



Jan 2004 - Sep 2007
Inpatients Data Analysis



Study Summary

The Diversity and Inclusion department took seriously the IOM 2002 quality healthcare disparity study which indicated higher mortality among minorities less likely to receive needed services, including clinically necessary procedures. Therefore Diversity and Inclusion requested that Clinical Process Improvement, Center for Health Futures, and Strategic Information departments perform analyses to explore the impact of race, ethnicity, language and insurance group on hospital outcomes such as length of stay, variable costs, readmissions and mortality.

Factors such as age, gender, severity and admission source, were used as control variables. Control variables are extraneous factors that are kept constant (controlled for) so as to minimize their effects on the outcome. Data on 307,803 Florida Hospital inpatients between January 2004 and September 2007 were used for the analyses.





The Model: Do Insurance Groups (Ins Grp), Race, Ethnicity, and Language Predict Health Outcomes?

Predictor Variables

- ✓ Age
- ✓ Gender
- ✓ Race
- ✓ Ethnicity
- ✓ Language
- ✓ Admission Source
- ✓ Insurance Group
- ✓ Severity

Predicting

- ✓ Length of Stay Adjusted
- ✓ Mortality
- ✓ Readmissions (7 & 30; same Dx & any Dx)
- ✓ Length of Stay
- ✓ Variable Costs



3



Sample: DRG 127 - Heart Failure & Shock

Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	7690			147
English Language as Primary	6904	90%	130	1.88%
Non-English Language as Primary	745	10%	13	1.74%
Hispanic Ethnicity	1149	15%	17	1.48%
Non-Hispanic Ethnicity	6541	85%	130	1.99%
Medicaid and Self-pay	780	10%	8	1.03%
Medicare and Others	6910	90%	139	2.01%
Black/African American	1316	17%	16	1.22%
White	5032	65%	111	2.21%



4



Sample: DRG 143 - Chest Pain

Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	13315			4
English Language as Primary	11554	87%	4	0.03%
Non-English Language as Primary	1444	11%	0	0.00%
Hispanic Ethnicity	3450	26%	2	0.06%
Non-Hispanic Ethnicity	9865	74%	2	0.02%
Medicaid and Self-pay	3898	29%	0	0.00%
Medicare and Others	9417	71%	4	0.04%
Black/African American	1909	14%	0	0.00%
White	7440	56%	2	0.03%



5

The skill to heal. The Spirit to care.



Sample: DRG 316 – Renal Failure

Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	5589			170
English Language as Primary	5050	90%	155	3.07%
Non-English Language as Primary	511	9%	15	2.94%
Hispanic Ethnicity	939	17%	15	1.60%
Non-Hispanic Ethnicity	4650	83%	155	3.33%
Medicaid and Self-pay	522	9%	8	1.53%
Medicare and Others	5067	91%	162	3.20%
Black/African American	992	18%	12	1.21%
White	3483	62%	140	4.02%



6

The skill to heal. The Spirit to care.



Sample: Bloodstream Infection

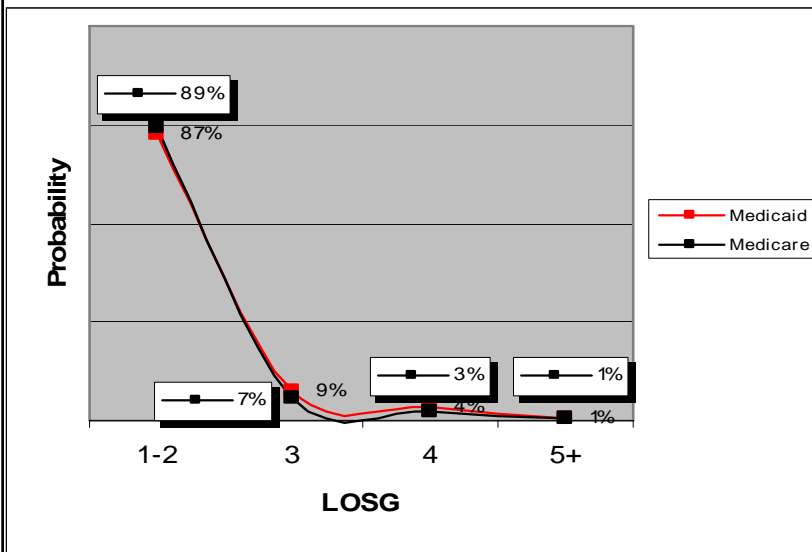
Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	417			75
English Language as Primary	390	94%	72	18.46%
Non-English Language as Primary	25	6%	2	8.00%
Hispanic Ethnicity	60	14%	7	11.67%
Non-Hispanic Ethnicity	357	86%	68	19.05%
Medicaid and Self-pay	55	13%	7	12.73%
Medicare and Others	362	87%	68	18.78%
Black/African American	54	13%	7	12.96%
White	282	68%	58	20.57%



7



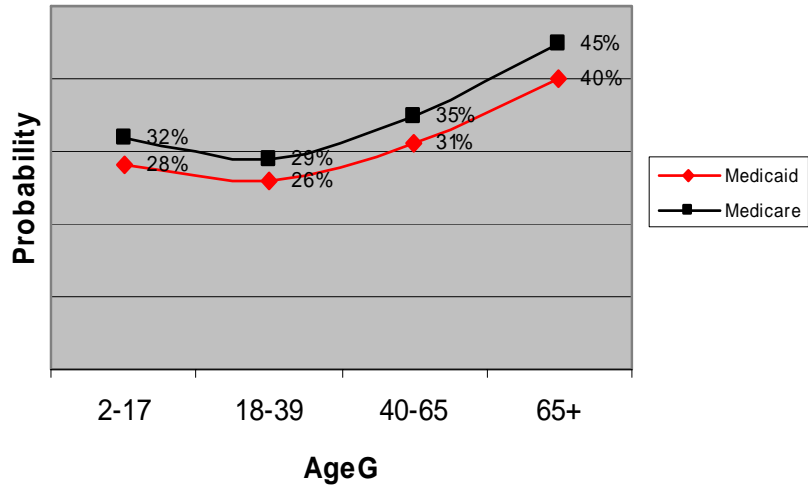
Ins Grp predicts LOSg for Chest Pain (DRG 143)



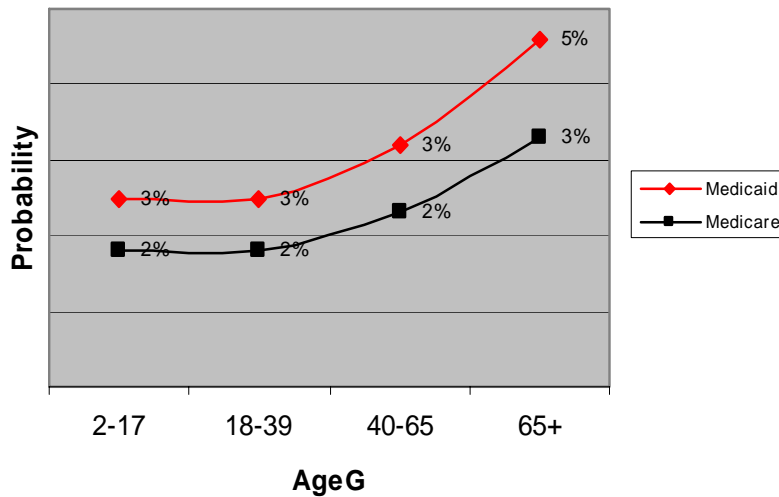
8



Ins Grp predicts LOSa* for Chest Pain (DRG 143)

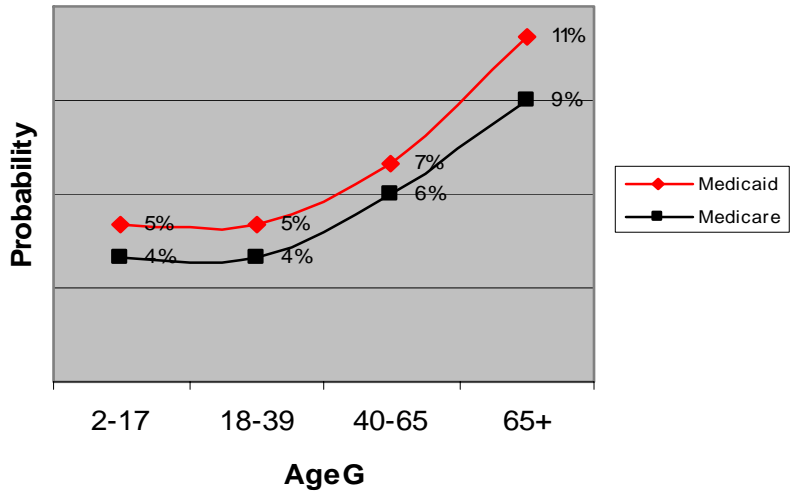


Ins Grp predicts Read7 for Chest Pain (DRG 143)





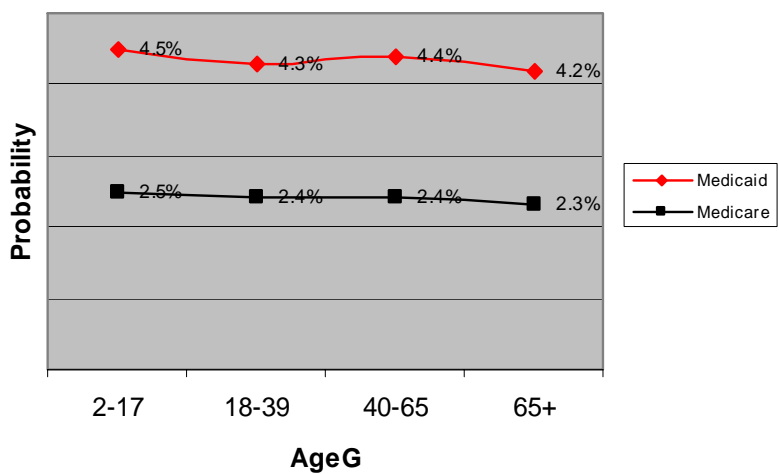
Ins Grp predicts Read30 for Chest Pain (DRG 143)



11



Ins Grp predicts Reads7 for Heart Failure & Shock (DRG 127)



12



Observations on Insurance Status (5 differences)

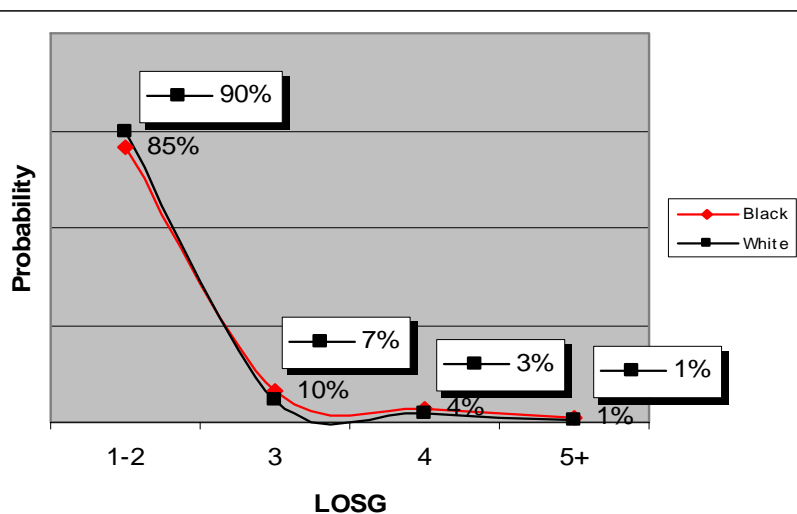
- ✍ Medicaid and self-pay patients tend to have a
 - mixed probability in LOSg for Chest Pain.
 - lower probability in LOSa-a lower chance of having LOS greater than GMLOS for Chest Pain.
 - higher probability of re-admissions for Chest Pain and Heart Failure & Shock.



