

Calculating “Cost”: Cost-to-Charge Ratios

Faith Asper, MHS

Director, ResDAC Assistance Desk

Objectives

- Define cost-to-charge ratios (CCRs)
- Examine uses and types of CCRs
- Provide CCR formulas
- Identify cost and charge variable locations within the cost reports
- Review an example from the literature
- Outline steps needed to calculate and apply CCRs to charges

Cost-to-Charge Definitions

- A ratio of the cost divided by the charges.
- Generally used with acute inpatient or outpatient hospital services.
- The following CCRs can be calculated from the Hospital cost reports
 - Total Hospital (all payers, all patients)
 - » Hospital level
 - » Cost center specific
 - Medicare specific
 - » Hospital level
 - » Cost center specific

Costs Defined for Other Facilities

- **Skilled Nursing Facilities (SNFs)**
 - CCRs for ancillary and outpatient services only
 - Use cost per diem instead
- **HHAs report cost per visit**
- **Hospices report cost per day**
- **Renal Dialysis facilities report cost per treatment**
- **RHC report cost per visit**

Use of CCRs

- Medicare uses CCRs for
 - Calculation of outlier payments
 - DRG cost weighting
- Researchers use CCRs as a method to convert charges to cost

Types of CCRs Available

- **Cost center level CCRs**
 - Found in downloadable cost report data
- **Hospital overall total CCR**
 - Found in downloadable cost report data
 - Found in “CSTS_CHRGS...” report found in “...REPORTS...” Download
- **Medicare specific CCR**
 - Found in downloadable cost report data
 - Found in annual “Impact File” under Medicare Inpatient PPS website.
 - » Medicare Capital CCR
 - » Operating CCR

Cost-to-Charge Formulas

All Payer Total or Cost Center CCRs

- **CCR = Cost / Charges**
- **Worksheet C, Parts I, Columns 5 (Cost), 6, & 7 (Charges)**
 - Hospital overall CCR
 - Cost center specific CCR
- **Total all hospital cost and charge report available from CMS Hospital cost report website under “Reports” download.**
 - **CCR = Cost (Column 5)/Charges (Column 6 + Column 7)**

Cost-to-Charge Formulas

Medicare Specific CCR

- Detailed formula found in the Internet Only Manuals 100-04 Claims Processing, Chapter 3, Section 20.1.2.1 – Cost to Charge Ratios, Section A – Calculating a Cost-to-Charge Ratio
- Worksheet D is used
- Medicare calculates Operating and Capital CCRs
- Can also find Medicare Hospital-specific CCRs in annual Impact Files
 - <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/HistoricalImpactFiles-for-FY-1994-through-Present.html>
 - Medicare Hospital-specific CCR = Capital CCR + Operating CCR

Review Example from Literature

Reference Article Chen et al.

- Chen, LM “Hospital Cost of Care, Quality of Care, and Readmission Rates...”
 - <http://archinte.jamanetwork.com/article.aspx?articleid=774388>
- Read p. 341, “Data” and “Hospital Cost Model” sections
 1. What was the name of the file that they used to calculate the cost-to-charge ratios?
 2. In paragraph 2 of the “Hospital Cost Model” section, which variables identified could possibly be found in the cost report data?

Review Example from Literature

Reference Article Chen et al.

- Review what is in the Impact File:
- <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Historical-Impact-Files-for-FY-1994-through-Present.html>

Review Example from Literature

Reference Article Chen et al.

- **Impact File was used to adjust charges**
 - Medicare operating cost-to-charge ratio
 - Medicare capital cost-to-charge ratio
 - Medicare Hospital cost-to-charge ratio = operating + capital CCR
 - Range: CCR .12 to .96

Review Example from Literature

Reference Article Chen et al.

- What is the difference between the Hospital Medicare CCR and the Total CCR?
- Examples:
 - Provider 01-0005
 - » Total CCR = .21
 - » Medicare CCR = .36
 - Provider 01-0006
 - » Total CCR = .33
 - » Medicare CCR = .23

Review Example from Literature

Reference Article Chen et al.

