

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

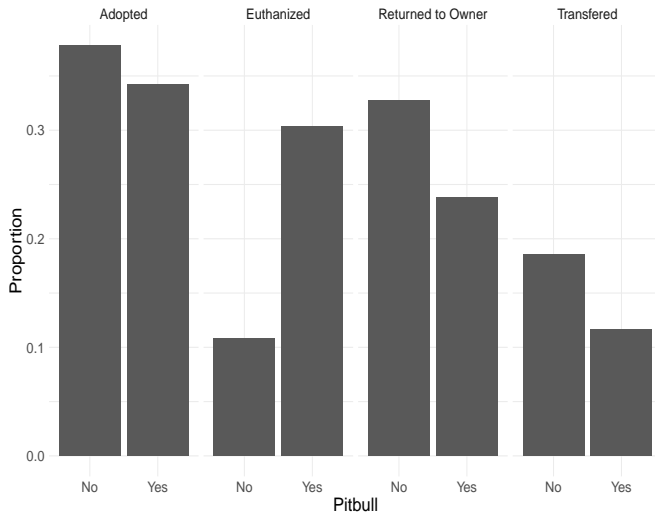


Figure 1: Outcomes for Pitbulls v.s. Non Pitbulls

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:

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

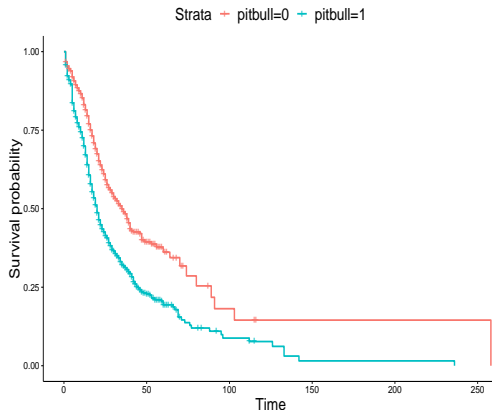
Note:

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Survival Analysis

Cox Proportional Hazards

- Used for modeling event occurrence over time
- Follows the general form
$$h(t) = h_0(t) * \exp\{b_1 * x_1 + b_2 * x_2 + \dots + b_p * x_p\}$$
- 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: $\exp(b_1)$ Estimates for Each Strata

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

Note:

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Discussion

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- Pitbulls have far larger chance of dying in animal shelter than non-pitbulls
 - Quasi-binomial regression
 - Random intercepts approach
 - Cox proportional hazards approach
- What can be done to address this?

Questions?