13



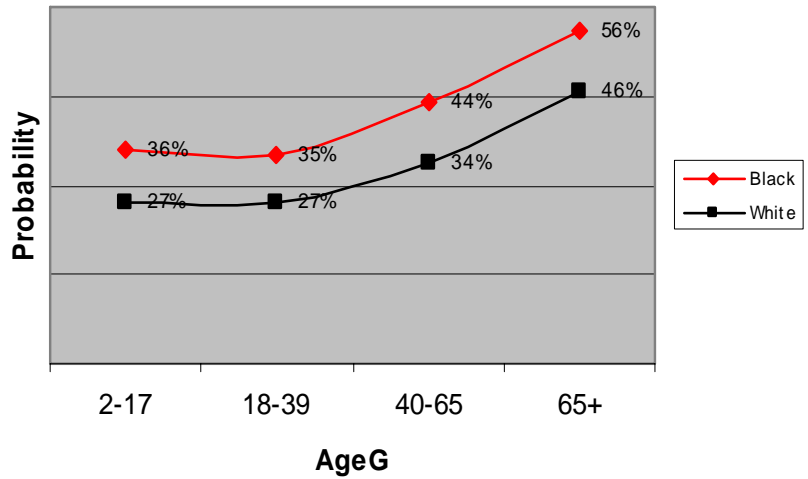
Race predicts LOSg for Chest Pain (DRG 143)



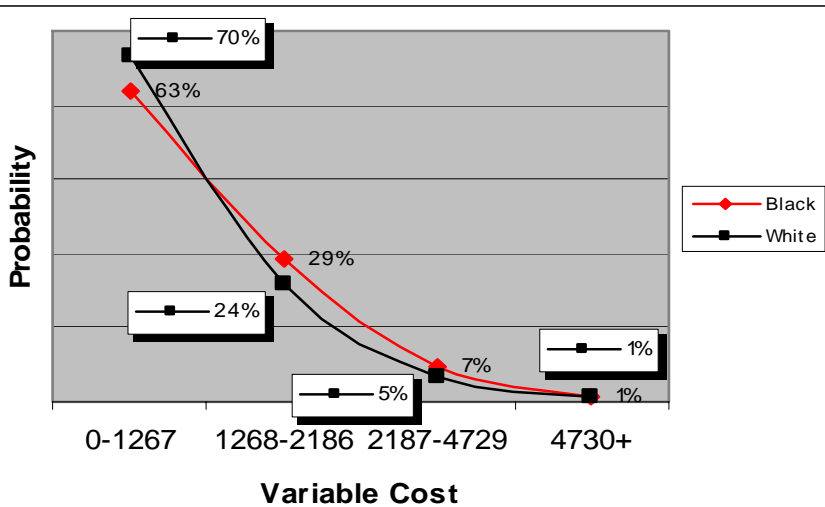
14



Race predicts LOSa* for Chest Pain (DRG 143)

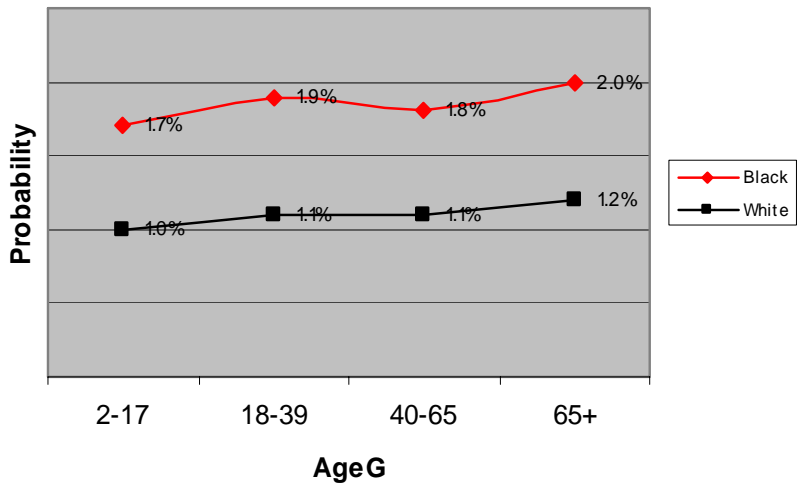


Race predicts Vcost for Chest Pain (DRG 143)

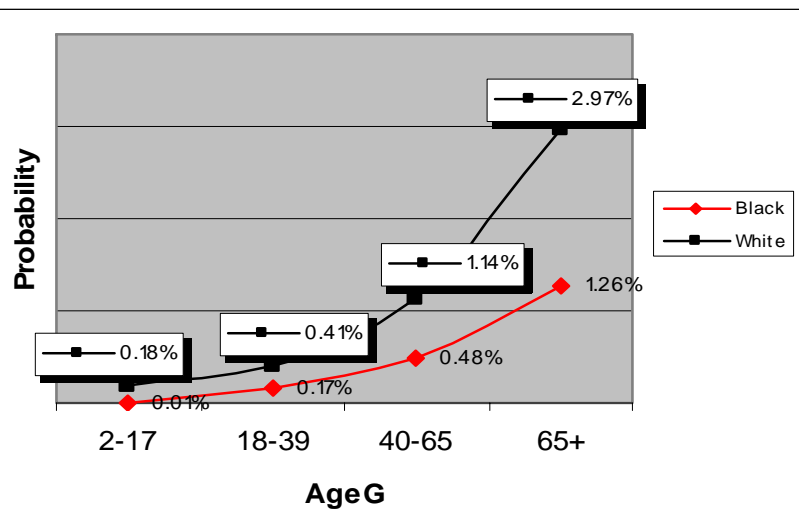




Race predicts Reads7 for Renal Failure (DRG 316)



Race predicts Mortality for Renal Failure (DRG 316)





Observations on Insurance Status (5 differences)

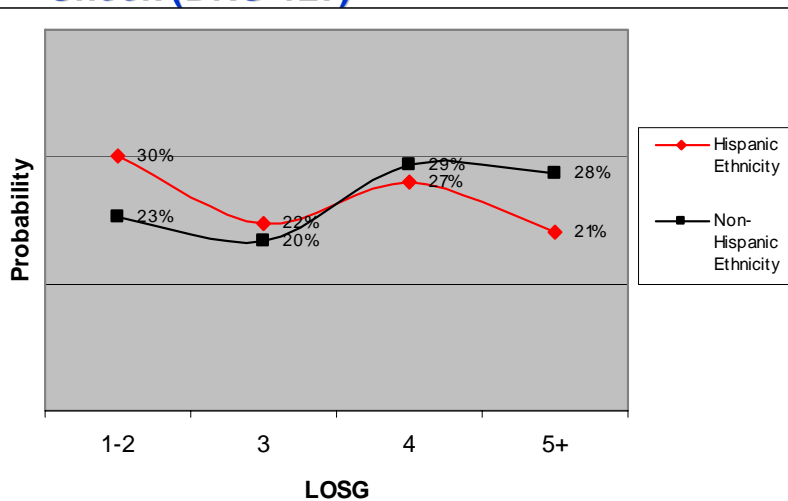
- 👁️ Black patients tend to have a
 - lower probability in shorter LOSg and higher probability in longer LOSg for Chest Pain.
 - higher probability in LOSa-a larger chance of having LOS greater than GMLOS for Chest Pain.
 - lower probability to have lower variable cost and higher probability to have higher variable cost for Chest Pain.
 - higher probability of re-admission within 7 days for the same DRG for Renal Failure.
 - lower mortality rate for Renal Failure.



19



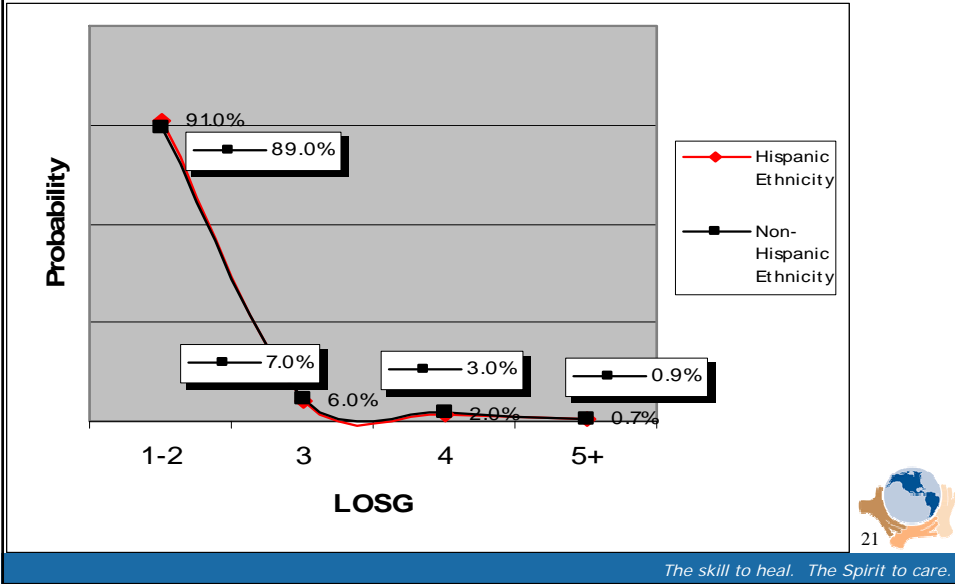
Ethnicity predicts LOSg for Heart Failure & Shock (DRG 127)



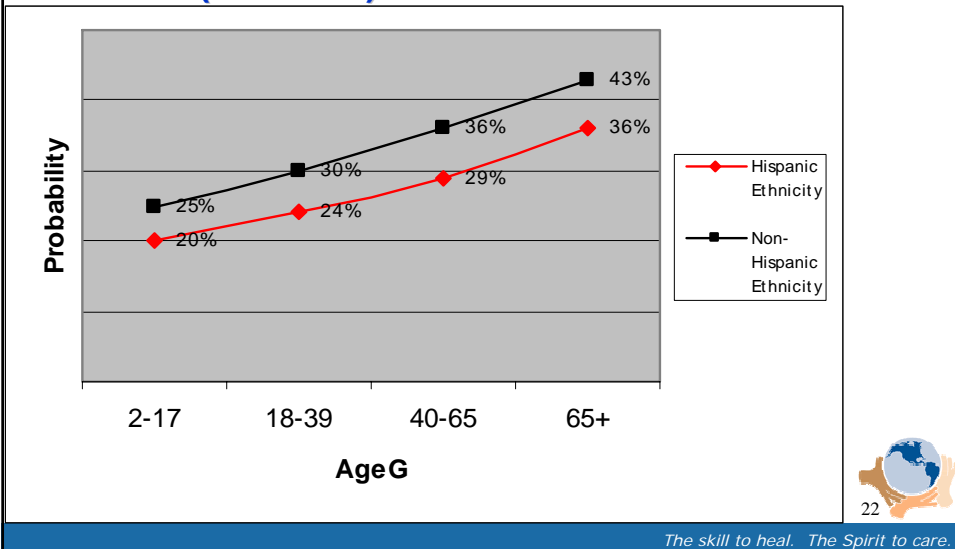
20



Ethnicity predicts LOSg for Chest Pain (DRG 143)

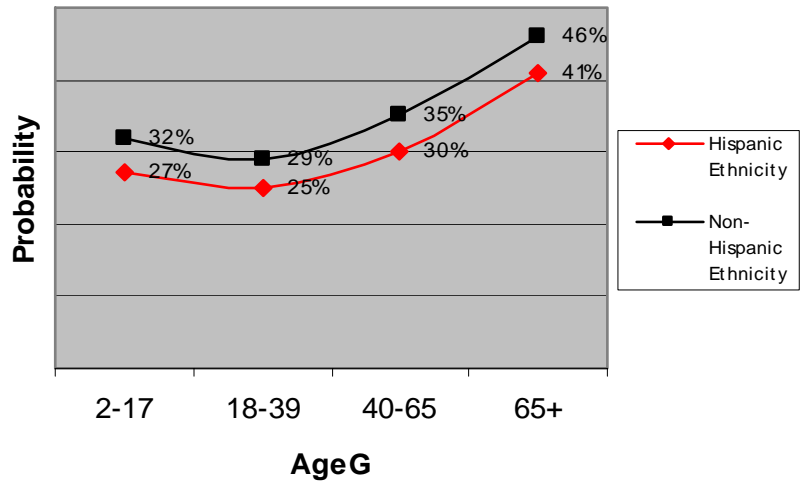


Ethnicity predicts LOSa* for Heart Failure & Shock (DRG 127)

