COMMONWEALTH OF MASSACHUSETTS
HEALTH POLICY COMMISSION

TECHNICAL APPENDIX A2
HOSPITAL OPERATING EXPENSES

ADDENDUM TO 2013 COST TRENDS REPORT

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Summary

This technical appendix describes the methodology used for our analysis of hospital operating expenses.

A. Operating expenses per case mix- and wage-adjusted discharge

We calculated inpatient operating expenses per discharge, adjusted for hospital case mix and for area wages. Each component of this measure is described below.

Inpatient operating expenses: we used a measure of fully allocated inpatient operating expenses from the 2012 hospital cost reports collected by the Center for Health Information and Analysis (CHIA).

The specific measure used was:

Sched II: SUMMARY SCHEDULE
Col: 10 - PAT EXPENSE BY SVC INCL CAP
Row: 100 - SUBTOT I/P

Discharges: We used inpatient discharges from CHIA's 2012 hospital cost reports.
The specific measure used was:

Sched VA: PAYER INFORMATION
Col: 2 - TOTAL (SUM[C3:C14])
Row: 25 – DIS

Case mix adjustment: The number of hospital discharges was multiplied by the hospital's 2011 CHIA case mix index (2012 case mix index was unavailable at time of analysis). CHIA's case mix index reflects the complexity of the inpatient discharges a particular hospital received in a year.

Area wage adjustment: We performed adjustments using each hospital's 2012 occupational mix adjusted wage index as determined by the Centers for Medicare & Medicaid Services (CMS). This index was used to adjust the labor-related portion of operating expenses based on CMS's established "labor share" methodology, which estimates the labor share at 68.8 percent for hospitals with a wage index above 1.0 and at 62 percent for areas with a wage index less than or equal to 1.0.
For example, for a hospital with a wage index of 1.1, the calculation would be:

$$Adjusted\ operating\ expenses = (Operating\ expenses \times 31.2\%) + (Operating\ expenses \times 68.8\% \times 1.1)$$

For a hospital with a wage index of 0.9, the calculation would be:

$$Adjusted\ operating\ expenses = (Operating\ expenses \times 38\%) + (Operating\ expenses \times 62\% \times 0.9)$$

For analyses in which we identified teaching hospitals and disproportionate share hospitals (DSH), we used the teaching and DSH status published by CHIA in their fiscal year 2012 annual report on hospital financial performance.[1]

B. Measures of hospital quality performance

We used three measures of hospital quality performance that have been widely described in research and reporting on hospital performance and that reflect a broad range of types of care within a hospital.

1. Excess readmissions ratio
2. Mortality rate
3. Process-of-care measures

1 Excess readmissions ratio

We obtained hospital-level excess readmission ratio measures for acute myocardial infarction (AMI), heart failure (HF), and pneumonia (PN) from CMS's Hospital Compare database and calculated a composite measure. For each hospital, the composite measure represented the weighted average of the three excess readmissions ratios, with the average weighted based on volume of cases of each type. Detail on the excess readmissions ratio measure is available from CMS.[2]

2 Mortality rate

We obtained hospital-level 30-day risk-adjusted mortality measures for acute myocardial infarction (AMI), heart failure (HF), and pneumonia (PN) from CMS's Hospital Compare database and calculated a composite measure. For each hospital, the composite measure represented the weighted average of the three mortality rates, with the average weighted based on volume of cases of each type. Detail on the risk-adjusted mortality measure is available from CMS.[3]

3 Process-of-care measures

We obtained hospital-level process-of-care measures from CHIA's Quality Databook released with their 2013 Annual Report on the Massachusetts Health Care Market.[4] (CHIA used data from CMS Hospital Compare to publish these measures.)

Our composite measure represents a simple average across ten process-of-care measures. The measures used were:

- Urinary catheter removed on Postoperative Day 1 (POD1) or Postoperative Day 2 (POD2) with day of surgery being day zero (**SCIP-Inf-9**)
- Aspirin prescribed at discharge for AMI (**AMI 2**)
- Percent of heart attack patients given PCI within 90 minutes of arrival
- Evaluation of left ventricular systolic function (LVS) (**HF2**)
- ACEI or ARB for left ventricular systolic dysfunction (LVSD) (**HF3**)
- Initial antibiotic selection for community-acquired pneumonia (CAP) in immunocompetent patients (**PN6**)
- Prophylactic antibiotic received within 1 hour prior to surgical incision (**SCIP-Inf-1**)
- Prophylactic antibiotic selection for surgical patients (**SCIP-Inf-2**)
- Prophylactic antibiotics discontinued within 24 hours after surgery end time (**SCIP-Inf-3**)
- Surgery Patients with Perioperative Temperature Management (**SCIP-Inf-10**)

Detail on the process-of-care measures is available from CHIA.[5]

C. Composition of hospital operating expenses

We estimated the proportion of hospital operating expenses comprised by labor, supplies, and major movable equipment depreciation. These were estimated based on total direct expenses as collected through CHIA's 2012 hospital cost reports.

