Dallas Animal Shelter Analysis

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Introduction

Background

- Working with data from DallasOpenData
- 61634 individual observations
- adopted, out_dead, days_in_shelter, chip_status, intake_condition, etc

EDA

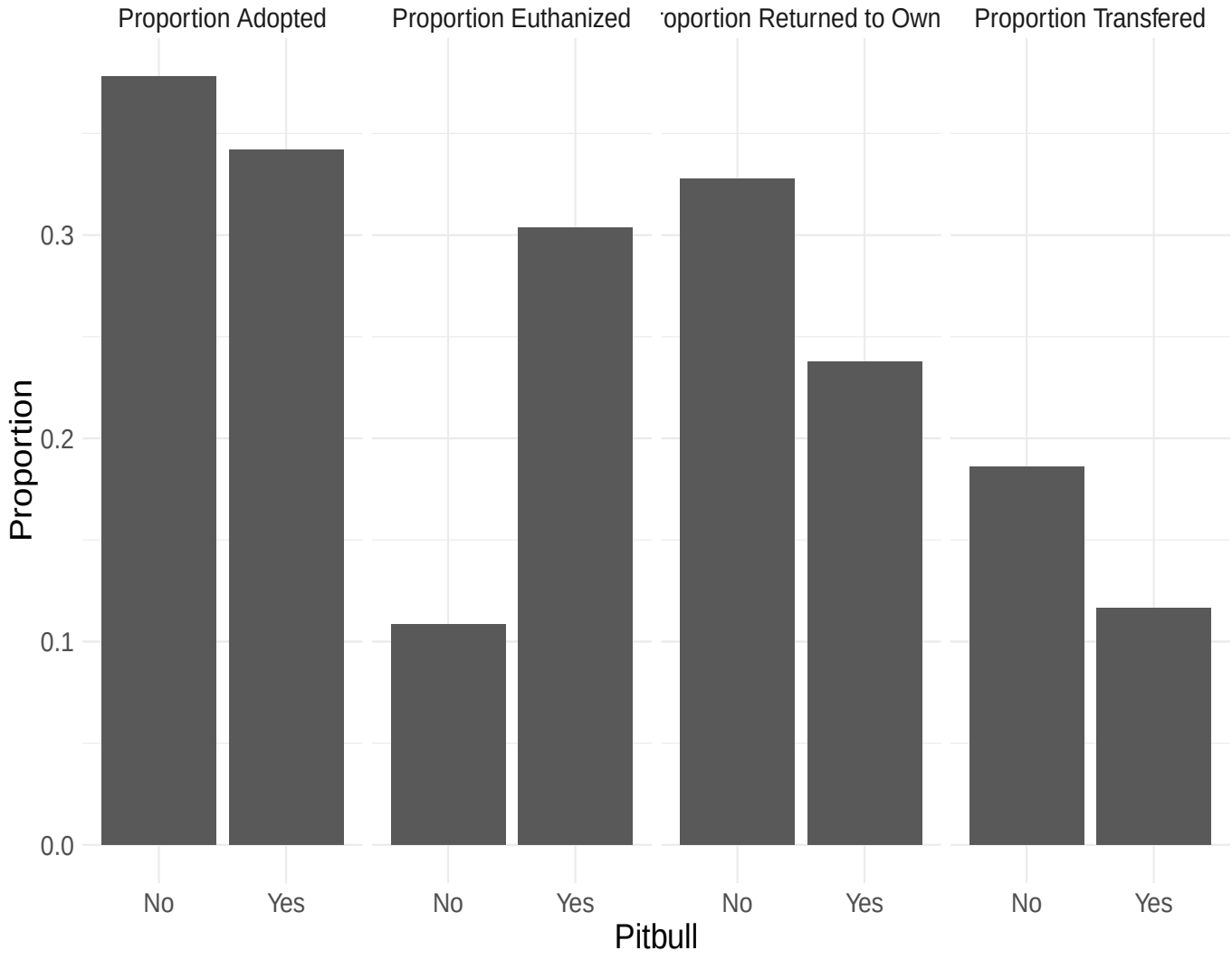

Figure 1: Outcomes for Pitbulls v.s. Non Pitbulls

Quasibinomial Model

Quasibinomial Model

- Modeling the odds of dying at outcome
- Interested in the `pitbull` coefficient
- Need to control for:
  - season
  - chip status
  - intake condition

Quasibinomial Results

Table 1:

	Dependent variable:		
	Proportion of dogs who died		
	(1)	(2)	(3)
Intercept	0.116^{***}	0.111^{***}	0.552^{***}
	(0.069,0.186)	(0.069,0.170)	(0.454,0.669)
Pitbull	3.440^{***}	3.424^{***}	3.489^{***}
	(1.795,6.557)	(1.905,6.130)	(3.022,4.027)
Scannable Chip	0.789	0.799	0.781^{***}
	(0.377,1.566)	(0.412,1.483)	(0.667,0.911)
Summer Outcome	1.461	1.447	1.478^{***}
	(0.725,2.852)	(0.771,2.649)	(1.271,1.718)
Contagious		7.286^{**}	3.975^{***}
		(1.324,44.137)	(2.568,6.168)
Treatable At Intake			0.161^{***}
			(0.133,0.196)
Overdisperson Parameter	139.72	111.46	6.27
Nested F Test		F : 5.1142^{*}	F : 313.62^{***}
Note:			*p<0.1; **p<0.05; ***p<0.01

Survival Analysis

Cox Proportional Hazards

- Used for looking at time till event.
- Follows the general form
  $h(t) = h_0(t) * \exp\{b_1 * x_1 + b_2 * x_2 + ... + b_p * x_p\}$.
- Only assumes that the hazards are proportional.

Cox Proportional Hazard Results

- Our Model: $h(t) = h_0(t) * \exp\{b_1 * \text{Pitbull}\}$

Table 2: b_1 Estimates for Each Strata

	Strata			
	Summer and Chip	Summer and No Chip	Not Summer and Chip	Neither Summer or Chip
pitbull	1.698***	1.717***	1.694***	1.941***
	(1.431,2.016)	(1.553,1.897)	(1.509,1.902)	(1.509,1.902)

Note: *p<0.1; **p<0.05; ***p<0.01

Discussion

Discussion

- Pitbulls have far larger chance of dying in animal shelter than non-pitbuls
  - quasibinomial regression
  - random intercepts approach
  - Cox proportional hazards approach
- What can be done to address this?