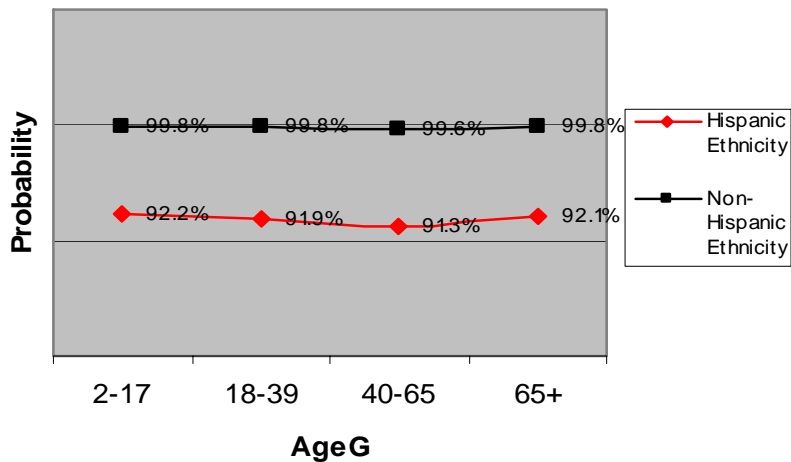




Ethnicity predicts LOSa* for Chest Pain (DRG 143)

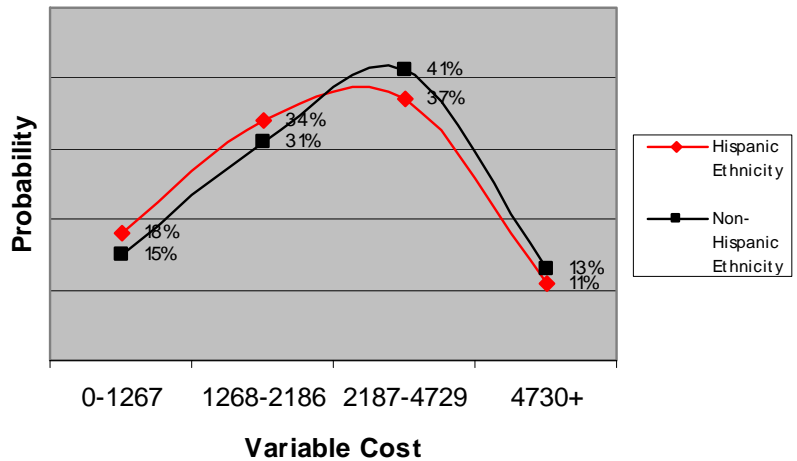


Ethnicity predicts LOSa* for Bloodstream Infection





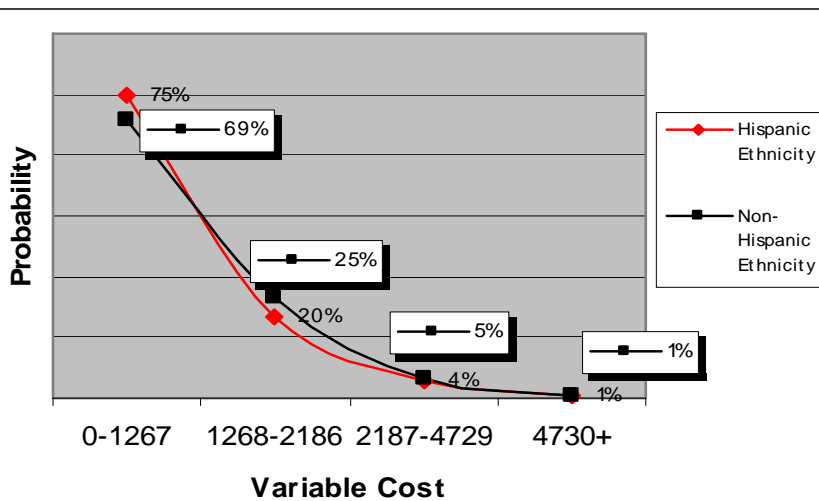
Ethnicity predicts Vcost for Heart Failure & Shock (DRG 127)



25



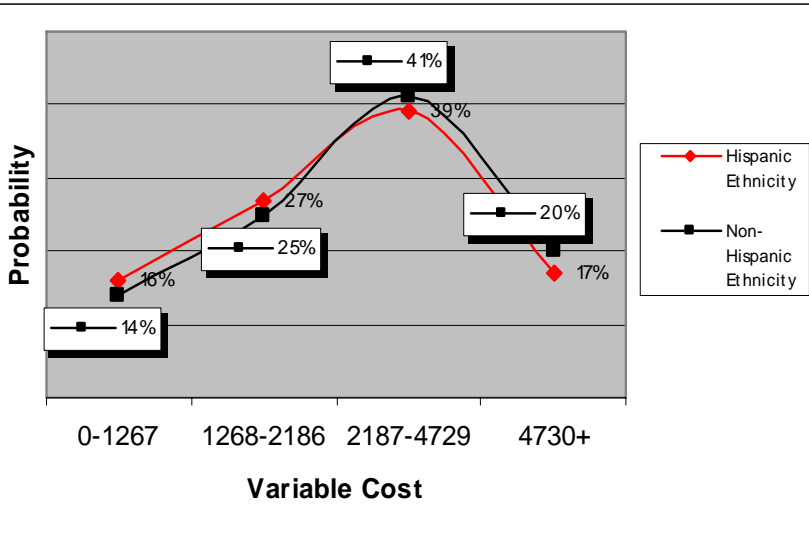
Ethnicity predicts Vcost for Chest Pain (DRG 143)



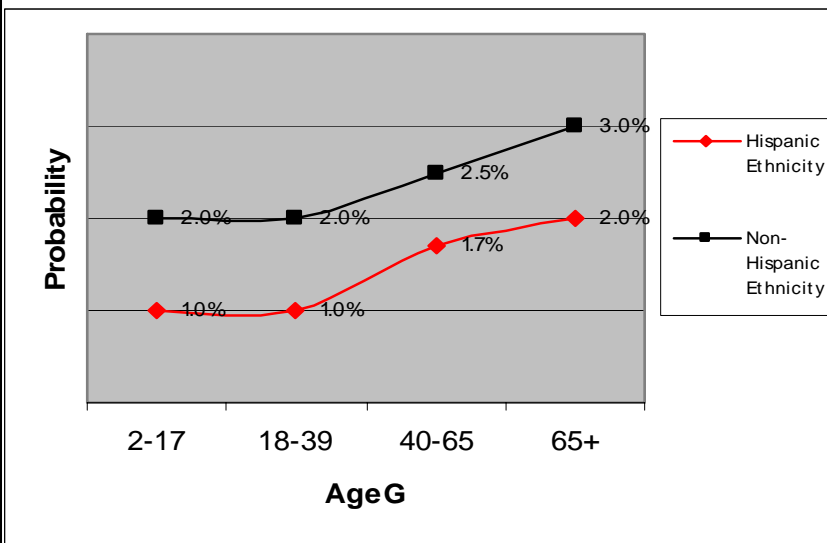
26



Ethnicity predicts Vcost for Renal Failure (DRG 316)

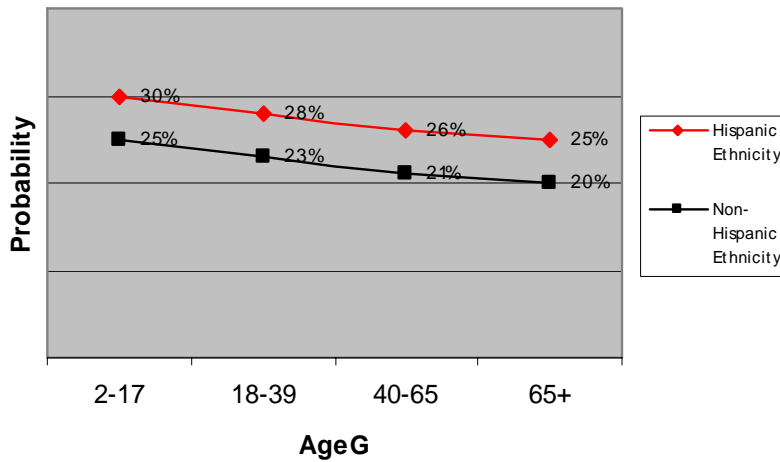


Ethnicity predicts Read7 for Chest Pain (DRG 143)





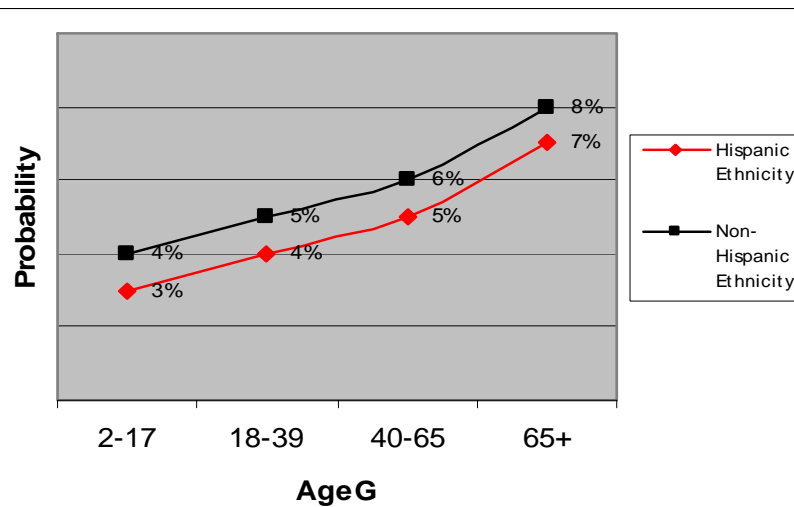
Ethnicity predicts Read30 for Heart Failure & Shock (DRG 127)



29



Ethnicity predicts Read30 for Chest Pain (DRG 143)



30



Observations on Insurance Status (11 differences)

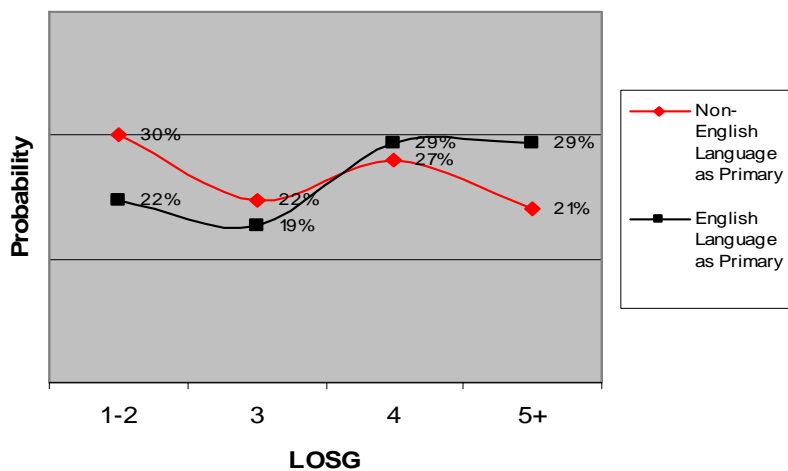
- ✍ Patients with Hispanic ethnicity tend to have a
- higher probability in shorter LOSg and lower probability in longer LOSg for Heart Failure & Shock and Chest Pain.
 - lower probability in LOSa-a smaller chance of having LOS greater than GMLOS for Heart Failure & Shock, Chest Pain, and Bloodstream Infection.
 - higher probability to have lower variable cost and lower probability to have higher variable cost for Heart Failure & Shock, Chest Pain, and Renal Failure.
 - lower probability of re-admission for Chest Pain and higher probability of re-admission for Heart Failure & Shock.



