use is a contraindication to KT because of concerns about the negative impact on post-transplant outcomes.

# Relative listing contraindications, considerations

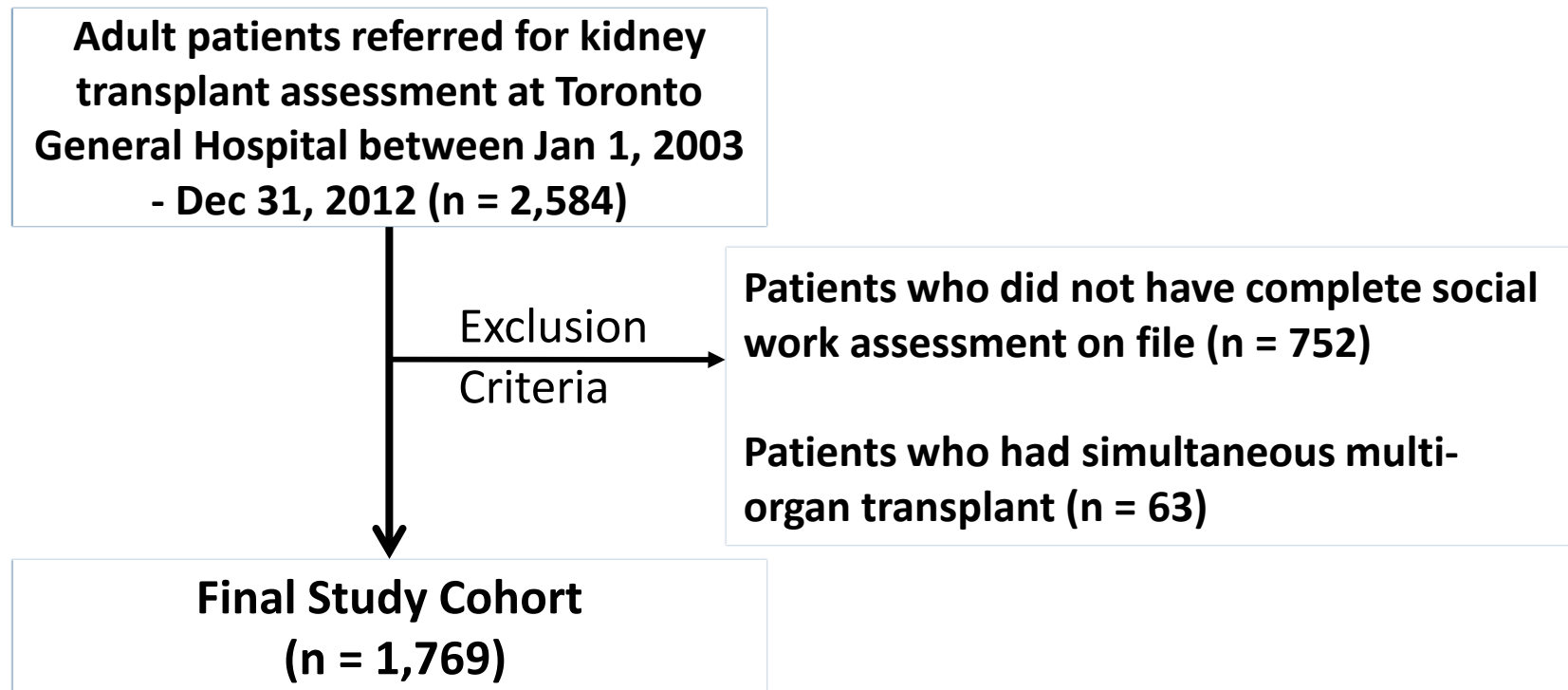
- Psychosocial Considerations: Patients with an acute or untreated psychotic illness, or that display social support/compliance issues that prohibit adherence to therapy are not candidates for kidney transplantation.
- Psychosocial Considerations: Cognitive impairment **is not an absolute contraindication** to kidney transplantation. However, particular care must be taken to ensure that informed consent can be obtained and that a support system is in place to ensure adherence to therapy and patient safety.
- A history of psychiatric **illness is not an absolute contraindication** to kidney transplantation. Capacity should be evaluated when indicated.
- Kidney transplantation should be delayed until the patient has demonstrated freedom from substance abuse for at least 6 months.

