The background of the slide is a photograph of a hospital room, overlaid with a semi-transparent green filter. In the foreground, a metal gurney with a white mattress is positioned on the left. In the background, there is a hospital bed with white linens and a window with patterned curtains. On the right side of the image, there is a large, semi-transparent sign that reads 'HOSPITAL' at the top, followed by a large white arrow pointing to the right.

Quality-of-care Factors that Differentiate Hospitals in the Northeast vs. Other Regions

BUDT733: Group 3 (Spring 2008)

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Goal

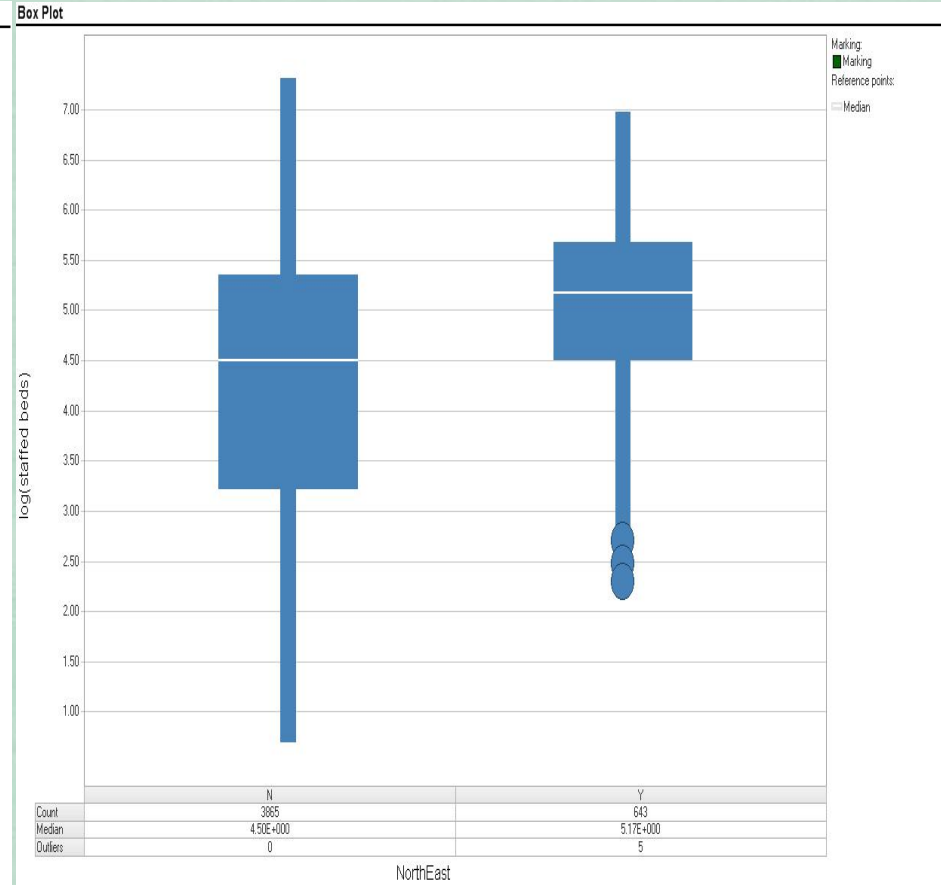
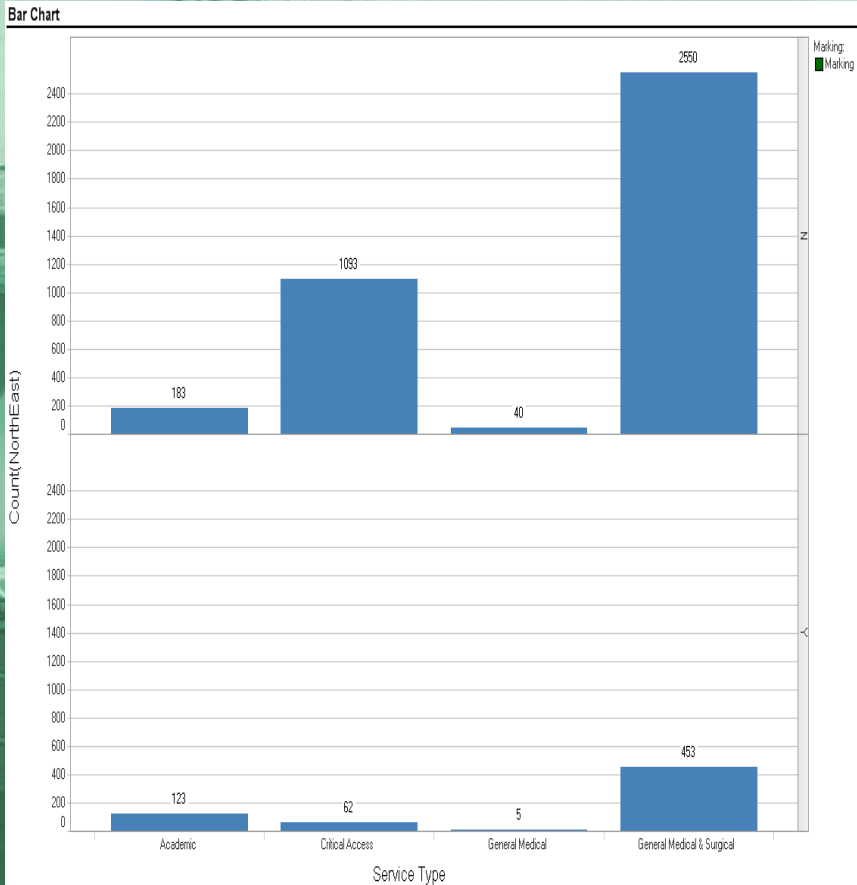
- Explore differences between hospitals located in the Northeast region of the United States vs. the rest of the country.
- Examined 4 types of hospitals:
 - Critical Access
 - General Medical
 - General Medical & Surgical
 - Academic
- Business purpose to see if differences in IT spending, size or other variables create competitive differentiation