31



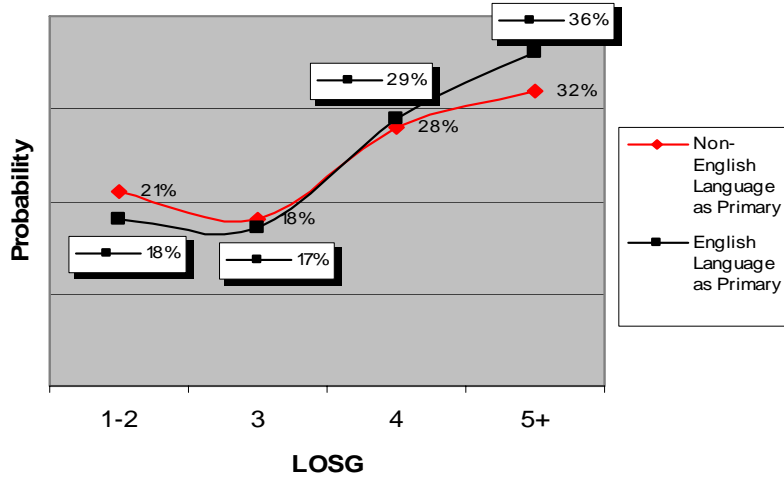
Language predicts LOSg for Heart Failure & Shock (DRG 127)



32



Language predicts LOSg for Renal Failure (DRG 316)

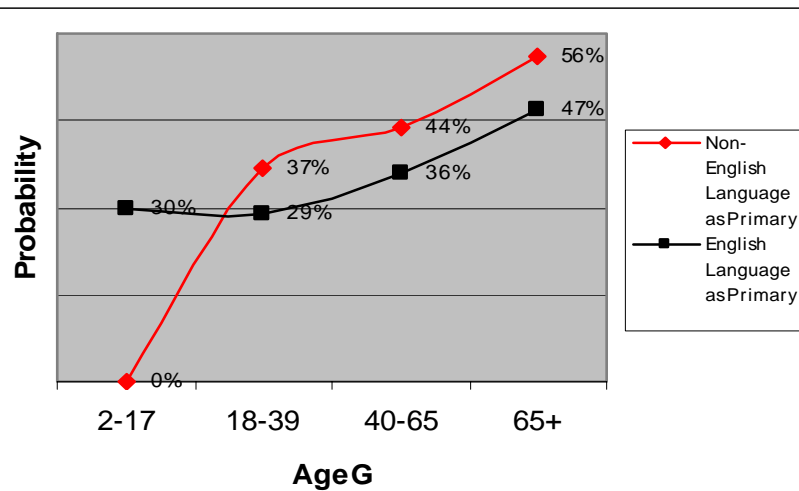


33

The skill to heal. The Spirit to care.



Language predicts LOSa* for Chest Pain (DRG 143)

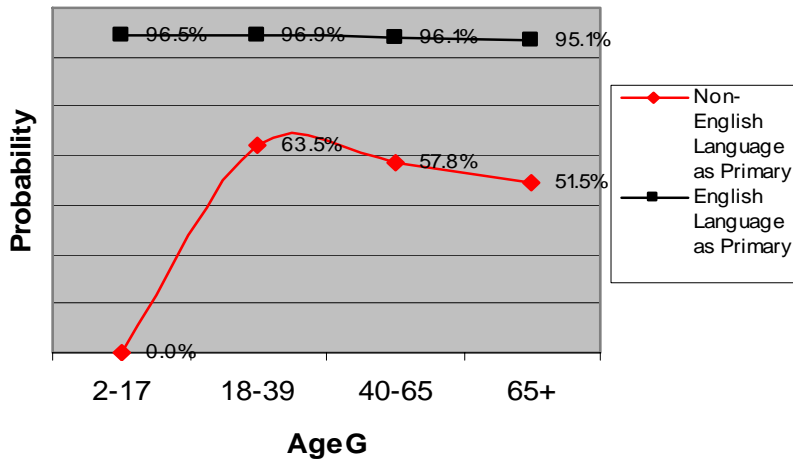


34

The skill to heal. The Spirit to care.



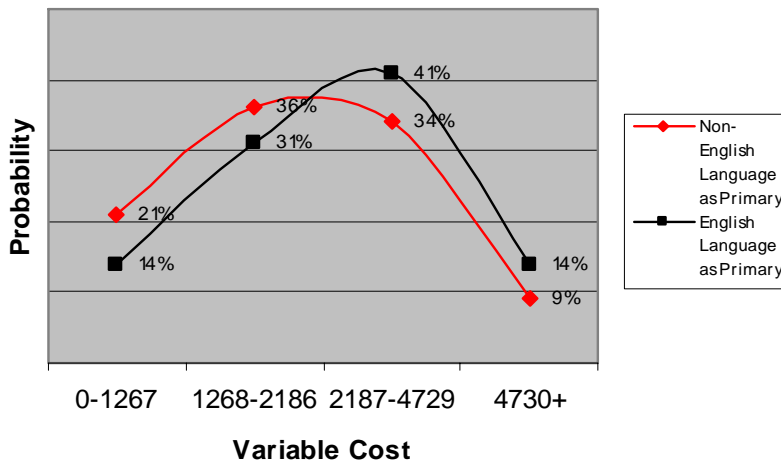
Language predicts LOSa* for Bloodstream Infection



35



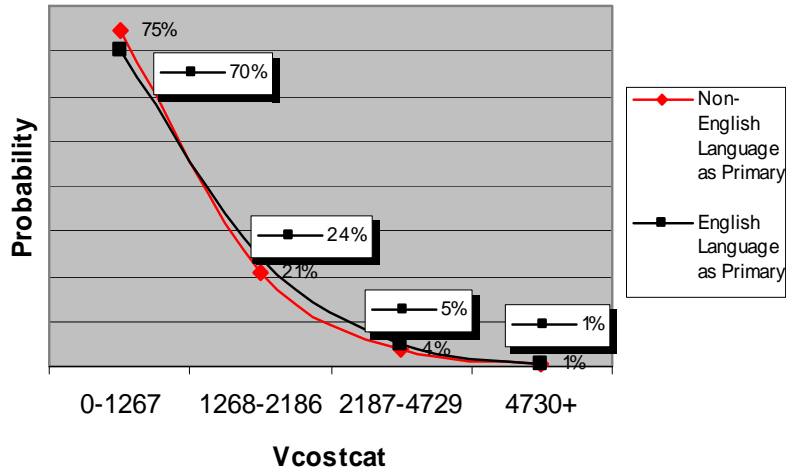
Language predicts Vcost for Heart Failure & Shock (DRG 127)



36



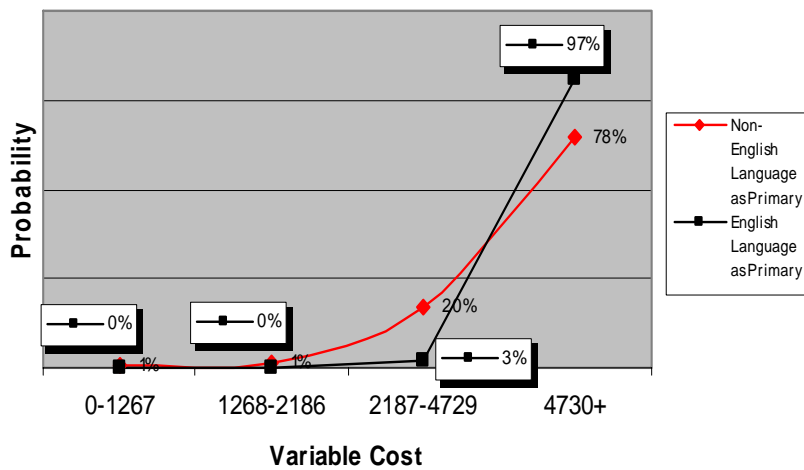
Language predicts Vcost for Chest Pain (DRG 143)



37



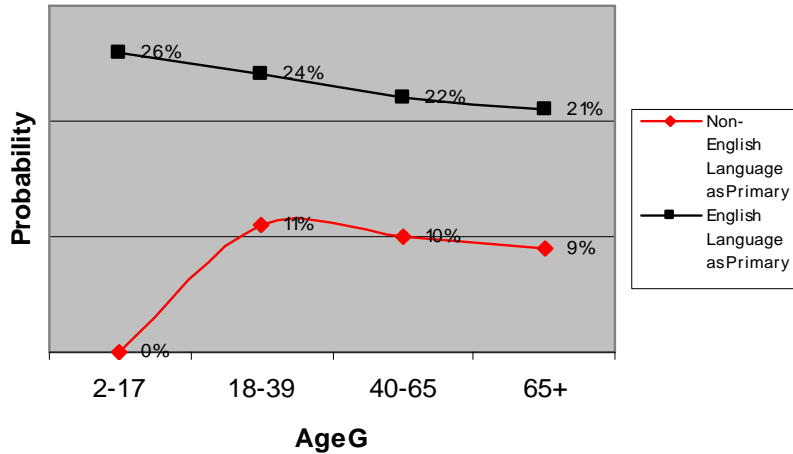
Language predicts Vcost in Bloodstream Infection



38



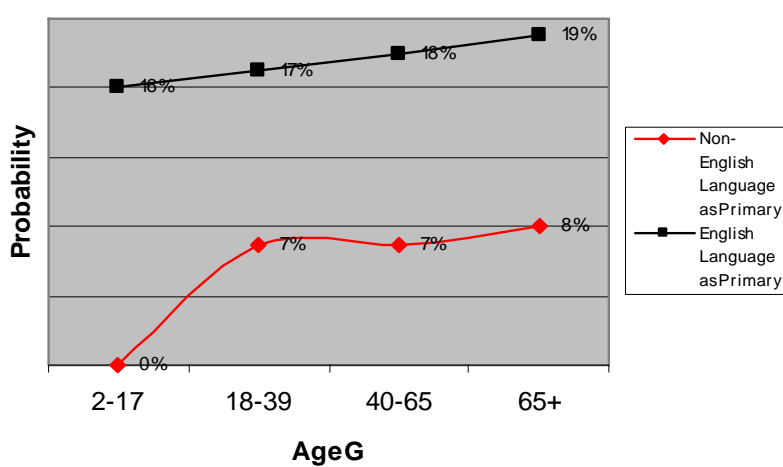
Language predicts Read30 for Heart Failure & Shock (DRG 127)



39



Language predicts Read30 for Renal Failure (DRG 316)



40



Observations on Insurance Status (9 differences)

- ✍ Patients with Non-English as their primary languages tend to have a
 - higher probability in shorter LOSg and lower probability in longer LOSg for Heart Failure & Shock and Renal Failure.
 - higher probability in LOSa-a larger chance of having LOS greater than GMLOS for Chest Pain and vice versa for Bloodstream Infection.
 - higher probability to have lower variable cost and lower probability to have higher variable cost for Heart Failure & Shock, Chest Pain, and Bloodstream Infection.
 - lower probability of re-admission for Heart Failure & Shock and Renal Failure



41



Research Team

- **Richard Bogue, PhD**
 - Senior Research Fellow and Director, Center for Health Futures
- **Lauren Josephs, PhD, LMHC, NCC**
 - Program Manager, Health Disparities Research and Education
- **Steve Yost**
 - Manager, Executive Computing Facility
- **David Yi**
 - Data Analyst, Executive Computing Facility



42



Jan 2004 - Sep 2007
Inpatients Data Analysis



Study Summary

The Diversity and Inclusion department took seriously the IOM 2002 quality healthcare disparity study which indicated higher mortality among minorities less likely to receive needed services, including clinically necessary procedures. Therefore Diversity and Inclusion requested that Clinical Process Improvement, Center for Health Futures, and Strategic Information departments perform analyses to explore the impact of race, ethnicity, language and insurance group on hospital outcomes such as length of stay, variable costs, readmissions and mortality.

