

Should we adjust for socioeconomic determinants of health when measuring hospital quality?

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Outline

- Risk adjustment
 - Challenges with quality/performance measurement
 - Inadequacy of current risk adjustment methods
- Socioeconomic determinants of health
 - Increasing focus on socioeconomic disparities due to equity concerns and stronger need for attributional validity of existing models
 - Recent evidence pointing to stronger links to hospital characteristics rather than that of patients; increased length-of-stay and resource use and improved financial risk sharing (Belgium)
 - Recommendations from literature on working with socioeconomic factors for varied policy objectives and performance measures
- Implications for composite measures of hospital performance
- Concluding remarks

Risk adjustment: Rationale

- Aim is to account for differences in the mix of important patient attributes across providers before comparing how their patients do
 - Devising credible, clinically, methodologically and politically acceptable measures is complicated
- Risk for whom?
 - Patients, providers in resource-limited settings, providers caring for complex patients are vulnerable
- Risk of what?
 - Clinical outcomes of care (deaths and complications)
 - Resources used (costs, lengths of stay)

Risk adjustment: Conflicting objectives

- Multiple policy objectives
 - Setting payment levels
 - Efficiency benchmarking
 - Quality and safety concerns
 - Public disclosure and report cards
 - Incentive and benefit (penalty) design
- Overlap and contradictions between cost-focused and quality-driven adjustment efforts
 - Despite shared conceptual foundations, they generally differ in specification and weighting of risk factors
 - Clashes now more apparent due to pay-for-performance initiatives
 - Evidence still points to adverse selection
 - US Congress no longer pays for preventable complications that shift cases to higher-paying case-mix adjusted DRGs

Risk adjustment: Methodological challenges

- Operationalization of performance measures
 - Lack of consensus on outcomes versus process measures
 - Not all proxy indicators are valid measures
- Availability of good quality data
- Confounding variables and misspecification bias
 - Models built on what is measurable; rather than conceptually required
 - Issues with attribution and causality
 - Fundamental attribution error: Healthcare insiders are more likely to look for external confounders and vice versa
- Limits of statistical tools and statistical power
- Multiple perspectives, iterative stakeholder feedback and scientific rigor required
 - Mostly disease-specific efforts; investment and sophistication not uniform across specialties; complex cases and elderly population with co-morbidities mostly neglected

Risk adjustment: Policy implications

Despite the challenges, consequences of not accounting for acceptable variations between providers and providing assurances are more serious:

Major policy implications remain

- putting patients and providers at risk in resource-limited settings or complex clinical cases
- unfair market shares due to institutional stigma
- unfair compensation and resultant gaming behavior
- unfair comparisons that provoke inappropriate management responses

Risk adjustment: Potential patient risk factors

Mainstream quality assurance emphasis on demographic and clinical factors have impeded progress in addressing socioeconomic disparities.

Socioeconomic/psychosocial factors <ul style="list-style-type: none"> · Educational attainment, health literacy · Languages · Economic resources · Employment and occupation · Familial characteristics and household composition · Housing and neighborhood characteristics · Health insurance coverage · Cultural beliefs and behaviors · Religious beliefs and behaviors, spirituality 	Demographic characteristics <ul style="list-style-type: none"> · Age · Sex/gender · Race and ethnicity 	Attitudes and perceptions <ul style="list-style-type: none"> · Overall health status and quality of life · Preferences, values, and expectations for health care services
	Clinical factors <ul style="list-style-type: none"> · Acute physiologic stability · Principal diagnosis · Severity of principal diagnosis · Extent and severity of comorbidities · Physical functioning · Vision, hearing, speech functioning · Cognitive functioning · Mental illness, emotional health 	Health-related behaviors and activities <ul style="list-style-type: none"> · Tobacco use · Alcohol, illicit drug use · Sexual practices · Diet and nutrition · Physical activity, exercise · Obesity and overweight

Adapted from Iezzoni, L (2009) Risk adjustment in performance measurement. In Performance Measurement for Health System Improvement: Experiences, Challenges and Prospects. Ed. Smith PC, Mossialos E, Leatherman S, Papanicolaos I. Cambridge University Press: Cambridge.