# Background and Aims

- We are not aware of studies exploring the prevalence of substance use (tobacco or recreational drug use, prescription drug abuse) and its impact on access to KT in a Canadian context.
  - Access to KT includes being placed on the waitlist and being transplanted.
- **Aims:** among patients with end stage kidney disease we will
  - describe the frequency of substance use
  - determine sociodemographic correlates of substance use
  - determine the impact of substance use on access to KT



# Sample selection



# Methods

- Information about substance use, socio-demographic and clinical data was obtained from Social Work notes stored in the Comprehensive Renal Transplant Research Information System (CoReTRIS).
- Patients were followed until Dec 31, 2013
- The Ontario Marginalization Index (OMI), a census- and geographically based index was used to consider material deprivation.
- Missingness was less than 3% for all variables, except OMI (8%).
- Multiple imputation by chained equations to address missing data.

## Methods - Exposure

- **Substance use** was categorized by substance and whether it was current or historical.
  - Tobacco
  - Recreational Drug Use
  - Prescription Drug Abuse
  - Alcohol
- Alcohol use was not well quantified and ubiquitous and was therefore excluded from analysis.
- Recreational drug use and prescription drug abuse was analyzed as one group (drug use).
- **Current substance use** was used in all analysis.

## Methods – Outcomes

- **Positive final disposition** was characterized as being activated on the waitlist or cleared for living donor transplant within two years from referral.
- **Transplant** was characterized as receiving a kidney transplant.

## Methods – Statistical analysis

- The association between substance use (dependent variable) and baseline patient characteristics and was explored using multinomial logistic regression.
- The cumulative probabilities of time-to-outcome were graphically assessed using the Kaplan–Meier product limit method, and differences across survival distributions were examined using the log-rank test.
- Univariable and multivariable associations between the exposure and outcome variables were explored using Cox proportional hazards models.
- Origin of analysis was the time of referral for kidney transplant assessment

# Baseline Characteristics - 1

Variables, %(n)	Total (1769)	No substance use (0)	Current tobacco use (245)	Current drug use (90)	P Value
<b>Mean Age (± SD)</b>	49 (14)	50 (14)	48 (12)	40 (14)	0.020
<b>Male</b>	60 (1066)	<b>59 (860)</b>	<b>69 (168)</b>	<b>69 (62)</b>	<b>0.001</b>
<b>OMI</b>					0.967
Highest (Least deprived)	18 (312)	18 (259)	17 (41)	19 (17)	
Second highest	20 (359)	20 (298)	21 (51)	20 (18)	
Mid	21 (364)	21 (309)	17 (41)	18 (16)	
Second lowest	16 (280)	16 (228)	19 (46)	17 (15)	
Lowest (Most deprived)	17 (307)	17 (253)	18 (43)	18 (16)	
<b>Ethnicity</b>					<b>&lt;0.001</b>
Caucasian	54 (958)	<b>51 (746)</b>	<b>69 (168)</b>	<b>74 (67)</b>	
African Canadian	13 (225)	14 (201)	7 (17)	11 (10)	
East-Asian Canadian	11 (191)	12 (177)	<b>5 (13)</b>	<b>4 (4)</b>	
South Asian Canadian	7 (121)	13 (189)	8 (19)	6 (5)	

# Baseline Characteristics - 2

Variables, % (n)	Total (1769)	No substance use (1466)	Current tobacco use (213)	Current drug use (90)	P Value
<b>Marital Status</b>					<b>&lt;0.001</b>
Single, never married	21 (371)	20 (295)	17 (36)	44 (40)	
Married/Common law	62 (1090)	<b>63 (963)</b>	<b>59 (126)</b>	<b>40 (36)</b>	
Divorced/Separated/Widowed	17 (298)	16 (235)	23 (50)	14 (13)	
<b>Employment</b>					<b>&lt;0.001</b>
Unemployed	43 (762)	<b>41 (599)</b>	<b>55 (117)</b>	<b>51 (46)</b>	
Employed	34 (594)	34 (503)	26 (56)	39 (35)	
Other	22 (393)	24 (346)	18 (39)	9 (8)	
<b>History of mental health disorder</b>	24 (432)	<b>23 (334)</b>	<b>26 (56)</b>	<b>47 (42)</b>	<b>&lt;0.001</b>
<b>History of non-adherence</b>	18 (311)	<b>16 (231)</b>	<b>22 (46)</b>	<b>38 (34)</b>	<b>&lt;0.001</b>