Observations:

- **The data aren't very timely**
 - Impact file uses cost reports that are 2-3 years old
 - Cost to charge reports may take 2 years to obtain complete information
- **Relatively easy to apply**

Steps to Apply CCRs to Charges

1. Clean up cost reports
2. Calculate Hospital specific CCR
3. Check for missing or extreme values
4. Create a revenue center to cost center crosswalk
5. Multiply CCR times charges to obtain cost

Step 1: Clean up Cost Reports

- **Identify hospitals with multiple cost reports**
 - Try to find a 12-month cost report
 - Evaluate partial year cost reports to determine if you should combine cost reports
- **Examine data for duplicate cost reports and determine which one to use**
 - Duplicates are errors
 - This happens very, very seldom

Step 2: Calculate Cost-to-Charge Ratios

- Determine which CCR you wish to calculate
 - Total all payer Hospital-specific CCR
 - Total cost center level hospital-specific CCR
 - Medicare CCR
- Use the formulas provided in previous slides to calculate the CCR

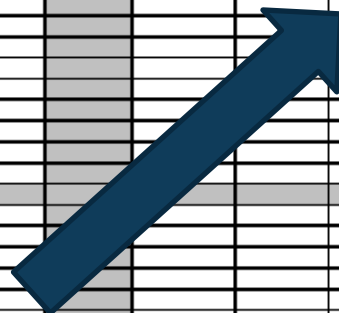
Step 2: Calculate Cost-to-Charge Ratios

- Worksheet C, Part I (2010 forms)
- See README document for special unit coding for 1996 forms.

10-12 FORM CMS-2552-10 4090 (Cont.)

COMPUTATION OF RATIO OF COSTS TO CHARGES PROVIDER CCN: PERIOD: FROM _____ TO _____ WORKSHEET C PART I

COST CENTER DESCRIPTIONS	Total Cost (from Wkst. B, Part I, col. 26)	Therapy Limit Adj.	Costs		Charges			Total (column 6 + column 7)	Cost or Other Ratio	TEFRA Inpatient Ratio	PPS Inpatient Ratio
			Total Costs	RCE Dis-allowance	Total Costs	Inpatient	Outpatient				
	1	2	3	4	5	6	7	8	9	10	11
INPATIENT ROUTINE SERVICE COST CENTERS											
30 Adults and Pediatrics (General Routine Care)											30
31 Intensive Care Unit											31
32 Coronary Care Unit											32
33 Burn Intensive Care Unit											33
34 Surgical Intensive Care Unit											34
35 Other Special Care (specify)											35
40 Subprovider IPF											40
41 Subprovider IRF											41
42 Subprovider (Specify)											42
43 Nursery											43
44 Skilled Nursing Facility											44
45 Nursing Facility											45
46 Other Long Term Care											46
ANCILLARY SERVICE COST CENTERS											
50 Operating Room											50
51 Recovery Room											51
52 Labor Room and Delivery Room											52
53 Anesthesiology											53
54 Radiology-Diagnostic											54
55 Radiology-Therapeutic											55
56 Radioisotope											56
57 Computed Tomography (CT) Scan											57
58 Magnetic Resonance Imaging (MRI)											58
59 Cardiac Catheterization											59
60 Laboratory											60



Step 2: Calculate Cost-to-Charge Ratios

- Example of cost center coding
- Resource document [HOSP2010_CSTCODES.pdf](#)

Std.	Line Number	Description	Code	Start	End
Std.	30	Adults & Pediatrics (General P		03000	
Std.	31	Intensive Care Unit	03100	-	03119
Std.	32	Coronary Care	03200	-	03219
Std.	33	Burn Intensive Care Unit	03300	-	03319
Std.	34	Surgical Intensive Care Unit	03400	-	03419
	35	Psychiatric ICU	02140	-	02159
	35	Pediatric ICU	02080	-	02099
	35	Neonatal ICU	02060	-	02079
	35	Trauma ICU	02180	-	02199
	35	Detoxification ICU	02040	-	02059
	35	Premature ICU	02120	-	02139
Std.	40	Subprovider IPF		04000	
Std.	41	Subprovider IRF		04100	

Step 2: Calculate Cost-to-Charge Ratios

Example for Adult & Pediatrics Cost Center 03000
FY 2011 (2010 forms)

Hospital Provider Number	CCR
01-0001	0.61
01-0005	1.36
01-0006	0.59
01-0007	1.39
01-0008	0.70
01-0009	1.23
01-0010	1.04
01-0011	0.52
01-0012	0.74