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SES: Increasing focus on disparities

- Socioeconomic disparities in health care have already been extensively documented by research
- Pathways through socioeconomic determinants to health care are complex
 - Affordability, geographic access, transportation, education, knowledge, literacy, health beliefs, racial/ethnic concordance between physician and patient, patient attitudes, patient preferences, competing demands including work and child care, provider bias
 - Significance of links vary by patient and provider, health system
 - Most studies have modeled them as confounding variables
- Mainstream quality assurance efforts on severity of illness have somewhat isolated these factors: Equity concerns are re-directing focus
 - Risk pooling of sickness funds in Europe and progressivity of contributions
 - WHO's recent report on Social Determinants of Health
 - World Bank and other international development assistance in healthcare reforms in South America, Asia and Africa

SES: Established links to outcomes

Research already confirms low SES is associated with:

Italy

- Higher rates of acute adverse medical events within 90 days of total hip replacement
- Higher rates of operative mortality with coronary artery bypass graft

England

- Higher rates of myocardial infarction and death 30 days after coronary bypass
- Worse long-term outcomes with various surgical procedures

Scotland

- 36% higher adjusted five-year mortality rates following colorectal cancer resection compared to high SES

US

- Significantly lower three-year survival following coronary artery bypass

...to what degree can these be attributed to the health system?

SES: Differences attributable to hospitals' SES

A major recent study on elderly Medicare population in the US (2008)

- Elderly population (65+)
- Summary SES measures constructed for both patients and hospitals using US ZIP code data and 2000 Census
- Operative mortality rates for CABG, aortic valve replacement, mitral valve replacement, lung resection, colectomy, gastrectomy studied

Source: Birkmeyer NJO, Gu N, Baser O, Arden M, Birkmeyer JD. Socioeconomic Status and Surgical Mortality in the Elderly. *Medical Care*. 2008;46:893-899.

Findings:

- There is a consistent inverse relationship between SES and operative mortality across (six) major surgical procedures
- After adjustment for patient characteristics, the odds of dying remain 17%-39% higher for patients with low SES
- More importantly, socioeconomic disparities in operative mortality are largely attributable to differences in hospitals where more and less well-off patients are treated

SES: Differences attributable to hospitals' SES

Odds ratios indicate that socioeconomic disparities between elderly Medicare patients' surgical mortality rates are largely attributable to hospital characteristics.

Table 3. Mortality odds ratios comparing the patients in the lowest to the highest summary socioeconomic status quintile by procedure