Factors such as age, gender, severity and admission source, were used as control variables. Control variables are extraneous factors that are kept constant (controlled for) so as to minimize their effects on the outcome. Data on 307,803 Florida Hospital inpatients between January 2004 and September 2007 were used for the analyses.



2



The Model: Do Insurance Groups (Ins Grp), Race, Ethnicity, and Language Predict Health Outcomes?

Predictor Variables

- ✓ Age
- ✓ Gender
- ✓ Race
- ✓ Ethnicity
- ✓ Language
- ✓ Admission Source
- ✓ Insurance Group
- ✓ Severity

Predicting

- ✓ Length of Stay Adjusted
- ✓ Mortality
- ✓ Readmissions (7 & 30; same Dx & any Dx)
- ✓ Length of Stay
- ✓ Variable Costs



3



Sample: DRG 127 - Heart Failure & Shock

Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	7690			147
English Language as Primary	6904	90%	130	1.88%
Non-English Language as Primary	745	10%	13	1.74%
Hispanic Ethnicity	1149	15%	17	1.48%
Non-Hispanic Ethnicity	6541	85%	130	1.99%
Medicaid and Self-pay	780	10%	8	1.03%
Medicare and Others	6910	90%	139	2.01%
Black/African American	1316	17%	16	1.22%
White	5032	65%	111	2.21%



4



Sample: DRG 143 - Chest Pain

Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	13315			4
English Language as Primary	11554	87%	4	0.03%
Non-English Language as Primary	1444	11%	0	0.00%
Hispanic Ethnicity	3450	26%	2	0.06%
Non-Hispanic Ethnicity	9865	74%	2	0.02%
Medicaid and Self-pay	3898	29%	0	0.00%
Medicare and Others	9417	71%	4	0.04%
Black/African American	1909	14%	0	0.00%
White	7440	56%	2	0.03%



5

The skill to heal. The Spirit to care.



Sample: DRG 316 – Renal Failure

Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	5589			170
English Language as Primary	5050	90%	155	3.07%
Non-English Language as Primary	511	9%	15	2.94%
Hispanic Ethnicity	939	17%	15	1.60%
Non-Hispanic Ethnicity	4650	83%	155	3.33%
Medicaid and Self-pay	522	9%	8	1.53%
Medicare and Others	5067	91%	162	3.20%
Black/African American	992	18%	12	1.21%
White	3483	62%	140	4.02%



6

The skill to heal. The Spirit to care.

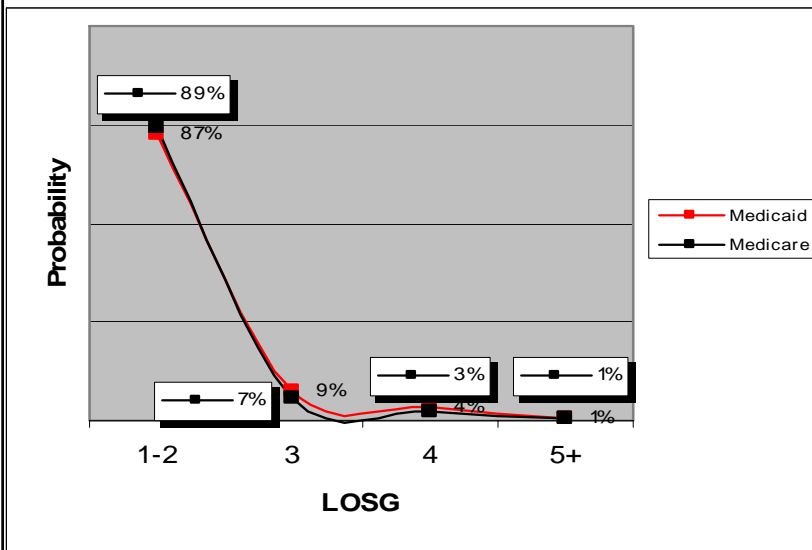


Sample: Bloodstream Infection

Total Observations: 307,803; all with age above 2 and has complete information for this study.	N	%	Expired	Mortality Rate
	417			75
English Language as Primary	390	94%	72	18.46%
Non-English Language as Primary	25	6%	2	8.00%
Hispanic Ethnicity	60	14%	7	11.67%
Non-Hispanic Ethnicity	357	86%	68	19.05%
Medicaid and Self-pay	55	13%	7	12.73%
Medicare and Others	362	87%	68	18.78%
Black/African American	54	13%	7	12.96%
White	282	68%	58	20.57%

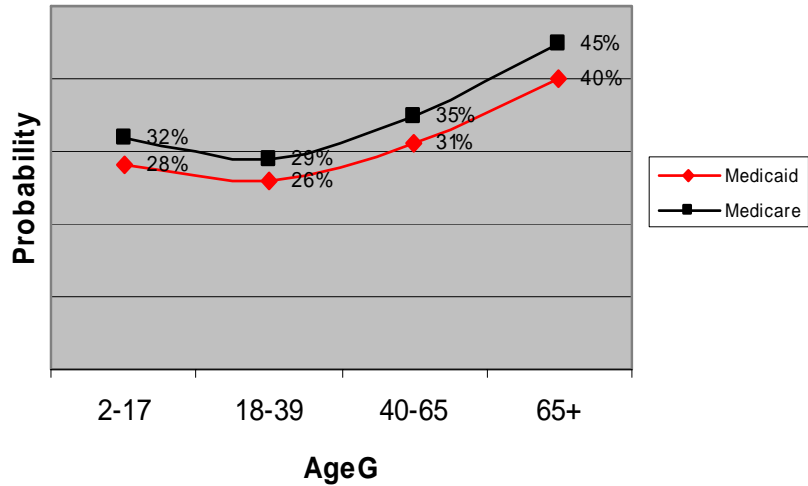


Ins Grp predicts LOSg for Chest Pain (DRG 143)

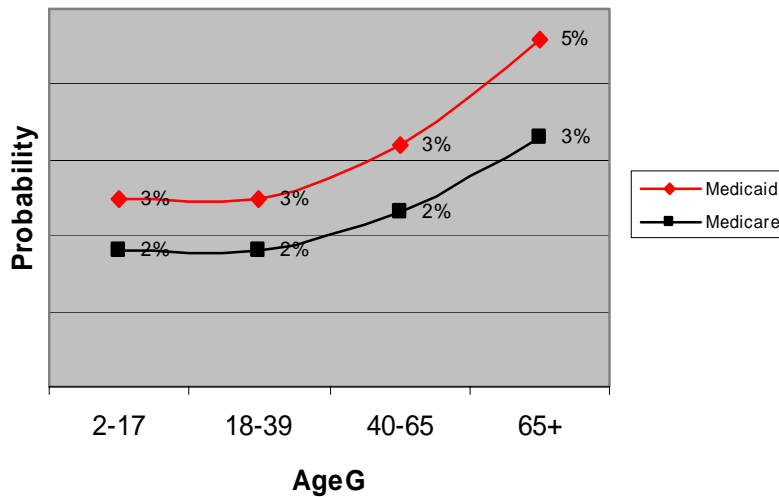




Ins Grp predicts LOSa* for Chest Pain (DRG 143)

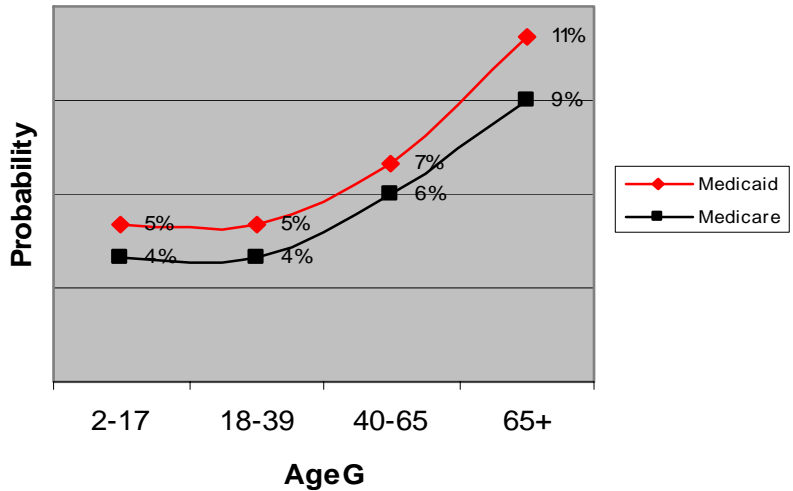


Ins Grp predicts Read7 for Chest Pain (DRG 143)





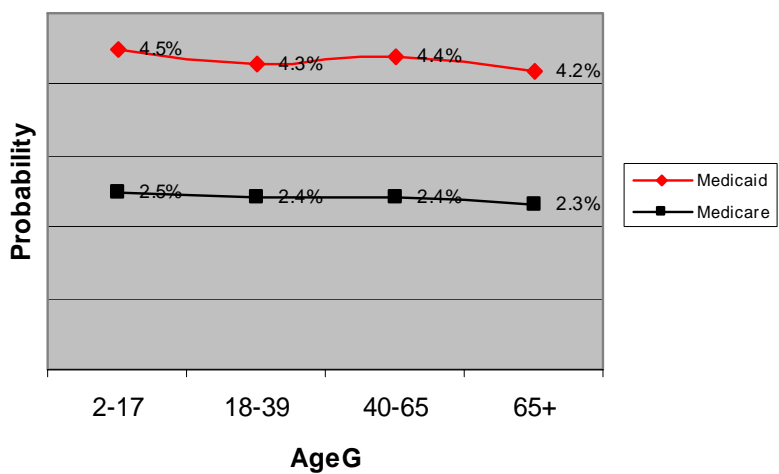
Ins Grp predicts Read30 for Chest Pain (DRG 143)



11



Ins Grp predicts Reads7 for Heart Failure & Shock (DRG 127)



12



Observations on Insurance Status (5 differences)

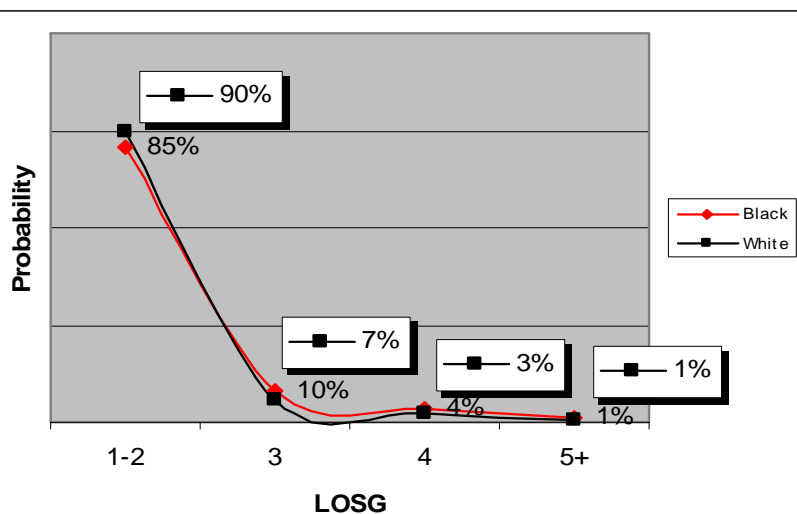
- ✍ Medicaid and self-pay patients tend to have a
 - mixed probability in LOSg for Chest Pain.
 - lower probability in LOSa-a lower chance of having LOS greater than GMLOS for Chest Pain.
 - higher probability of re-admissions for Chest Pain and Heart Failure & Shock.



