

HERC Series: Conducting Cost-Effectiveness Analysis with VA Data

VA Costs: HERC Average Cost Data and Managerial Cost Accounting System (MCA) Data

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Outline

- Overview of MCA National Data Extracts
 - How MCA estimates costs
 - Types of MCA data: Inpatient, Outpatient, Pharmacy
 - Advantages of using MCA
 - Overview of HERC Average Costs
 - How HERC costs are estimated
 - Types of HERC Average Cost data: Inpatient, Outpatient, Annual Summary
 - Advantages of using HERC Average Costs
 - HERC versus MCA costs
 - Criteria to chose
 - Examples
 - Data resources
-

Poll 1: I worked with these data before:

- MCA/DSS cost data
- HERC Average Cost data
- Both
- Neither

Poll 2: I plan to use these data in my own projects in the future:

- MCA/DSS cost data
- HERC Average Cost data
- Both
- Neither
- Not sure

Top Down, Bottom Up Costing Methods

- HERC cost data use relative value weights to estimate cost per encounter (top down)
- MCA cost data are based on an activity-based costing methodology (bottom up)



National approach
Experience based



Local approach
Activity based

Top Down, Bottom Up Advantages

- HERC data: Best for average cost across health system
 - Generalizes across health system
- MCA data: Best to capture local variation in inputs to producing services
 - Differences between facilities and over time



National approach
Experience based



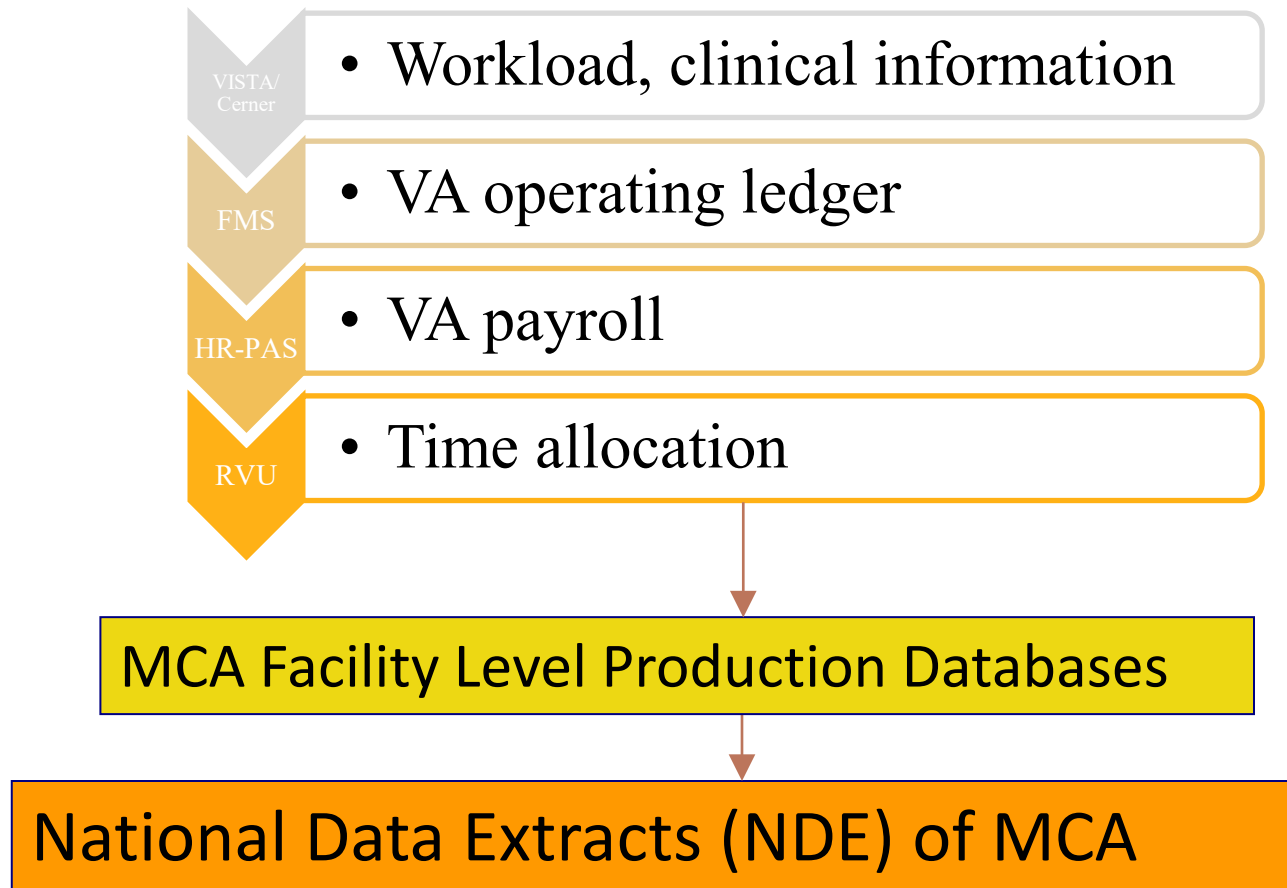
Local approach
Activity based

MCA National Data Extracts

Managerial Cost Accounting (MCA) System

- MCA (formerly called Decision Support System or DSS) is an activity-based costing method.
- MCA is the official managerial cost accounting system for VA.
- MCA developed for administrative purposes.
- MCA is not a billing system.