# Multinomial Logistic Regression - 1

Variable	Current Tobacco Use			Current Drug Use		
	RRR	95% CI	P	RRR	95% CI	P
<b>Age</b>	0.98	0.97 - 1	0.011	0.96	0.94 - 0.98	0.001
<b>Race</b>						
White		Ref			Ref	
Black	0.25	0.14 - 0.46	< 0.001	0.48	0.22 - 1.02	0.055
East Asian	0.24	0.12 - 0.47	< 0.001	0.27	0.1 - 0.76	0.013
South Asian	0.24	0.13 - 0.46	< 0.001	0.11	0.03 - 0.47	0.003
Other	0.73	0.42 - 1.28	0.271	0.49	0.17 - 1.42	0.19
<b>Sex</b>						
Female		Ref			Ref	
Male	1.6	1.16 - 2.21	0.004	1.94	1.19 - 3.18	0.008
<b>Marital Status</b>						
Married		Ref			Ref	
Single never married	0.65	0.41 - 1.03	0.066	1.67	0.92 - 3.03	0.089
Widowed/Divorced/Separated	1.53	1.05 - 2.26	0.028	1.48	0.74 - 2.97	0.261

**Current tobacco use** associated with:

- Younger age
- White ethnicity
- Male Sex
- Widowed/Divorced/ Separated individuals

**Current drug use** associated with:

- Younger age
- White ethnicity
- Male Sex



# Multinomial Logistic Regression - 2

Variable	Current Tobacco Use			Current Drug Use		
	RRR	95% CI	P	RRR	95% CI	P
<b>Employment Status</b>						
Employed		Ref			Ref	
Unemployed	2.04	1.42 - 2.96	< 0.001	1.08	0.65 - 1.81	0.766
Other	1.24	0.76 - 2.03	0.379	0.46	0.2 - 1.07	0.071
<b>Ontario Marginalization Index</b>						
Lowest - Poor		Ref			Ref	
Highest - Rich	0.89	0.53 - 1.51	0.676	0.88	0.38 - 1.99	0.75
Second Highest	0.88	0.53 - 1.46	0.612	0.84	0.4 - 1.76	0.644
Middle	0.74	0.44 - 1.25	0.259	0.7	0.31 - 1.56	0.381
Second Lowest	1.07	0.66 - 1.77	0.766	0.91	0.41 - 2	0.814
<b>History of Mental Health Disorder</b>						
No		Ref			Ref	
Yes	0.95	0.67 - 1.35	0.781	2.44	1.52 - 3.94	< 0.001
<b>History of Non-Adherence</b>						
No		Ref			Ref	
Yes	1.4	0.96 - 2.07	0.079	2.12	1.29 - 3.51	0.003

