



Introduction

Background

- **16,364 apparent opioid-related deaths** occurred between January 2016 and March 2020 [1].
- Individuals with fatal overdose are eligible to donate organs for transplantation and have been utilized in BC's transplant system.

Objectives

- 1) Characterize overdosed deceased donors (ODDs).
- 2) Examine outcomes for recipients of ODD kidney transplantation in BC.

Methods

Data

- The BC Transplant; **Patient Records and Outcome Management Information System (PROMIS) database** was utilized.
- Data was extracted for deceased donor solid organ transplants in BC from January 2013 to December 2019; restricted to donors 12-70 years of age. Donor chart reviews to identify ODDs were conducted by BC Transplant's Medical Director of Organ Donation Services.

Donor Characterization

- Describe the **number and proportion** of ODDs in BC from 2013 - 2019.
- Compare donor traits between ODDs and Non-ODDs. Trait comparisons were performed using the chi-square test or Fisher's exact test as appropriate.

Donor Outcome Analysis

- Among **first time kidney transplant recipients**, modeled acute rejection, all cause graft loss (ACGL), and death censored graft loss (DCGL) for ODDs.
- Used the Kaplan-Meier method to view unadjusted outcomes followed up for a 3 year period.
- Used non-weighted and inverse probability weighted cox multivariable proportional hazards models for all outcomes estimates, followed for 3 years. Weights based on the propensity score of donor overdose status.

Results – Donor Characterization

- Between 2013 and 2019 there were **N=644 local deceased donors in BC**: 149 (23%) were ODDs.
- ODD percentage representation **increased 2.5-fold from 7.9% in 2013 to 21.9% in 2019**.
- Transplantation from **149 ODDs** resulted in **259 (22%) of the 1181 kidney transplants** taken place between 2013-2019.

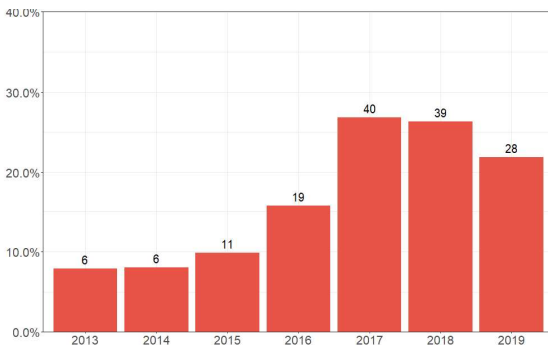


Figure 1. Count and proportional representation of ODDs amongst all donors in BC between 2013 – 2019.

ODDs were MORE likely	ODDs were LESS likely
Male (75.8% vs 60.0%, p = 0.001)	To be hypertensive (7.1% vs 25.1%, p < 0.001)
Younger than 40 years of age (69.1% vs 32.4%, p < 0.001)	To have diabetes (1.4% vs 9.0%, p = 0.004)
HCV positive (8.8% vs 2.2%, p = 0.002).	Flagged as Expanded Criteria Donor (4.0% vs 20.4%, p < 0.001)
Flagged as Exceptional Distribution (88.4% vs 54.5%, p < 0.001)	

Table 1. ODD vs. Non-ODD characteristics comparison.

Results – Donor Outcome Analysis

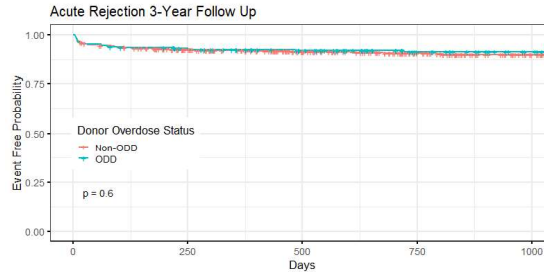


Figure 2a. Kaplan-Meier estimate of acute rejection between recipients of ODD and Non-ODD kidneys followed for 3 years.

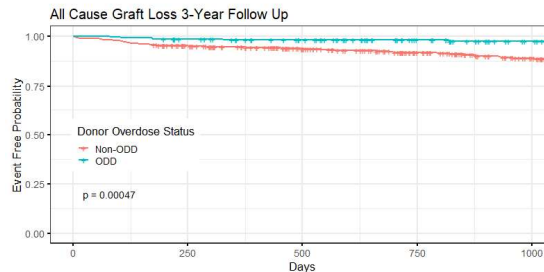


Figure 2b. Kaplan-Meier estimate of ACGL between recipients of ODD and Non-ODD kidneys followed for 3 years.

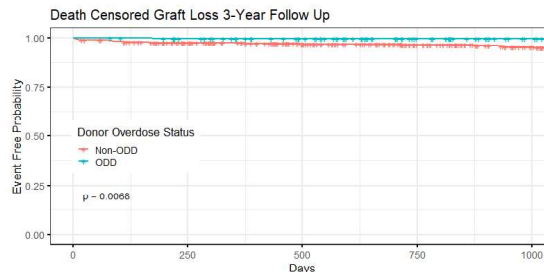


Figure 2c. Kaplan-Meier estimate of DCGL between recipients of ODD and Non-ODD kidneys followed for 3 years.

Kaplan-Meier Estimates

- **907 patients** received a first time kidney transplant between January 2013 and December 2019. **219 patients** received a **ODD kidney** and **688 patients** received a **Non-ODD kidney**.
- There was no difference in the event of acute rejection for recipients of an ODD kidney.
- There was a **statistically significant difference** in the event of **ACGL** and **DCGL** for recipients of an ODD kidney.

Cox Proportional Hazards Models

- There was no difference in the event of acute rejection, ACGL, and DCGL for recipients of an ODD kidney in the non weighted models adjusted for donor and recipient characteristics.
- There was no difference in the event of acute rejection and DCGL for recipients of an ODD kidney in the inverse probability weighted models adjusted for donor and recipient characteristics.
- There was a significant difference in ACGL for recipients of a ODD kidney. **Recipients of ODD kidneys had 0.31 times the risk of experiencing ACGL compared to Non-ODD kidney recipients.**

Outcome Variable	Hazard Ratio [95% CI] for ODDs	p-value	Inverse Probability Weighted
Acute Rejection	0.53 [0.17;1.64]	0.273	No
ACGL	0.38 [0.14;1.05]	0.062	No
DCGL	0.25 [0.02;2.65]	0.248	No
Acute Rejection	0.59 [0.19;1.85]	0.367	Yes
ACGL	0.31 [0.10;0.95]	0.040	Yes
DCGL	0.12 [0.01;2.05]	0.145	Yes

Table 2. Hazard ratio, 95% CI, and p-value estimates for the outcome of acute rejection, ACGL, and DCGL, compared between standard and inverse probability weighted cox proportional hazard models.

Conclusion

- **ODDs representation in the donor pool has increased in the last 6 years during the opioid epidemic.**
- **ODDs are more likely to be younger males with fewer chronic conditions but, have a greater chance of being HCV positive.**
- **Recipients of first time kidney transplants from ODDs have similar if not slightly better outcomes when compared to recipients of kidneys from Non-ODDs.**
- **Outcomes may be in part attributed to the younger age of ODDs and allocation guidelines that prioritize younger donor kidneys to younger recipients. As overdose deaths continue to rise in BC, ensuring that individuals who die after overdose are offered the opportunity to become organ donors is important.**

References

1. Special Advisory Committee on the Epidemic of Opioid Overdoses. Opioid-related Harms in Canada. Ottawa: Public Health Agency of Canada; September 2020. <https://health-infobase.canada.ca/substance-related-harms/opioids>