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Presentation Overview

Research Questions and Data
Risk Adjustment Conceptual Issues
Methodological issues
Risk adjustment methodology
Research Questions and Data
Research Questions

1. What effect does using available patient socio-demographic factors and facility characteristics to risk adjust clinic quality measures have on model performance and clinic rankings?

2. How is risk adjustment performance affected by methodological and measurement issues such as measurement completeness for socio-demographic factors and methods for measure composition?
# Measures and Risk Factors to be Tested

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<thead>
<tr>
<th>Measures</th>
<th>Risk Factors</th>
<th>Risk Factors (cont.)</th>
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<tbody>
<tr>
<td>Optimal Diabetes Care</td>
<td>• Race</td>
<td>• Median income*</td>
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<tr>
<td>01/01/2014 – 12/31/2014 DOS</td>
<td>• Hispanic ethnicity</td>
<td>• Clinic type</td>
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<td></td>
<td>• Preferred language</td>
<td>• Rurality</td>
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<td>• Comorbidities</td>
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<td>Optimal Vascular Care</td>
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<td>01/01/2014 – 12/31/2014 DOS</td>
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<td>Optimal Asthma Control – Adult</td>
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<td>07/01/2014 – 06/30/2015 DOS</td>
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<td>Colorectal Cancer Screening</td>
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<td>07/01/2014 – 06/30/2015 DOS</td>
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Data source: Minnesota Community Measurement

*Data source for median income is Primary Care Service Area Data from the Dartmouth Atlas of Health Care (based on 2010 Census Tract) or Internal Revenue Service Individual Income Tax Statistics - ZIP Code Data for 2013 (linked through patient zip-code)
Risk Adjustment: Contextualizing the Analysis
What are the expectations for risk adjustment?

Risk adjusting mechanics

◦ Risk adjustment is not just a technical exercise, it must carefully consider the impacts to avoid unintended consequences
◦ The adequacy of the performance of the risk adjustment may also be related to unintended consequences

How do we interpret the effects of race, ethnicity, language, and country of origin?

How do we assess risk adjustment performance?
How can race, ethnicity, language and country of origin affect quality?

Cumulative Complexity
- Patient workload-capacity imbalances are the central mechanism driving patient complexity
- Workload can be caused by social factors (economic insecurity, housing insecurity, food insecurity, social support systems, medical complexity)
- When capacity for self-management decreases, providers will face a larger challenge in helping patients reach care goals

Patient Culture / Preferences

Care Organization / Bias
- Lack of fit of clinic capabilities (translators or social workers or behavioral health providers) with population needs, lack of cultural fit, and bias
Understanding race, ethnicity, language and country of origin effects

Ideally, we would have separate distinct measures for cumulative complexity, patient culture/preferences, and care organization/bias.

Race, ethnicity, language, and country of origin are potentially associated with all three concepts.

Using race, ethnicity, language, and country of origin as proxies for cumulative complexity, patient culture/preferences, and bias/care organization risks risk adjusting for factors both outside of and within the control of providers.

The analysis of RELO risk adjustment performance cannot address what specifically is being risk adjusted for.
Methodological Issues in Risk Adjusting: Issues to assess when doing risk adjustment
Missing Data and Risk Adjustment

In any profiling initiative, the quality of the data is more important than choice of statistical models. Clear and concise definitions for data elements are exceedingly important.


What is the pattern of missing data? Is it random or systematic? What are the implications of the missing data pattern for risk adjustment RELO?
Overlapping Groups

“there may be patients from one hospital for whom there are no comparable patients in the other hospital (in causal inference parlance, there is no empirical counterfactual), and thus no way to fairly compare performance in all patients cared for by the two hospitals. p. 96

“Thus, ‘risk-adjusted’ results derived using indirect standardisation cannot be used to directly compare two hospitals unless their patient mix has been demonstrated to be similar (eg, overlapping propensity score distributions).” p. 96

“Covariate imbalance is a common problem in profiling using observational data because patients are not randomized (the method used to achieve covariate balance in clinical trials). Standard regression-based adjustment may not completely address bias when there is substantial lack of covariate balance.” P. 97


How may non-overlapping groups be related to risk adjustment for RELO?
Case Mix Bias

“Despite excellent patient-level risk adjustment, substantial case mix bias (eg, due to marked differences in the distributions of high and low risk cases between hospitals) may be present and may impact performance estimates and outlier status.”


Case mix bias may exist because of risk adjustment has not adequately included covariates or because of unobserved factors that affect the distribution of risk in clinics.

**How may case mix bias affect RELO risk adjustment?**
Overdispersion

Outliers and Over-Dispersion - “A problem can arise when a performance indicator shows substantially more variability than would be expected by chance alone, since ignoring such “over-dispersion” could lead to a large number of institutions being inappropriately classified as “abnormal”.”


Overdispersion results in type 1 errors (false positives) – clinics being identified as performance outliers when they may not be.

Overdispersion can occur because of omitted variables or unobserved risk.

Is there over-dispersion in measures that are not risk adjusted? How much does risk adjustment reduce over-dispersion? Is there over-dispersion remaining after risk adjustment?
Small Sample Size

“Small sample sizes are common in provider profiling, and this makes it difficult to reliably differentiate hospital performance and classify outliers.”

Sample size affects the reliability and precision of quality measurement.


How may small sample sizes affect risk adjustment for RELO and identifying outliers?
Methods for Risk Adjusting for Race, Ethnicity, Language, and Country of Origin and Other Factors
Proposed Models and Analysis

Direct standardization
- By RELO and insurance type; Age and gender categories can be added; Diabetes type for diabetes.

Indirect Standardization
- Regress quality on RELO, insurance, age, gender, comorbidities
- Regress quality on RELO, insurance, age, gender, comorbidities with a correction for over-dispersion
- Regress quality on RELO, insurance, age, gender, comorbidities with a random effect for clinic to correct for over-dispersion

Compare Observed and Expected
- Observed / Expected

Assess over-dispersion and performance outlier patterns
- Explore “shrinkage” methods for assessing performance
Thank you

Questions?

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