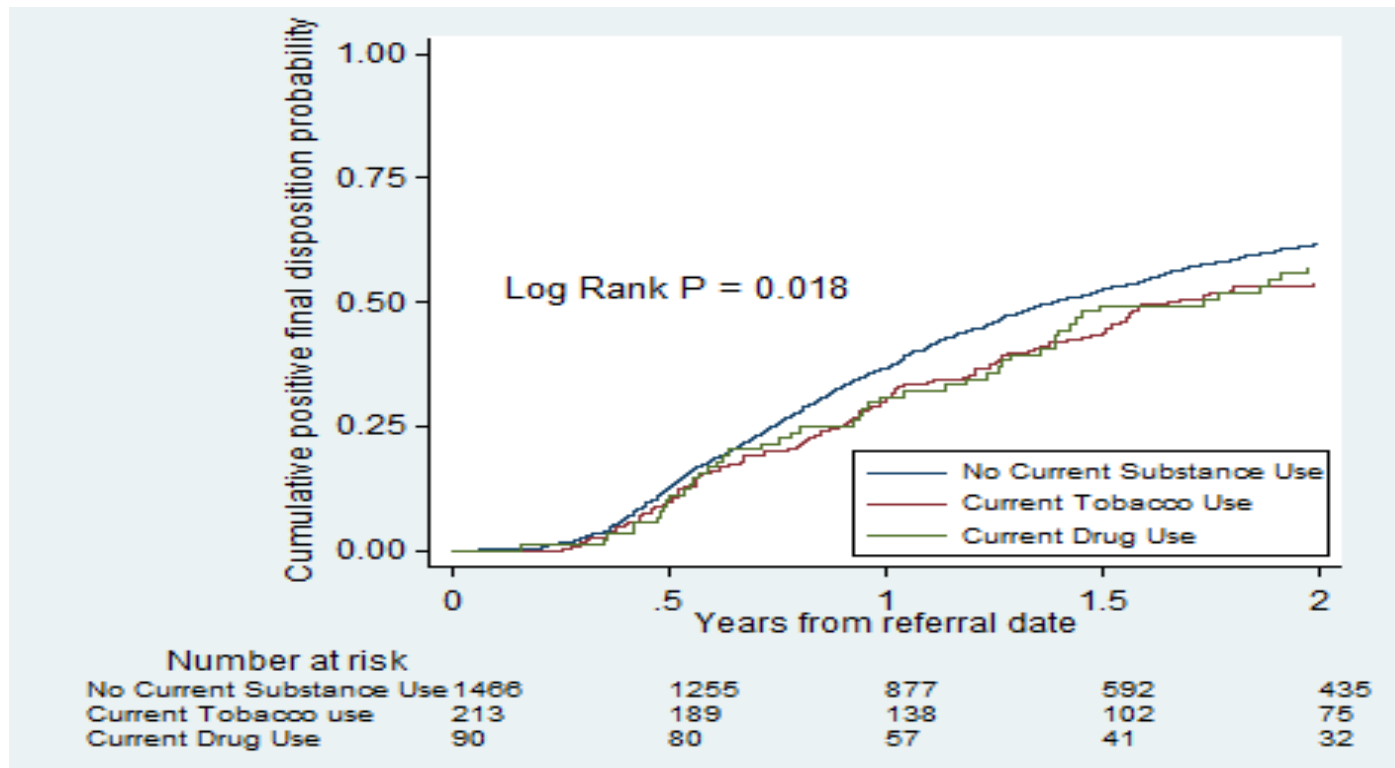
**Current tobacco use** associated with:

