

Calibration & discrimination results

We assessed the discriminative ability of the model using the c-statistic.[1,2] Discrimination refers to how well the model distinguishes between subjects with and without the outcome (in this case, readmission).[1] The c-statistic is a unitless measure of the probability that a randomly selected subject who experienced readmission will have a higher predicted probability of having been readmitted than a randomly selected subject who did not experience readmission.[1] The c-statistic for our case-mix adjustment model, when applied to the MAX dataset, was 0.71.

We assessed model calibration with a chi-square goodness-of-fit test analogous to the Hosmer-Lemeshow test.[3] We used the test, which evaluates how well observed outcomes correspond to those predicted by the fitted logistic regression model,[3] to determine how well observed and predicted numbers of readmissions matched for the levels of the 2 ordinal variables in our case-mix adjustment model, age and CCI count. The lack of a significant difference between observed and predicted values indicates good model calibration.

When we stratified records by age categories, the p-value for the chi-square goodness-of-fit test was not significant (p = .56).

Table 12 – Chi-Square Goodness-of-Fit Test for Lower Respiratory Infection Readmissions: Age

Age Group	Number of Index Admissions	Predicted Cases of Readmissions		Observed Cases of Readmissions	
		n (%)		n (%)	
0 years	33,149	2,105	(6.4%)	2,152	(6.5%)
1-4 years	24,710	1,154	(4.7%)	1,182	(4.8%)
5-7 years	4,501	167	(3.7%)	171	(3.8%)
8-11 years	2,544	127	(5.0%)	130	(5.1%)
12-17 years	2,256	170	(7.5%)	173	(7.7%)

This table displays the number and percent of predicted cases of readmissions compared to the number and percent of observed cases of readmissions, stratified by age categories.

When we stratified records by categories of the number of body systems affected by chronic conditions, the p-value for the chi-square goodness-of-fit test also was not significant (p = .32).

Table 13 – Chi-Square Goodness-of-Fit Test for Lower Respiratory Infection Readmissions: CCI Count

CCI Count	Number of Index Admissions	Predicted Cases of Readmissions		Observed Cases of Readmissions	
		n (%)		n (%)	
0 or 1 body systems	60,546	2,881	(4.8%)	2,959	(4.9%)
2 body systems	4,203	435	(10.3%)	440	(10.5%)
3 body systems	1,567	252	(16.1%)	254	(16.2%)
4+ body systems	844	154	(18.3%)	155	(18.4%)

This table displays the number and percent of predicted cases of readmissions compared to the number and percent of observed cases of readmissions, stratified by the number of body systems affected by chronic conditions.

Figure 1 — Chi-Square Goodness-of-Fit Test for Lower Respiratory Infection Readmissions: Age

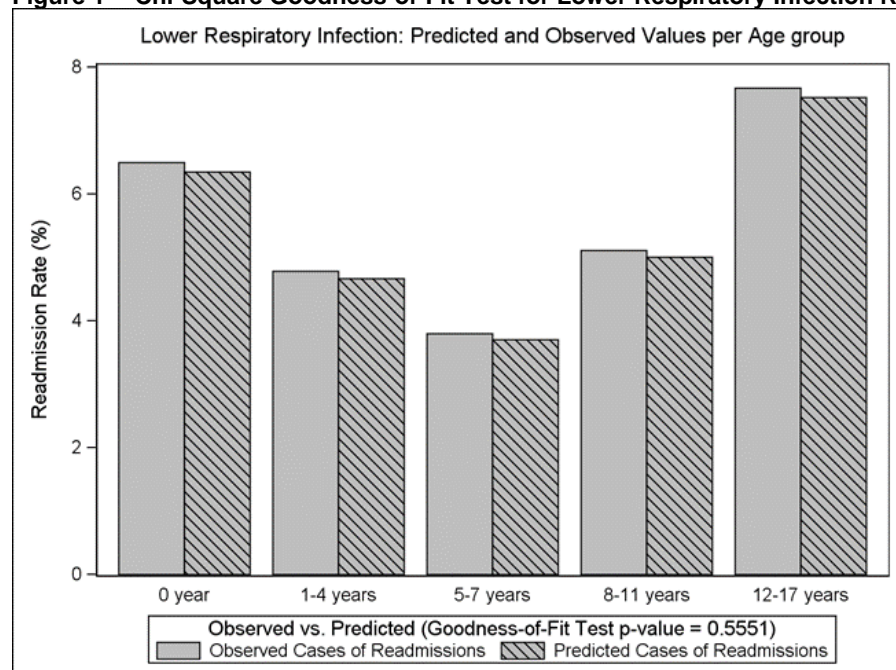
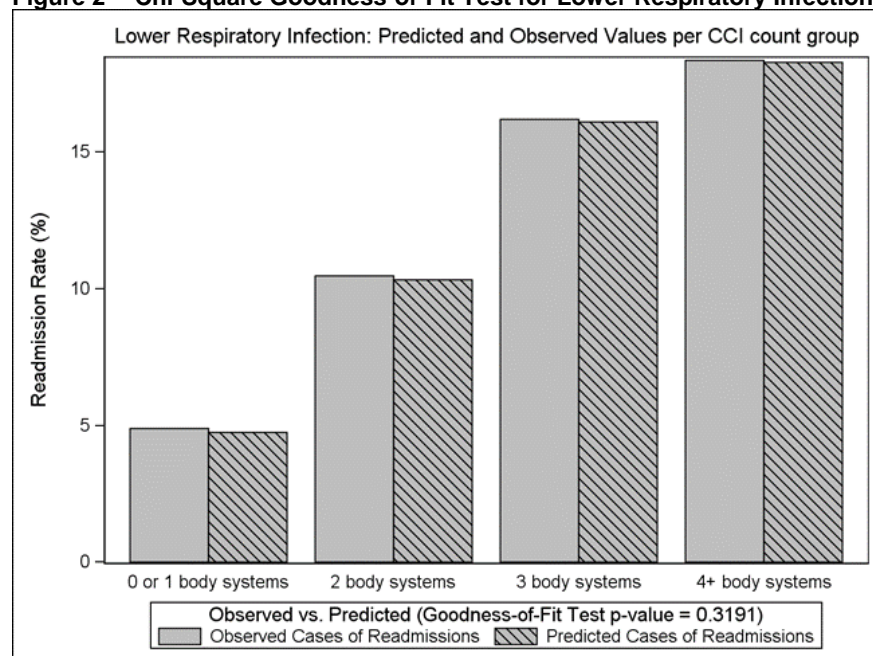


Figure 2 — Chi-Square Goodness-of-Fit Test for Lower Respiratory Infection Readmissions: CCI Count



The discriminative ability of the case-mix adjustment model is good, with a c-statistic that is very similar to that of other 30-day readmission measures.[4–6] The model calibration is also good, with a close match between observed and predicted numbers of readmissions.

References

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