13



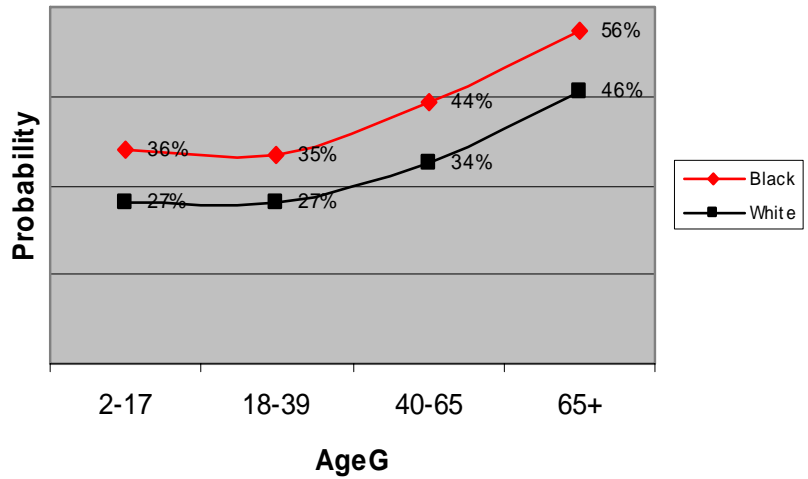
Race predicts LOSg for Chest Pain (DRG 143)



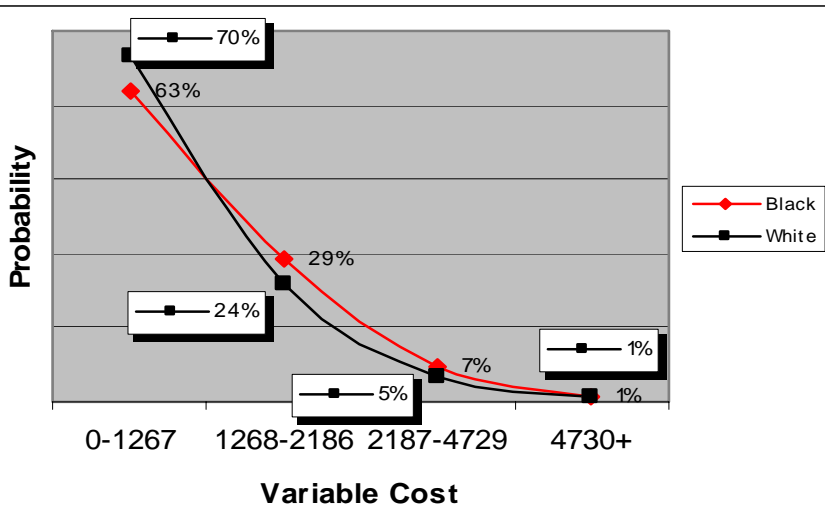
14



Race predicts LOSa* for Chest Pain (DRG 143)

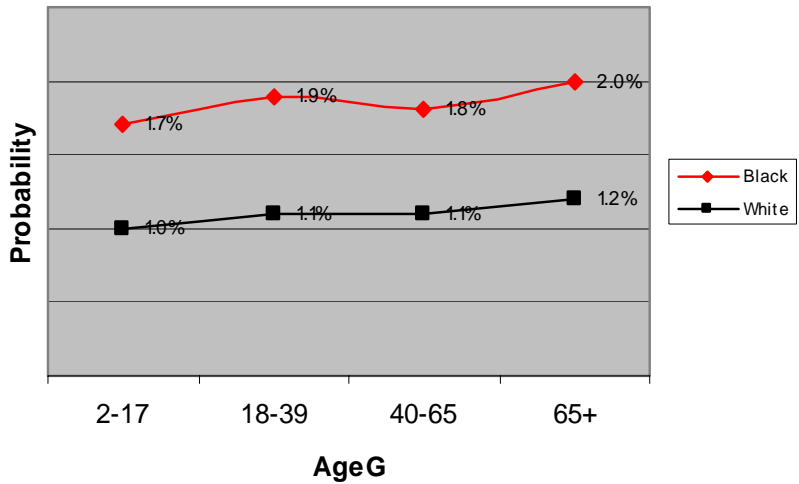


Race predicts Vcost for Chest Pain (DRG 143)

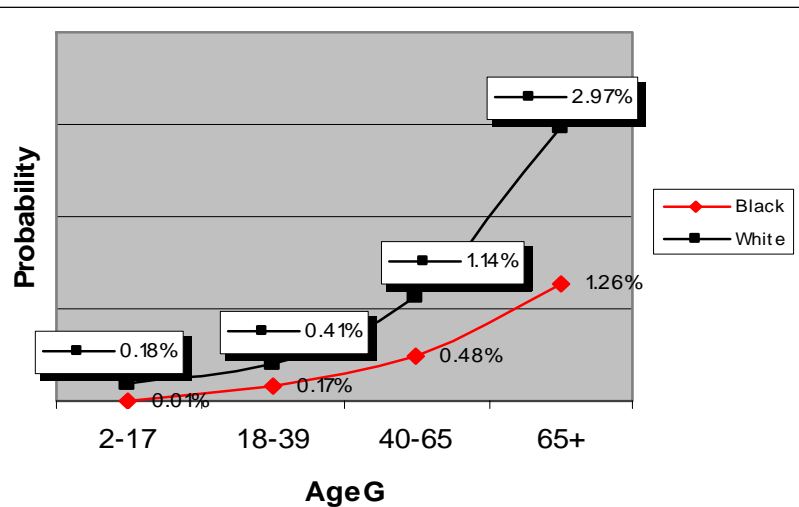




Race predicts Reads7 for Renal Failure (DRG 316)



Race predicts Mortality for Renal Failure (DRG 316)





Observations on Insurance Status (5 differences)

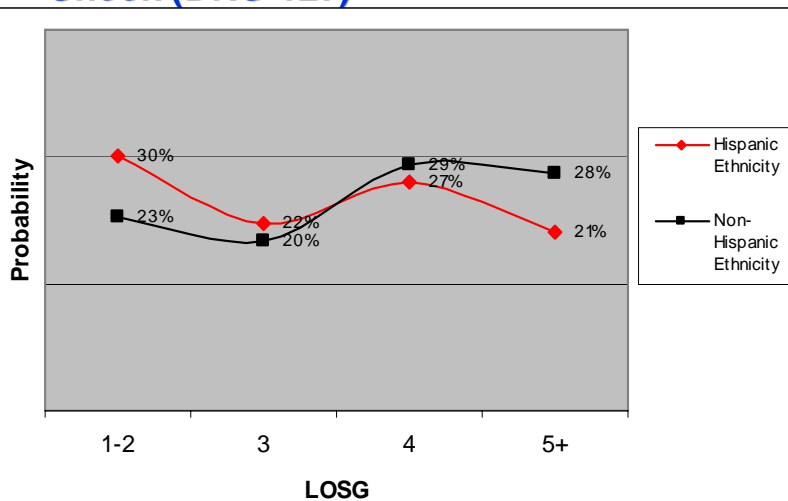
- 👁️ Black patients tend to have a
 - lower probability in shorter LOSg and higher probability in longer LOSg for Chest Pain.
 - higher probability in LOSa-a larger chance of having LOS greater than GMLOS for Chest Pain.
 - lower probability to have lower variable cost and higher probability to have higher variable cost for Chest Pain.
 - higher probability of re-admission within 7 days for the same DRG for Renal Failure.
 - lower mortality rate for Renal Failure.



19



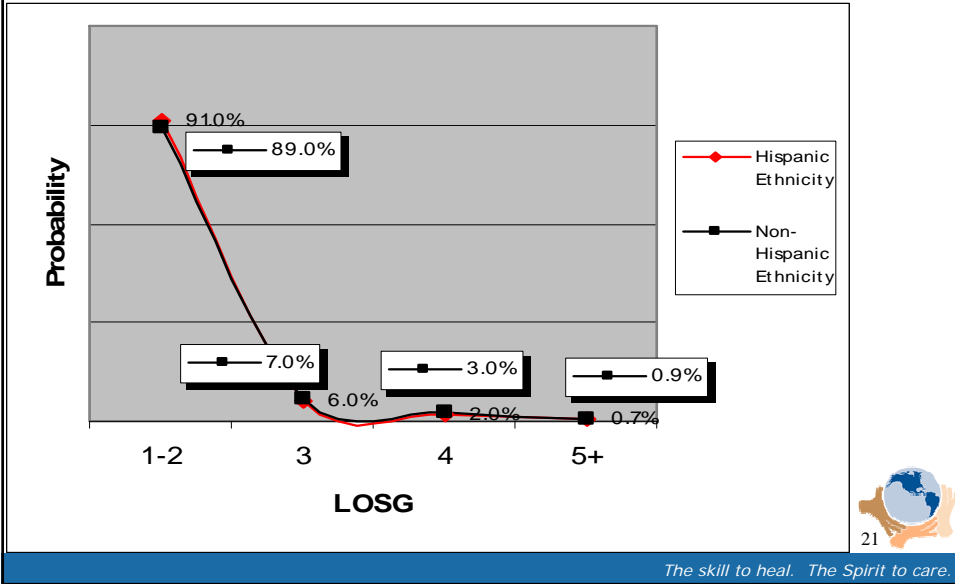
Ethnicity predicts LOSg for Heart Failure & Shock (DRG 127)



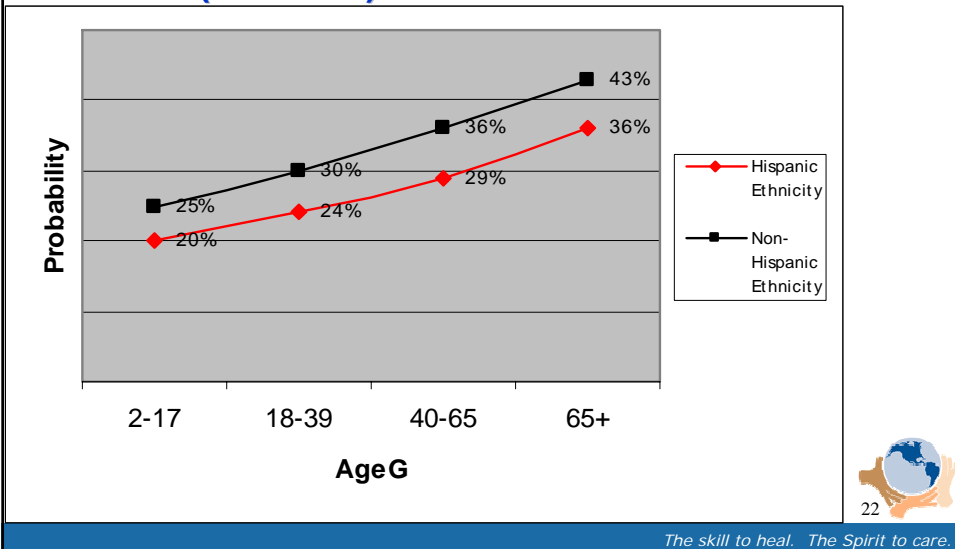
20



Ethnicity predicts LOSg for Chest Pain (DRG 143)

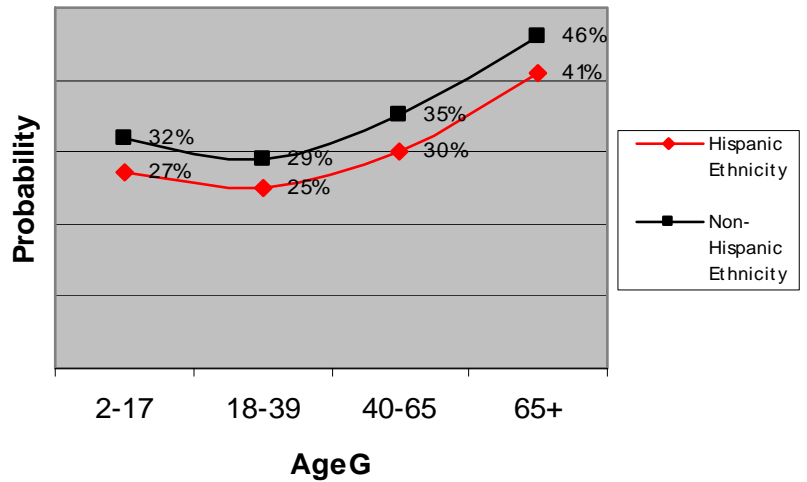


Ethnicity predicts LOSa* for Heart Failure & Shock (DRG 127)