- Unemployment

**Current drug use** associated with:

- History of mental health disorder
- History of non-adherence

# Association between substance use and Positive Final Disposition

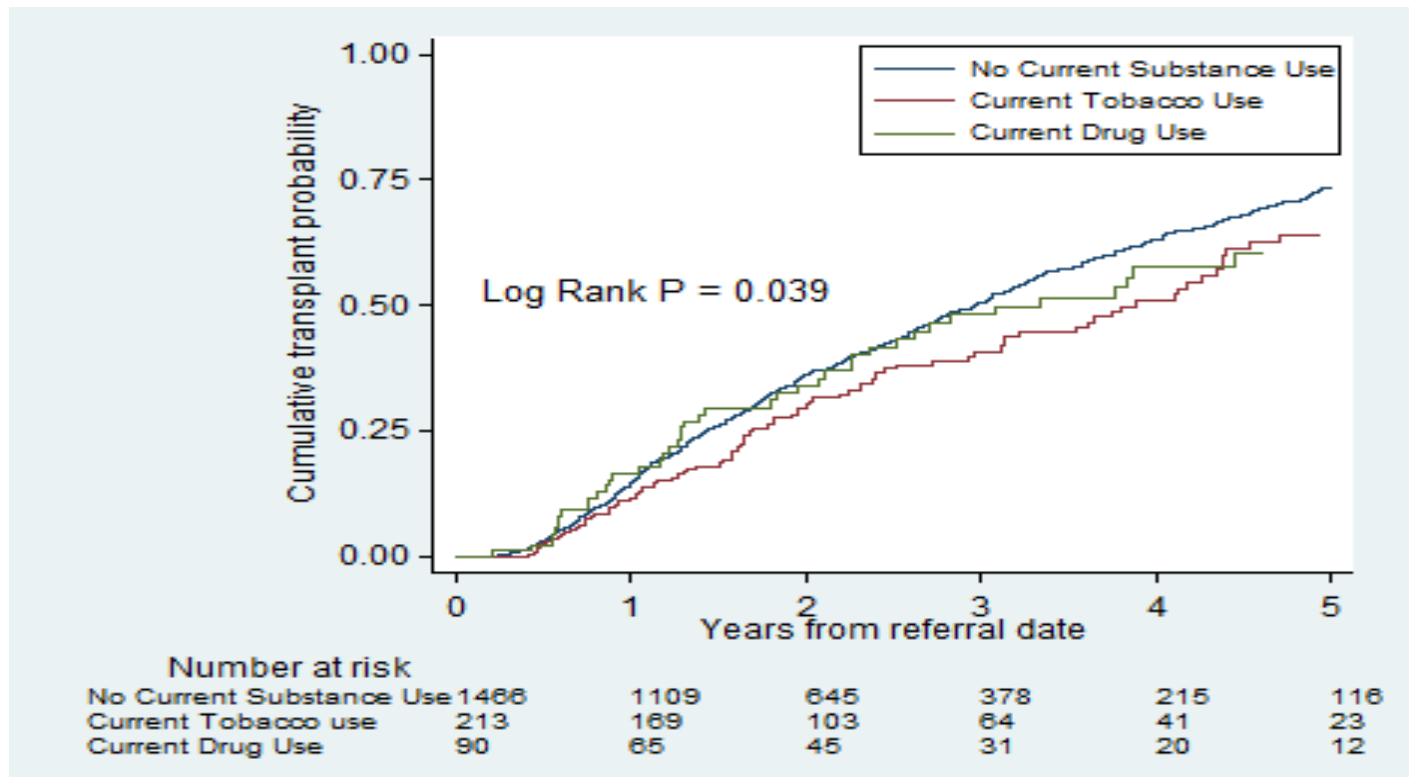


# Multivariable adjusted association between substance use and Positive Final Disposition

Cox Proportional Hazards Model	Current Tobacco Use Hazard Ratio (95% CI)	Current Drug Use Hazard Ratio (95% CI)
Model 1	0.80 (0.65, 0.98)	0.85 (0.63, 1.13)
Model 2	0.78 (0.63, 0.95)	0.76 (0.56, 1.02)
Model 3	0.78 (0.63, 0.96)	0.76 (0.56, 1.02)
Model 4	0.81 (0.65, 0.99)	0.82 (0.60, 1.11)
Model 5	0.82 (0.65, 0.98)	0.84 (0.57, 1.04)

- Model 1: Univariable
- Model 2: Model 1 plus age, ethnicity, sex, marital status
- Model 3: Model 2 plus English communication, Ontario Marginalization Index, employment status
- Model 4: Model 3 plus History of mental health, history of non-adherence
- Model 5: Model 4 plus history of diabetes, coronary artery disease/ myocardial infarction, heart failure

# Association between substance use and receiving a kidney transplant



# Multivariable adjusted association between substance use and receiving a kidney transplant

Cox Proportional Hazards Model	Tobacco Use	Drug Use
	Hazard Ratio (95% CI)	Hazard Ratio (95% CI)
Model 1	0.81 (0.66, 1.00)	0.87 (0.65, 1.16)
Model 2	0.72 (0.58, 0.89)	0.70 (0.52, 0.95)
Model 3	0.73 (0.59, 0.90)	0.71 (0.53, 0.96)
Model 4	0.75 (0.60, 0.93)	0.80 (0.59, 1.09)
Model 5	0.77 (0.62, 0.96)	0.81 (0.59, 1.11)

- Model 1: Univariable
- Model 2: Model 1 plus age, ethnicity, sex, marital status
- Model 3: Model 2 plus English communication, Ontario Marginalization Index, employment status
- Model 4: Model 3 plus History of mental health, history of non-adherence
- Model 5: Model 4 plus history of diabetes, coronary artery disease/ myocardial infarction, heart failure,

## Summary and discussion

- Current drug use occurred in 5% and current tobacco use occurs in 14% of our sample
- Tobacco use was associated with younger age, male sex, Caucasian ethnicity, widowed or divorced marital status, and unemployment.
- Current drug use was more frequent in patients who were younger, male, Caucasian or Black, with a history of mental health disorder and with a history of non-adherence.

## Summary and discussion

- Those with tobacco use have a lower likelihood of receiving a positive final disposition and a transplant.
- Current drug use was not significantly associated with receiving a positive disposition or a transplant, however, a trend for lower likelihood was seen.

## Limitations

- Lack of systematic method to explore and quantify substance use
- Potential for under-reporting and social desirability bias
- Incomplete or insufficient documentation of social work assessment (29%)
- Selected patient population – patients with significant substance use problems were likely not referred for transplant assessment



## Next Steps

- Develop a systematic approach to the pre-transplant assessment of substance use.
- Explore if post transplant clinical outcomes associated with pre-transplant substance use
- Explore the potential impact of interventions in this population to improve access to transplant and outcomes for