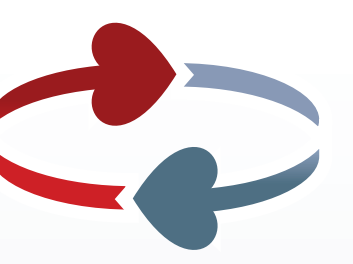


# Factors associated with organ donation by trauma patients in Nova Scotia



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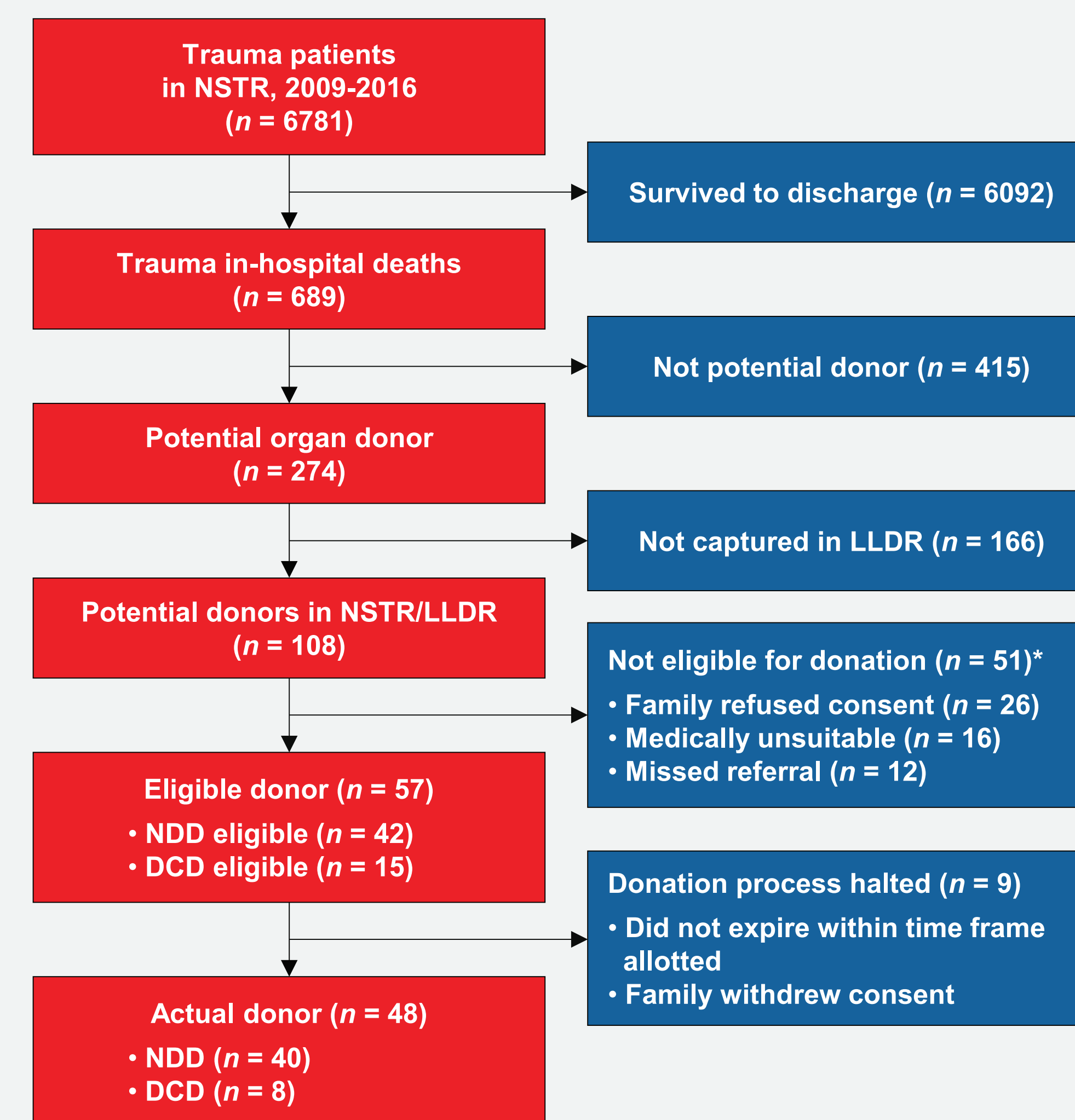
## Introduction