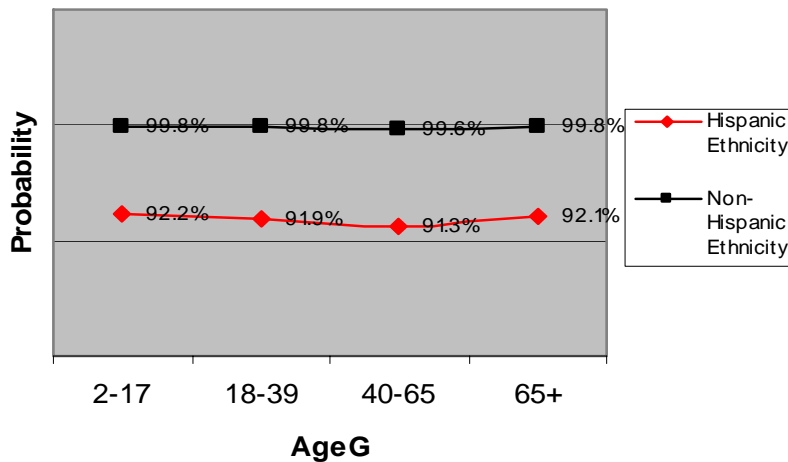
Ethnicity predicts LOSa* for Chest Pain (DRG 143)



23



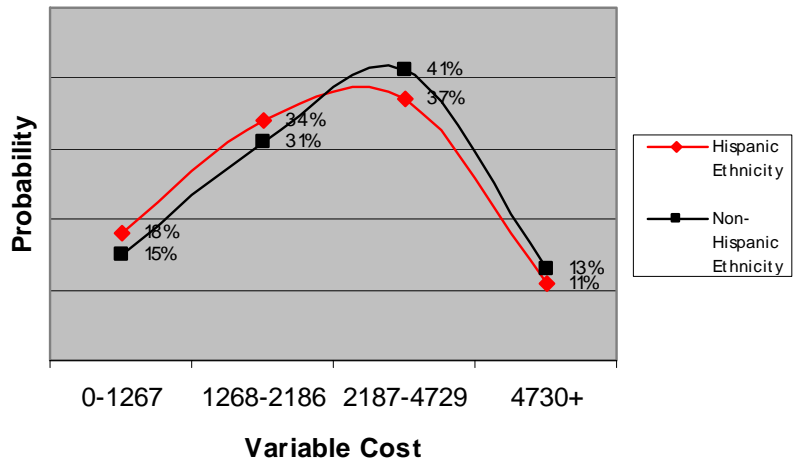
Ethnicity predicts LOSa* for Bloodstream Infection



24



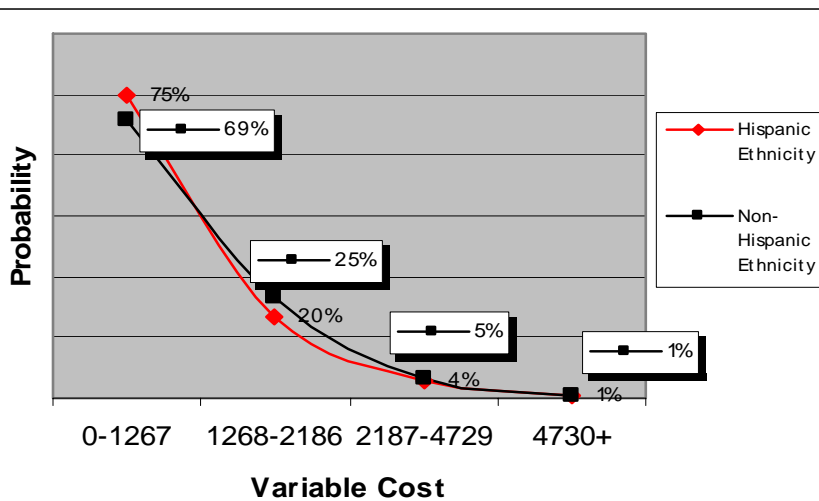
Ethnicity predicts Vcost for Heart Failure & Shock (DRG 127)



25



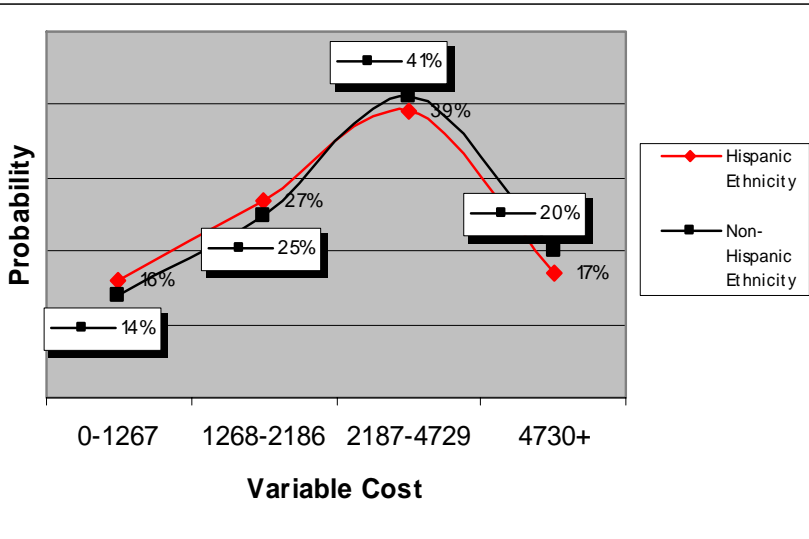
Ethnicity predicts Vcost for Chest Pain (DRG 143)



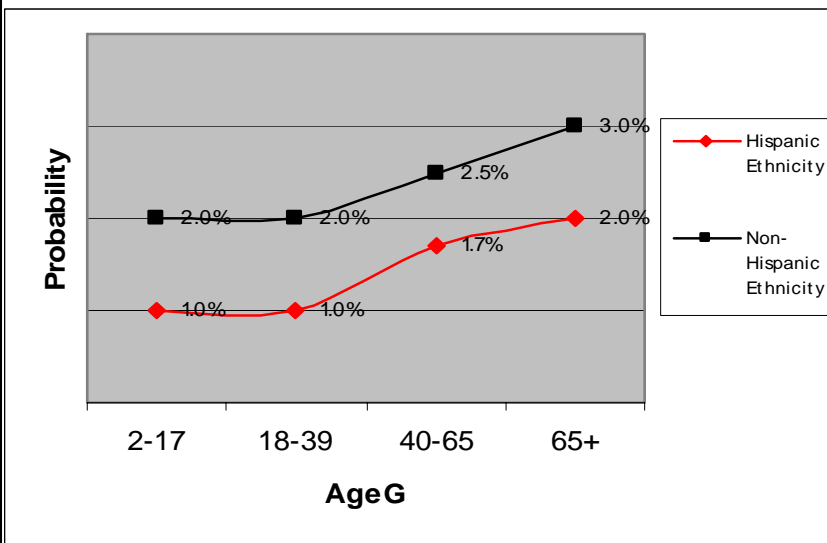
26



Ethnicity predicts Vcost for Renal Failure (DRG 316)

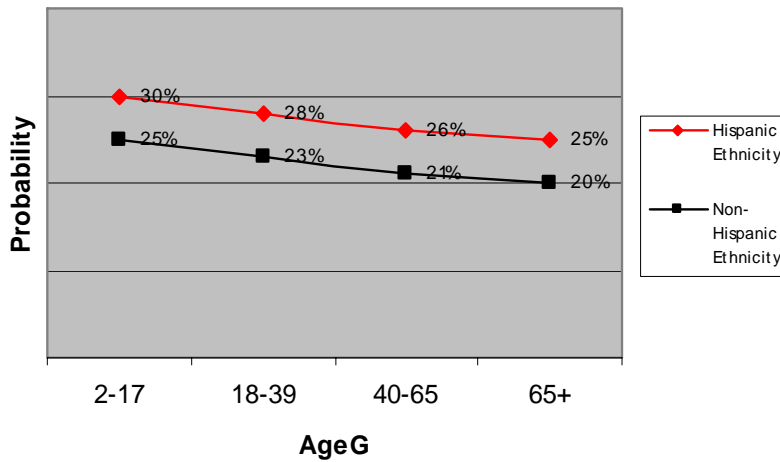


Ethnicity predicts Read7 for Chest Pain (DRG 143)





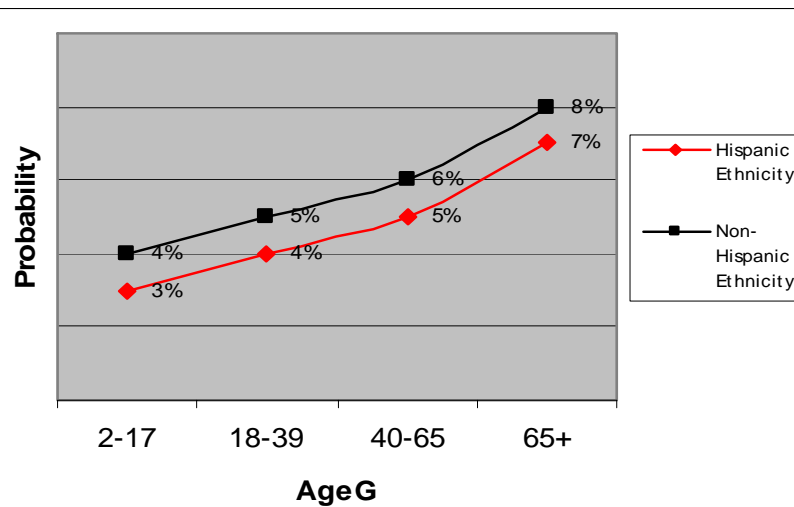
Ethnicity predicts Read30 for Heart Failure & Shock (DRG 127)



29



Ethnicity predicts Read30 for Chest Pain (DRG 143)



30



Observations on Insurance Status (11 differences)

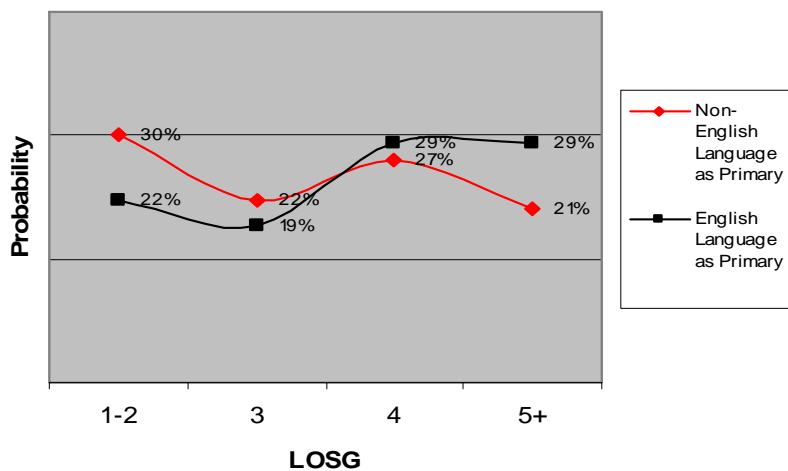
- ✍ Patients with Hispanic ethnicity tend to have a
- higher probability in shorter LOSg and lower probability in longer LOSg for Heart Failure & Shock and Chest Pain.
 - lower probability in LOSa-a smaller chance of having LOS greater than GMLOS for Heart Failure & Shock, Chest Pain, and Bloodstream Infection.
 - higher probability to have lower variable cost and lower probability to have higher variable cost for Heart Failure & Shock, Chest Pain, and Renal Failure.
 - lower probability of re-admission for Chest Pain and higher probability of re-admission for Heart Failure & Shock.