Step 3: Check for Missing or Extreme Values

- **Evaluate missing CCRs**
 - Use previous year CCRs
 - Use hospital overall total CCR
 - Eliminate provider from analysis
- **Evaluate extreme values**
 - CMS usually trims CCRs that are 3 SD from the geometric mean
 - CMS replaces extreme values with the Statewide average CCR or previous year CCR

Step 3: Check for Missing or Extreme Values

Example for Adult & Pediatrics Cost Center 03000
FY 2011 (2010 forms)

	Adult & Peds 03000	Operating Room 05000	Anesthesia 05300
Zero CCR	18.1%	28.0% (12.3% didn't report any cost or charges)	55.6% (43.5% didn't report any cost or chgs)
<10	79.7%	71.2%	44.2%
>=10	1.86%	0.8%	0.2%

Step 4: Create Revenue Center to Cost Center Crosswalk

- **Researcher needs to develop a crosswalk, no standard crosswalk available**
- **Utilization files contain revenue centers**
- **Cost reports contain cost centers**
- **Revenue center DO NOT EQUAL Cost centers**

Revenue Centers to Cost Center Crosswalk Definitions

Source: Essentials of Cost Accounting for Health Care Organizations, Finkler 1994

- Usually, a health care organization is divided into areas or units of responsibility
- These units of responsibility are referred to as revenue centers or cost centers
- “Department” is often used to describe either a cost center or a revenue center.
- Managers of a revenue center are responsible for both revenues and expenses of that unit – Intensive Care Unit
- Managers of a cost center are responsible for only the expenses of the unit – Finance department

Revenue Centers in Utilization Files versus Cost Center in Cost Reports

Inpatient Claims Revenue Center	MedPAR file Revenue Center Groups	Hospital Cost Reports Cost Center
0141 Private room, medical/surgical	Private room charge amount (Rev ctrs 011X, 014X)	03000 Adult and pediatrics (general routine care)
0258 Pharmacy, IV solution	Pharmacy charge amount (025X, 026X, and 063X)	07300 Drugs charged to patients

Example Revenue Centers to Cost Center Crosswalk

Revenue Center	Revenue Center Description	Cost Center	Cost Center Description
0100	All inclusive rate-room and board plus ancillary	03000	Adult and pediatrics (general routine care)
0101	All inclusive rate-room and board	03000	Adult and pediatrics (general routine care)
0110	Private medical or general-general classification	03000	Adult and pediatrics (general routine care)
0111	Private medical or general-medical/surgical/GYN	03000	Adult and pediatrics (general routine care)
0112	Private medical or general-OB	03000	Adult and pediatrics (general routine care)
0113	Private medical or general-pediatric	03000	Adult and pediatrics (general routine care)

Step 5: Multiply CCR times Charges to Obtain Cost

- When using overall hospital CCR, link on hospital provider number and multiply charges by CCR
- If calculating cost at cost center level, link on hospital and cost center then multiply charge by cost center CCR
 - Apply the provider specific CCRs to the revenue center total charges

Step 5: Multiply CCR times Charges to Obtain Cost

- **MedPAR**

- Revenue Center Group Cost = [Revenue center group name] Charge Amount * Cost center group cost-to-charge ratio

- **Inpatient claims**

- Revenue Center Cost = Revenue center total charge amount * cost center cost-to-charge ratio

Example from MedPAR File

- Knee replacement cohort from 2002 MedPAR

Provider Number	Case	Rev Ctr Group	Rev Ctr Grp Chg Amt	CCR	Estimated Cost
XX0001	A	Anesthesia	\$1,883	.150	\$282
XX0001	A	Blood Administration	\$844	.000	\$0
XX0001	A	Cardiology	\$109	.434	\$47
XX0001	B	Anesthesia	\$1,088	.150	\$163
XX0001	B	Blood Administration	\$1,853	.000	\$0
XX0001	B	Cardiology	\$109	.434	\$47

Comparison Between MedPAR & Inpatient

- Knee cohort from 2002, same population pulled from MedPAR and Inpatient files.
- MedPAR Estimated Cost = \$17,208
- Inpatient Estimate Cost = \$14,487

Summary

- **Considerable amount of efforts is required to use CCRs at cost center level**
- **Need to evaluate the potential benefit of using this method and the time required**
- **Determine which CCR you need to use**
 - **Cost center specific,**
 - **Overall hospital specific,**
 - **Medicare specific**