Data

- Source: HIMSS Analytics Database
 - comprehensive, web-based database that contains current detailed demographic and IT profile information for 5000+ hospitals nationwide.
- Variables

Initial Set of Variables	Final Set of Variables
Net operating revenue	Hospital type
Total operating expense	Revenue reported
Profitability as measured by operating margin	Staffed beds
Information systems budget as a percentage of overall budget	Log (staffed beds)
Size as measured by staffed beds	EMR use
Adjusted patient days	CPOE use
Computerized Order Entry (CPOE) use	
Electronic Medical Record (EMR) use	
Bar coding for medication	
Wireless LAN	

Exploration



- Staffed beds: Highly correlated with APD, Revenue
- Other factors: EMR, CPOE, Revenue Reporting

Models

- Oversampling: NE to non-NE 1:2 ratio

Logistic Regression

The Regression Model

Input variables	Coefficient	Std. Error	p-value	Odds
Constant term	-7.12299156	0.4419992	0	*
Staffed Beds	0.14228086	0.01225449	0	1.15290046
Revenue(Y/N)_Yes	0.89739084	0.24928385	0.00031837	2.4531939
CPOE(Y/N)_Yes	0.69752812	0.3088156	0.02390077	2.00878119

Training Data scoring - Summary Report

Cut off Prob.Val. for Success (Updatable)	0.5
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Classification Confusion Matrix		
Actual Class	Predicted Class	
	Y	N
Y	562	76
N	1	1294

Error Report			
Class	# Cases	# Errors	% Error
Y	638	76	11.91
N	1295	1	0.08
Overall	1933	77	3.98

Discriminant Analysis

Classification Function

Variables	Classification Function		
	Y	N	
Constant	-5.11835098	-4.06834269	
Service Type_Critical Access	3.29624462	6.18775129	-2.89150667
Std Log(staffed beds)	4.4949193	-0.54337823	5.03829753
Revenue(Y/N)_Yes	2.98743773	1.80696476	1.18047297
CPOE(Y/N)_Yes	1.03031409	0.85336459	0.1769495
EMR(Y/N)_Yes	1.62822962	1.40668046	0.22154916

Training Data scoring - Summary Report

Cut off Prob.Val. for Success (Updatable)	0.5
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Classification Confusion Matrix		
Actual Class	Predicted Class	
	Y	N
Y	559	79
N	1	1294

Error Report			
Class	# Cases	# Errors	% Error
Y	638	79	12.38
N	1295	1	0.08
Overall	1933	80	4.14

Conclusions

- Northeast Hospitals
 - Larger
 - More investment in EMR and CPOE technologies
 - Less critical access hospitals (more rural)
- Implications
 - Technology companies may want to target this area
 - Companies offering technology support may want to target this area
 - Physicians/administrators may prefer to work in these environments
 - Patients may prefer northeast hospitals with more resources – better quality of care?

Questions?