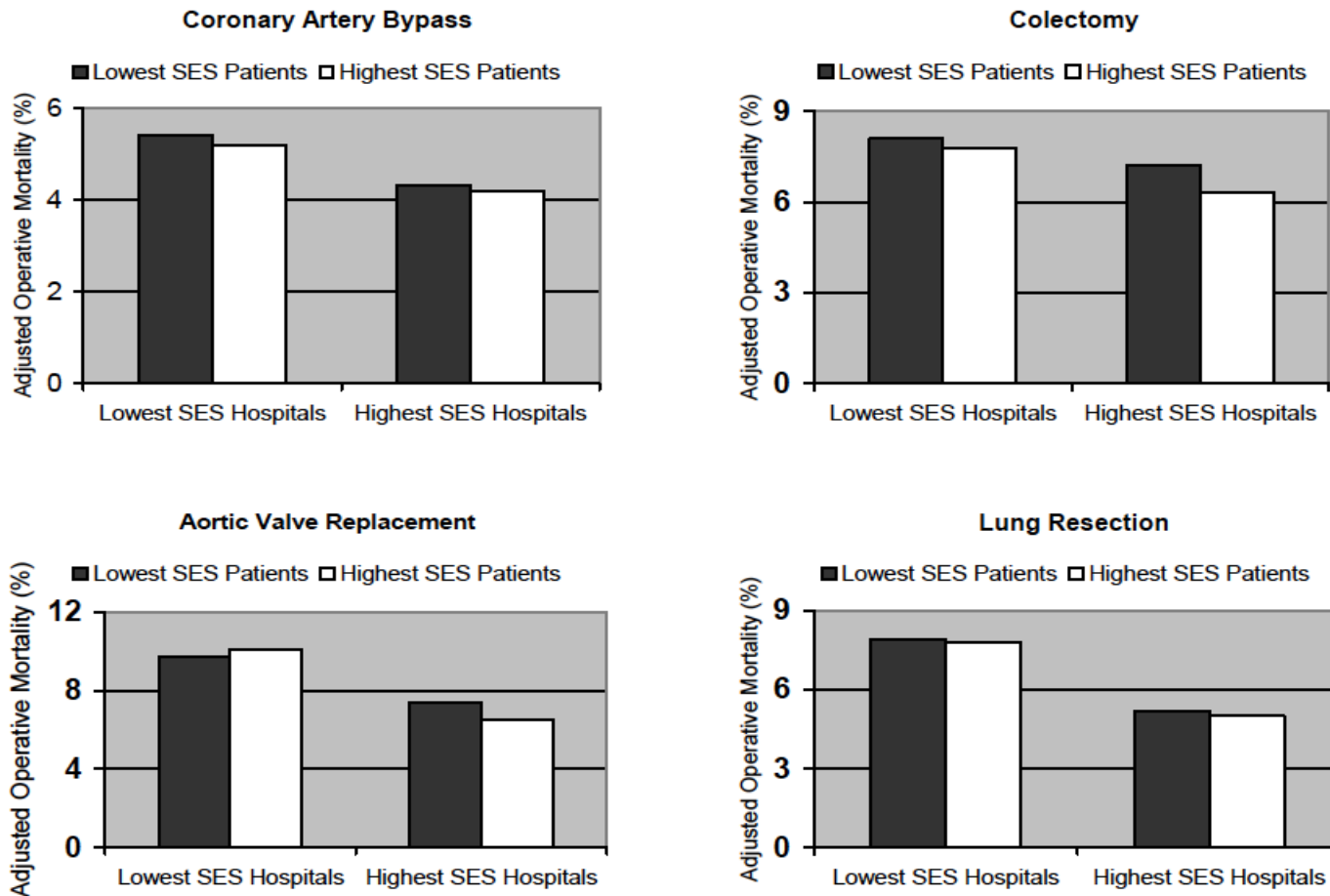
Lowest versus highest patient SES quintile	Crude OR (95% CI)	Adjusted for patient characteristics* OR (95% CI)	Adjusted for patient characteristics and hospital [‡] OR (95% CI)
Coronary artery bypass	1.22 (1.16-1.29)	1.22 (1.16-1.29)	1.14 (1.09-1.19)
Aortic valve replacement	1.32 (1.22-1.42)	1.33 (1.23-1.44)	1.13 (1.04-1.23)
Mitral valve replacement	1.38 (1.26-1.52)	1.30 (1.19-1.43)	1.11 (1.00-1.23)
Lung resection	1.40 (1.24-1.57)	1.23 (1.09-1.39)	0.93 (0.81-1.07)
Colectomy	1.26 (1.19-1.33)	1.17 (1.10-1.25)	1.04 (0.98 -1.12)
Gastrectomy	1.55 (1.31-1.83)	1.39 (1.18-1.65)	1.11 (0.90 -1.38)

* Logistic regression model including patient age, race, sex, comorbidity, and admission acuity.

‡ Fixed effect logistic model including patient age, sex, race, comorbidity, admission acuity, and hospital indicator.

Source: Birkmeyer NJO, Gu N, Baser O, Arden M, Birkmeyer JD. Socioeconomic Status and Surgical Mortality in the Elderly. *Medical Care*. 2008;46:893-899.

Figure: Adjusted operative mortality among the lowest and highest SES patients within lowest and highest SES hospitals (Birkmeyer et al. 2008)



Surgical mortality in elderly Medicare patients not too different within the same hospital but significantly different according to the socioeconomic index of the hospital offering the treatment

SES: How much variation is controllable by hospitals?