- Similar to other provinces, there is a deficit in organs available for transplant in Nova Scotia.
- Organ donation (OD) is dependent on a multitude of factors including patient-level factors (e.g., age, medical suitability), obtaining patient/family consent, as well as institution-level factors (e.g., resources for procurement and transplantation, having an in-house OD coordinator).
- Few studies have investigated factors associated with OD in Canada, and none of these studies have focused specifically on the trauma population.
- Our objective was to characterize OD in trauma victims on a provincial scope and to assess for factors associated with OD in these patients.

## Methods

- Data from the Nova Scotia Trauma Registry (NSTR) and the Nova Scotia Legacy of Life Donor Registry (LLDR) was collected and linked (2009-2016).
- We included all patients in the NSTR who died in-hospital, as well as all trauma PODs in the LLDR.
- We grouped patients as “donors” and “non-donors”, and we compared characteristics between these groups using Student’s t-test and chi square analysis as appropriate.
- A multiple logistic regression model was used to assess for factors associated with OD. The following variables were included: age (continuous), gender (male, female), residence (urban, rural), injury type (drowning/asphyxia, blunt), injury location (within HRM, outside HRM), GCS at scene (continuous), transport mode (land, air, land/air), intermediate facilities (0, 1, ≥2), trauma team activation (yes, no), any comorbidities (yes, no), day (weekday, weekend), and season (fall, winter, spring, summer).

## Results



**Figure 1. Flow chart of trauma victims who donated organs in Nova Scotia, 2009-2016.** NSTR = Nova Scotia Trauma Registry; LLDR = Legacy of Life Donor Registry; NDD = Donation after neurological death; DCD = Donation after cardiac death. A potential donor in the NSTR was defined as a trauma patient who died in hospital, had an appropriate ICD-10-CA injury code, and received mechanical ventilation during hospital stay. The LLDR definition of a potential organ donor was a patient who met the following criteria: 1) grave prognosis of GCS  $\geq$  5T; 2) injured brain or non-recoverable injury or illness; 3) patient is intubated and ventilator-dependent; and 4) end of life discussion has been held with family and decision made to withdraw life sustaining therapy. \*3 patients were ineligible for more than 1 reason.

Factor	Adjusted analysis	
	OR (95% CI)	p-value
Age	0.97 (0.95 – 0.99)	0.006
Male gender (Ref: Female)	0.88 (0.33 – 2.38)	0.80
Urban residence (Ref: Rural)	0.65 (0.22 – 1.90)	0.43
Injury type – Drowning/asphyxia (Ref: Blunt)	1.23 (0.32 – 4.67)	0.76
Injury location – Inside HRM (Ref: Outside HRM)	4.64 (1.42 – 15.10)	0.011
Scene GCS	0.76 (0.66 – 0.88)	<0.001
Transport mode (Ref: Land)		
Air	8.27 (2.07 – 33.08)	0.003
Land and air	6.11 (1.09 – 34.15)	0.039
Intermediate facilities (Ref: 0)		
1	2.25 (0.51 – 9.81)	0.28
2 or more	5.54 (0.28 – 108.23)	0.26
Prehospital time	1.00 (0.99 – 1.00)	0.71
Trauma team activation – Yes (Ref: No)	0.74 (0.25 – 2.15)	0.58
Comorbidities – Yes (Ref: No)	1.57 (0.60 – 4.13)	0.36
Weekend (Ref: Weekday)	1.73 (0.74 – 4.03)	0.21
Season (Ref: Fall)		
Winter	0.18 (0.04 – 0.83)	0.028
Spring	0.51 (0.16 – 1.64)	0.26
Summer	0.50 (0.18 – 1.43)	0.20

HRM: Halifax Regional Municipality; GCS: Glasgow Coma Scale.