Labor: Comprised of three measures (salaries and wages, physician compensation, and purchased services):

Sched IX: DIRECT EXPENSES
Col: 2 - SALARIES AND WAGES
Row: 124 - TOTPAT+NPAT+B/D+GR UCP ASSMT
Sched IX: DIRECT EXPENSES
Col: 3 - PHYSICIAN COMPENSATION (SCH XXV C2)
Row: 124 - TOTPAT+NPAT+B/D+GR UCP ASSMT
Sched IX: DIRECT EXPENSES
Col: 4 - PURCHASED SERVICES
Row: 124 - TOTPAT+NPAT+B/D+GR UCP ASSMT

Supplies:

Sched IX: DIRECT EXPENSES
Col: 5 - SUPPLIES AND EXPENSE
Row: 124 - TOTPAT+NPAT+B/D+GR UCP ASSMT
Several additional expenses were subtracted from this amount based on the adjustment described below.

Depreciation and amortization:

Sched IX: DIRECT EXPENSES
Col: 7 – MAJOR MOVEABLE EQUIPMENT DEPRECIATION
Row: 124 - TOTPAT+NPAT+B/D+GR UCP ASSMT
Several additional expenses were added to this amount based on the adjustment described below.

Adjustments: We re-classified several expenses from the supplies category into our depreciation and amortization category.

Sched IX: DIRECT EXPENSES
Col: 5 - SUPPLIES AND EXPENSE
Row: 1 - BUILDINGS / FIXED DEPRECIATION
Sched IX: DIRECT EXPENSES
Col: 5 - SUPPLIES AND EXPENSE
Row: 2 - CAPITAL LEASES / AMORTIZATION
Sched IX: DIRECT EXPENSES
Col: 5 - SUPPLIES AND EXPENSE
Row: 4 - BOND ISSUE AMORTIZATION

D. Payer-specific operating margins

We estimated payer-specific operating margins based on an approach commonly used in the literature.[6] We calculated a hospital-specific cost-to-charge ratio, based on total operating expenses divided by total gross patient service revenue. We then applied the cost-to-charge ratio to payer-specific gross patient service revenue to estimate costs by payer. The operating margin was calculated as payer-specific net patient service revenue minus payer specific estimated costs, divided by payer-specific net patient service revenue.
All data were obtained from CHIA's 2012 hospital cost reports. Specific measures used are described below:

Total operating expenses: the sum of fully allocated inpatient patient services expenses and fully allocated outpatient patient service expenses.
Inpatient
Sched II: SUMMARY SCHEDULE
Col: 10 - PAT EXPENSE BY SVC INCL CAP
Row: 100 - SUBTOT I/P
Outpatient
Sched II: SUMMARY SCHEDULE
Col: 10 - PAT EXPENSE BY SVC INCL CAP
Row: 114 - SUBTOT I/P

Net patient service revenue: the sum of inpatient net patient service revenue and outpatient net patient service revenue.
Inpatient
Sched VA: PAYOR INFORMATION
Col: Varies by payer (Medicare: 3, 4; Medicaid: 5,6; commercial: 10,11)
Row: 65.01 - NET I/P REVENUE
Outpatient
Sched VA: PAYOR INFORMATION
Col: Varies by payer (Medicare: 3, 4; Medicaid: 5,6; commercial: 10,11)
Row: 78.01 - NET O/P REVENUE

Gross patient service revenue: the sum of inpatient routine, inpatient ancillary, outpatient routine, and outpatient ancillary gross patient service revenue.
Inpatient
Sched VA: PAYOR INFORMATION
Col: Varies by payer (Medicare: 3, 4; Medicaid: 5,6; commercial: 10,11)
Row: 40.00 - I/P ROUTINE
Sched VA: PAYOR INFORMATION
Col: Varies by payer (Medicare: 3, 4; Medicaid: 5,6; commercial: 10,11)
Row: 41.00 - I/P ANCILLARY
Outpatient
Sched VA: PAYOR INFORMATION
Col: Varies by payer (Medicare: 3, 4; Medicaid: 5,6; commercial: 10,11)
Row: 42.00 - O/P ROUTINE

Sched VA: PAYOR INFORMATION
Col: Varies by payer (Medicare: 3, 4; Medicaid: 5,6; commercial: 10,11)
Row: 43.00 - O/P ANCILLARY

[1] Center for Health Information and Analysis. Massachusetts Acute Hospital Financial Performance: Fiscal Year 2012. Boston (MA): Center for Health Information and Analysis; 2013 May.
[2] Centers for Medicare & Medicaid Services. Readmissions Reduction Program. [Internet]. Washington (DC): Centers for Medicare & Medicaid Services. [cited 2014 Jan 2] Available from: http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html
[3] Centers for Medicare & Medicaid Services. 30-day death and readmission measures. [Internet]. Washington (DC): Centers for Medicare & Medicaid Services. [cited 2014 Jan 2] Available from: http://www.medicare.gov/hospitalcompare/Data/30-day-measures.html
[4] Center for Health Information and Analysis. Annual Report on the Massachusetts Health Care Market: Quality Databook. [Internet]. Boston (MA): Center for Health Information and Analysis; [cited 2014 Jan 2] Available from: http://www.mass.gov/chia/docs/r/pubs/13/2013-annual-report-quality-data-book.xlsx
[5] Centers for Medicare & Medicaid Services. 30-day death and readmission measures. [Internet]. Washington (DC): Centers for Medicare & Medicaid Services. [cited 2014 Jan 2] Available from: http://www.medicare.gov/hospitalcompare/Data/30-day-measures.html
[6] Fox W and Pickering J. Hospital & Physician Cost Shift: Payment Level Comparison of Medicare, Medicaid, and Commercial Payers. Seattle (WA): Milliman, Inc.; 2008 Dec.