Disparities may be attributable to inequities in the structure of the health care system rather than differential treatment of disadvantaged groups of patients within individual care settings

- Hospitals located in areas with lower SES
 - May have lower rates of financial compensation (insurance coverage)
 - Lower operating margin, less capacity to invest in infrastructure
 - Low specialist staffing of ICU, nurse staffing education, technology and equipment
 - Less likely to be staffed by higher quality surgeons
- Pay for performance plans disregarding these structural deficiencies may create unintended consequences

SES: When is adjustment appropriate?

Different approaches recommended for different policy objectives and related measures

- **Using risk-stratification** for clinical process measures to ensure accountability and prevent biased treatment
- **Using risk-adjustment** for population-based measures for hospital comparison
 - Only when measures for monitoring care to vulnerable groups have been fully implemented to avoid institutionalizing substandard care
- **Linking reimbursement to socioeconomic position** through accounting for SES and morbidity for improved financial risk sharing
 - Higher reimbursement rates for deprived areas with greater need (UK)
 - Case-mix modification to include SES adjustment (Medicare)

Source: Fiscella, K., Franks, P., Gold, M. R., & Clancy, C. M. (2000). Inequality in quality: Addressing socioeconomic, racial, and ethnic disparities in health care. *JAMA: The Journal of the American Medical Association*, 283(19), 2579-2584.

Case study: Belgium adopts SES as risk- adjustors for hospital payment in 2008

Perelman, J. (2008). Hospital case-mix funding and the necessity to adjust for socio-economic status. *BMC Health Services Research*, 8(1): Meeting Abstract, A7.

Prior to change:

- Inpatient payments based on AP-DRGs
- Supporters of SES adjustors argue:
 - AP-DRG/age classification system is limited in predicting differences in length-of-stay between poorer and richer patients
 - Hospitals with large portion of underprivileged unfairly penalized, others receive windfall gains
 - Failure to adjust for patients' SES rewards hospitals for adverse selection, penalizes those treating the poor
- Opponents argue:
 - Socioeconomic condition is accounted for by severity indicators
 - Particularly since the shift from AP- to APR-DRGs
- Government adopts a series of socio-economic characteristics as risk-adjustors, starting from 2008

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Evidence after the change:

- Supports that incentives for risk selection have decreased
- Impact of SES remains significant and large in magnitude after controlling for severity of the disease
- Low-SES patients have a significantly longer length of stay
 - Beneficiaries of reduced co-payment rates 15% longer
 - Recipients of health services vouchers 24% longer
- Impact of SES persists even after controlling for APR-DRGs
- Conclusion: Hospital financing designs can no longer neglect these factors and search for higher efficiency might have consequences for equity and utilization.

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Composite performance measures

- **US:** Medicare rankings of US states
- **Canada:** Macleans Report on regions
- **England:** Star Ratings for acute hospitals and trusts
- **Health Consumer Powerhouse** (Euro Health Consumer Index): European country comparisons
- **WHO 2000 Report** on country health systems
- **Turkey:** Hospital performance measurement

Motivation:

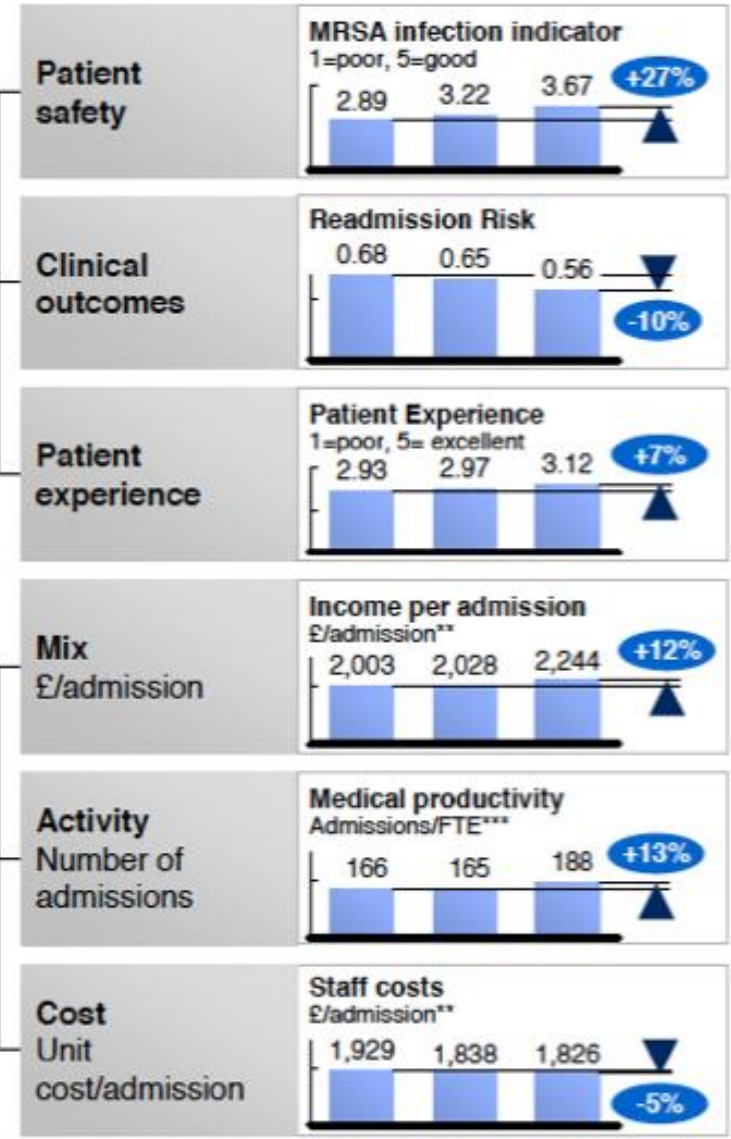
- Capture multi-dimensions of performance
- Facilitate systematic comparison
- Overall assessment of
 - Managerial competence
 - Efficiency
 - Accountability

Composite performance measures: Issues

- Technical Considerations
 - Choice of constructors
 - Collinearity of components
 - Choice of weights
 - Transformation of indicators
 - Incorporating environmental influences on performance
- Major Criticisms
 - Relative weights and methodologies challenged
 - May disguise failings in specific parts of the healthcare system
 - Difficult to identify where poor performance occurs
 - Ignore other dimensions and may lead to adverse behavior

Key performance metrics from an analysis of the NHS in UK: differences in managerial scope for controlling for socioeconomic factors

Integrated Performance



* HealthCare Commission Star Rating System
 ** Trust income excluding Research, Education and Training income
 *** Case-mix adjusted admissions

Source: A healthier health care system: the UK experience, October 2008, McKinsey&Co.

Composite measures: Risk adjustment

How socioeconomic factors relate to indicators within a composite performance measure



Little experience and evidence on composite measures for hospitals, none on risk adjustment

- Quality constructors
 - **Patient safety:** variation should not be acceptable
 - **Clinical outcomes:** risk-stratification may be preferable over adjustment
 - **Patient satisfaction:** already suffers from respondent bias, needs prior adjustment for reported health status
- Financial constructors
 - **Case-mix adjusted income:** attributional validity to avoid case mix fallacy difficult to justify
 - **Medical productivity, unit cost/admission:** strongest evidential support for adjustment for socioeconomic factors

Concluding remarks

Socioeconomic factors

- With growing evidence of causality and international concern for equity on policy agendas, socioeconomic factors are likely to play a more prominent role in measurement and adjustment mechanisms
- Choice between stratification versus adjustment for factors depends on specific policy objective and performance measure
- Their role in financial risk sharing is more evident; therefore can more readily be incorporated into payment schemes with some caution
- Existing methods are context-specific and most likely not transferrable between countries
 - improved data collection and multidisciplinary modeling needed, attributional validity require local calibration

Concluding remarks

Policy implications

- Science and success of risk adjustment will inevitably be compromised: Incorporation of socioeconomic adjustment may not fully restore technical and distributive efficiency.
 - Counter mechanisms will still need to be in place to prevent risk selection and institutional stigma – particularly around pay-for-performance schemes
- Composite indices for hospital quality may create too many complications for linkages to pay-for-performance and quality.
 - Individual indicators and multiple perspectives may be more effective
- Given limitations of performance measurement and inevitably imperfect risk adjustment, the success of ongoing reforms in Turkey may achieve more from continued provider engagement and multidisciplinary feedback mechanisms than what science can deliver.