Characteristic	Organ donors (n = 48)	Non-donors (n = 641)	p-value
Age, mean $\pm$ SD	39.8 $\pm$ 20.5	67.4 $\pm$ 22.4	<0.001
Male, n (%)	34 (70.8)	427 (66.6)	0.55
Residence, n (%)			0.70
Urban	35 (72.9)	441 (68.8)	
Rural	13 (27.1)	194 (30.2)	
Missing	0 (0)	6 (1.0)	
Injury type, n (%)			<0.001
Blunt	36 (75.0)	540 (84.2)	
Drowning/asphyxia	10 (20.8)	34 (5.3)	
Other*	n < 5	67 (10.5)	
Injury location, n (%)			0.99
Inside HRM	17 (35.4)	226 (35.3)	
Outside HRM	28 (58.3)	371 (57.9)	
Missing	n < 5	44 (6.8)	
ISS, mean $\pm$ SD	29.1 $\pm$ 12.5	23.5 $\pm$ 12.0	0.002
AIS Head, mean $\pm$ SD	4.8 $\pm$ 0.4	4.2 $\pm$ 1.1	<0.001
Scene GCS, mean $\pm$ SD	4.2 $\pm$ 2.7	9.8 $\pm$ 5.2	<0.001
Transport mode, n (%)			<0.001
Land ambulance	24 (50.0)	529 (82.5)	
Air†	18 (38.0)	48 (7.5)	
Both land and air	6 (12.0)	28 (4.4)	
Private vehicle	0 (0)	9 (1.4)	
Walk in	0 (0)	6 (0.9)	
Missing	0 (0)	21 (3.3)	
Time to final institution in hours, mean $\pm$ SD	4.8 $\pm$ 6.6	15.9 $\pm$ 90.2	0.39
Trauma team activation, n (%)	23 (47.9)	143 (22.3)	<0.001
Day of the week, n (%)			0.30
Monday - Friday	30 (62.5)	449 (70.0)	
Saturday - Sunday	18 (37.5)	182 (28.4)	
Missing	0 (0)	10 (1.6)	
Season of the year, n (%)			0.61
Spring/Summer	26 (54.2)	319 (49.8)	
Fall/Winter	22 (45.8)	312 (48.7)	
Missing	0 (0)	10 (1.5)	

SD: standard deviation; HRM: Halifax Regional Municipality; ISS: Injury Severity Score; AIS: Abbreviated Injury Scale; GCS: Glasgow Coma Scale. \*Other types included penetrating injuries and burns. †Includes helicopter and fixed-wing aircraft.

- A total of 57 patients were eligible donors (i.e., medically eligible and consent obtained) of which 48 became actual organ donors (40 NDD, 8 DCD).
- The likelihood of OD decreased as patient age increased.
- Patients injured within HRM were over four times more likely to donate compared to those injured outside HRM.
- The odds of OD were over six times higher in patients transported by a combination of land and air ambulance, and over eight times higher in patients transported by air compared to patients transported by land ambulance.

## Discussion

- This is the first Canadian study to examine factors that influence OD specifically in the trauma population.
- The likelihood of OD were higher among trauma patients who were younger, injured within HRM, had a lower GCS at the scene, and were transported by air ambulance.
- Our finding that OD was more likely among patients transported by air ambulance or injured within HRM may reflect a minimization of time from injury to care, as these patients would have received expert care from the EHS LifeFlight team, or been closer in proximity to expertise in trauma resuscitation (i.e., ED, trauma team, ICU) at the QEII HSC.
- Overall, our results demonstrate there are opportunities for improvement in OD rates, and the trauma population appears to be an underutilized source of donors.

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## Disclosure

I **do not** have any involvement with industry that may be perceived to influence the content of this presentation. I **do not** have any barriers to practice change implementation to report.