31



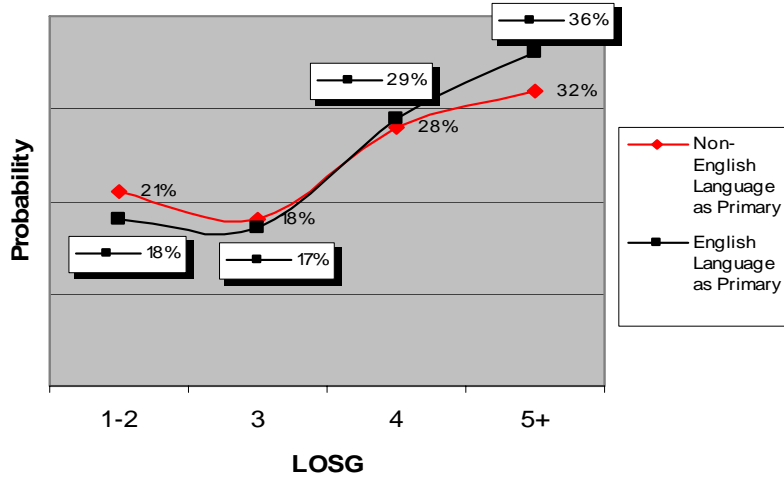
Language predicts LOSg for Heart Failure & Shock (DRG 127)



32



Language predicts LOSg for Renal Failure (DRG 316)

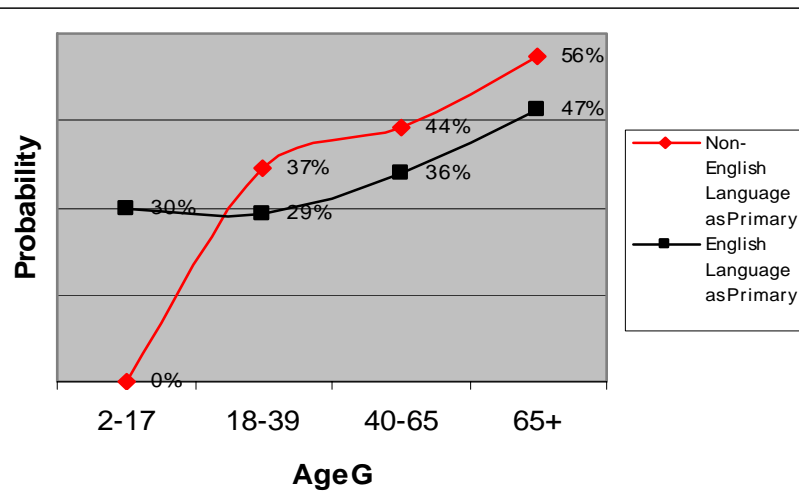


33

The skill to heal. The Spirit to care.



Language predicts LOSa* for Chest Pain (DRG 143)

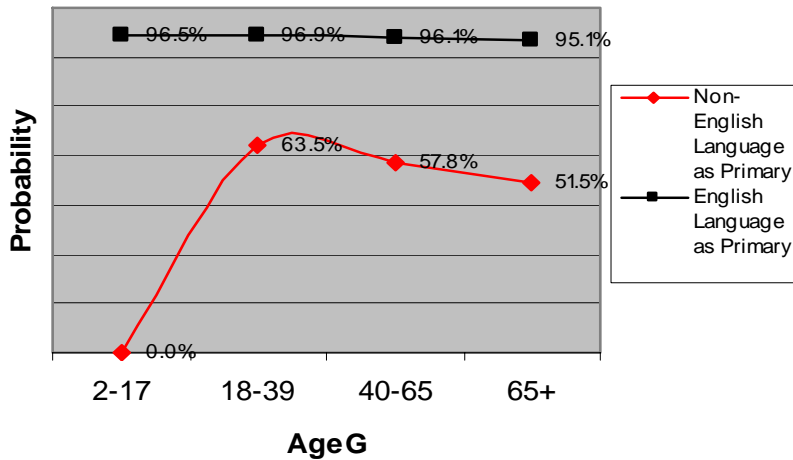


34

The skill to heal. The Spirit to care.



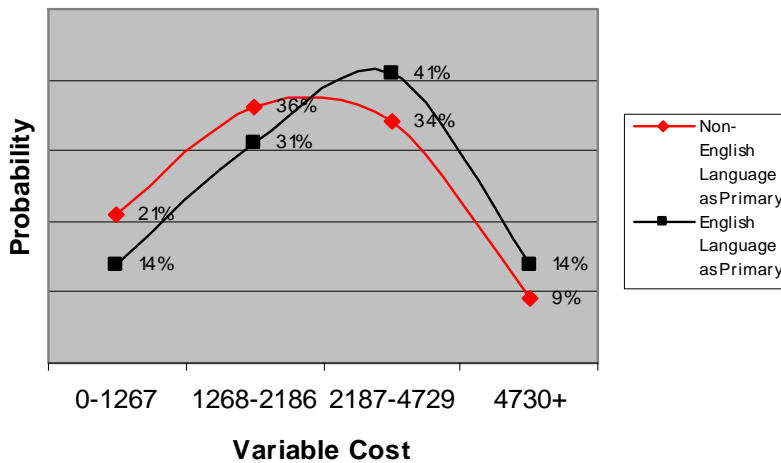
Language predicts LOSa* for Bloodstream Infection



35



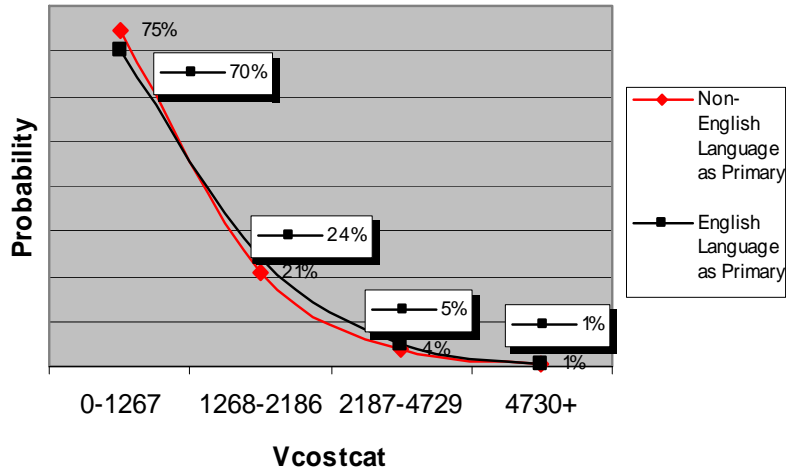
Language predicts Vcost for Heart Failure & Shock (DRG 127)



36



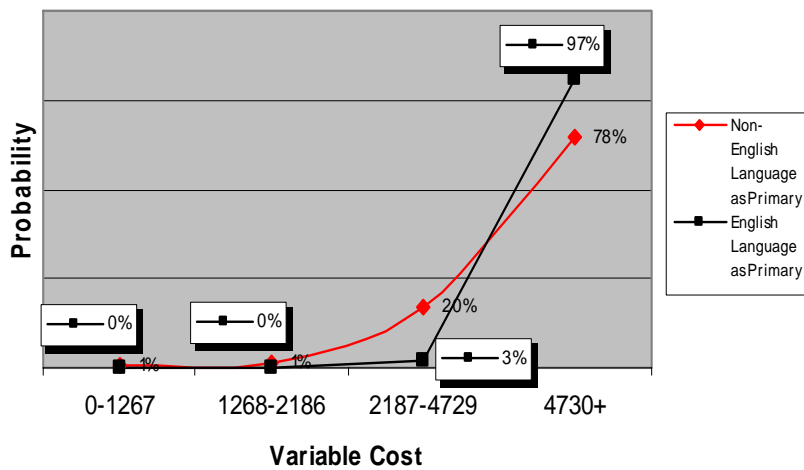
Language predicts Vcost for Chest Pain (DRG 143)



37



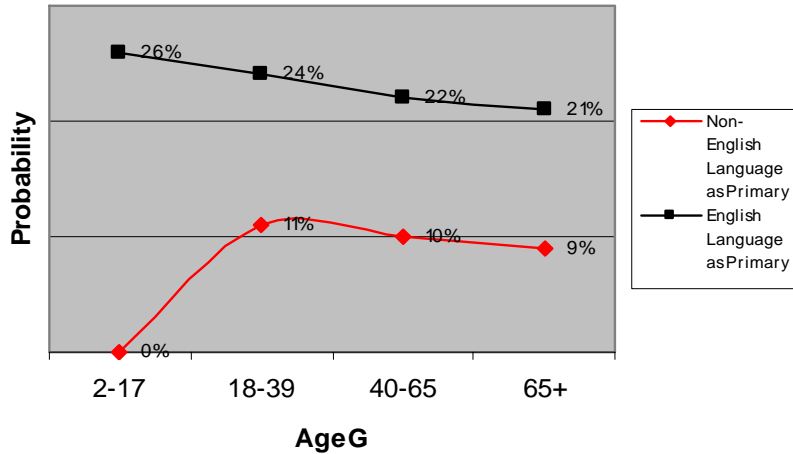
Language predicts Vcost in Bloodstream Infection



38



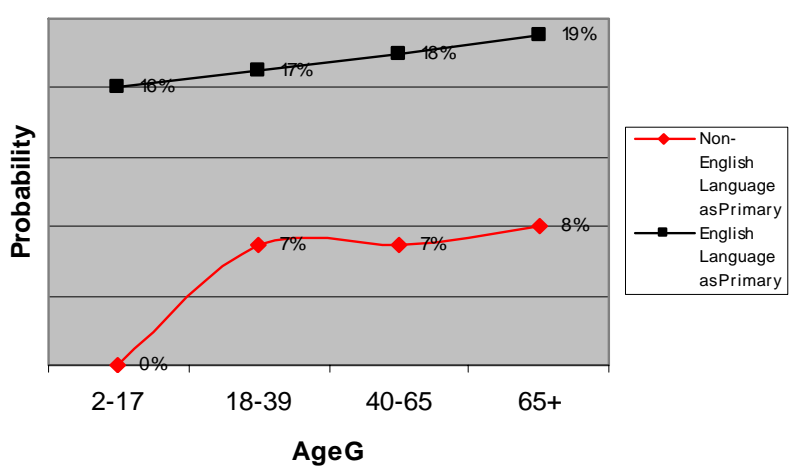
Language predicts Read30 for Heart Failure & Shock (DRG 127)



39



Language predicts Read30 for Renal Failure (DRG 316)



40



Observations on Insurance Status (9 differences)

- ✍ Patients with Non-English as their primary languages tend to have a
 - higher probability in shorter LOSg and lower probability in longer LOSg for Heart Failure & Shock and Renal Failure.
 - higher probability in LOSa-a larger chance of having LOS greater than GMLOS for Chest Pain and vice versa for Bloodstream Infection.
 - higher probability to have lower variable cost and lower probability to have higher variable cost for Heart Failure & Shock, Chest Pain, and Bloodstream Infection.
 - lower probability of re-admission for Heart Failure & Shock and Renal Failure



41



Research Team

- **Richard Bogue, PhD**
 - Senior Research Fellow and Director, Center for Health Futures
- **Lauren Josephs, PhD, LMHC, NCC**
 - Program Manager, Health Disparities Research and Education
- **Steve Yost**
 - Manager, Executive Computing Facility
- **David Yi**
 - Data Analyst, Executive Computing Facility



42