How Does MCA Produce Cost Data?



MCA Method: VAMC Assigns RVUs to Products

Example of Primary Care Products & Encounter

Encounter
Same patient,
visit day,
clinic stop



15-min clinic visit
RVU1



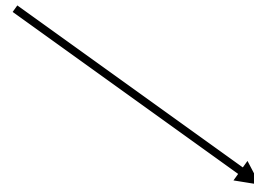
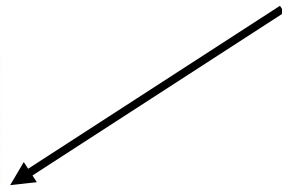
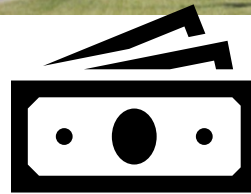
Pneumococcal
Vaccine
RVU2



Tobacco use
treatment counseling
RVU3

Products

MCA Method: VAMC Assigns Costs to its Cost Centers/ Product Departments



MCA Method: Determine Costs of Products

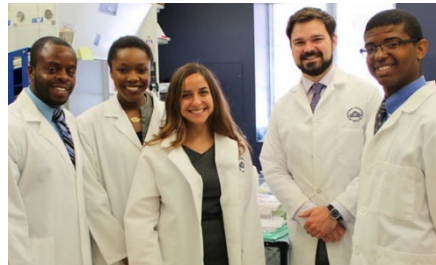
1. Total products in a department are tabulated

\$



Total costs of department

2. Calculate Cost/RVU=






Total RVUs of all products in a department

3. Calculate cost of product = (cost/RVU) x (RVU of product)

MCA Method: Assign Costs to Encounters

Encounter

Same patient,
visit day,
clinic stop

	15-min clinic visit Cost1
	Pneumococcal Vaccine Cost2
	Tobacco use treatment counseling Cost3

$$\text{Encounter cost} = \text{cost1} + \text{cost2} + \text{cost3}$$

MCA National Data Extracts (NDE)

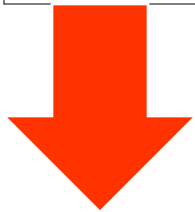
- **Inpatient (Treating Specialty, Discharge)**
- **Outpatient Encounter**
- **Pharmacy**
- Intermediate Product Department
- Account Level Budget Cost Center
- Other files not listed here

MCA Cost File: Inpatient Discharge NDE

- Care of patients discharged in each fiscal year
- One record per discharge
- May include cost incurred in prior fiscal years
- Data only in Discharge NDE:
 - Discharge day
 - Total days of stay
 - Discharge bedsection

Discharge example

Patient	ADMITDAY	DISDAY	FP	LOS	DBEDSECT	TOT
A	24SEP05	01OCT05	1	7	Gen Acute Med	9824.24
A	31OCT05	11NOV05	2	11	Gen Acute Med	4673.01
A	04AUG06	21SEP06	12	48	Rehab	81868.77



3 different admit/discharge dates

Same patient

MCA Cost File: Inpatient Treating Specialty (TRT) NDE

- Treating specialty
- One record per treating specialty per month
 - More than one record in a month if more than one treating specialty in a month
 - All care provided during fiscal year
 - Include stays not yet over

MCA Data Only in Treating Specialty NDE

- Treating specialty
- Census indicator
- Date of entry and exit from treating specialty
 - No discharge date
- Treating specialty length of stay
 - No total length of stay

MCA Treating Specialty NDE Example

Patient	TRTIN	TRTOUT	TR SP	TR SP LOS	FP	TCST_TOT
A	01OCT05	01OCT05	15	1	1	350.01
A	31OCT05	11NOV05	15	1	1	544.24
A	31OCT05	11NOV05	15	10	2	23787.22



Same patient

2 records with same
entry/exit dates

But different months (FP)

MCA Data in Both Inpatient NDEs

- Admit day
- Admitting diagnosis related group (DRG)
- Principal diagnosis
- Admitting diagnosis

MCA Cost Files: Outpatient NDE

- One record per patient per day per clinic stop (identifier)
 - Other utilization data (CDW Outpatient, Inpatient) allow more than 1 record per clinic stop per day
- Primary DX and CPT codes

MCA Data Only in Outpatient NDE

- Date of encounter
- MCA identifier (clinic stop)
 - MCA uses “pseudo stop” code for prosthetics, pharmacy, etc.
- Flag variables identifying data source
 - pharmacy, prosthetics, Vast CBOC, etc

MCA Outpatient Example

Patient	VIZDAY	CLSTOP	COST_TOT
A	20051018	411	340.10
A	20051018	108	240.33
A	20051018	306	250.20



Same patient



Same visit date



Different clinic stops

MCA Cost Variables in All NDEs

- Total
- Fixed direct
- Fixed indirect
- Variable direct
- Variable supply
- Variable labor category 4 & 5
 - Subcategories for surgery and radiology

Additional Cost Variables in Inpatient NDEs

- Separate costs for lab, nursing, pharmacy, radiology, surgery, all other
 - Variable, fixed direct, fixed indirect, supply (where applicable)

MCA Pharmacy NDE

- In the MCA Pharmacy Extract NDE
 - For outpatient records, there is one record
 - Per prescription or supply per person per day
 - For inpatient records, there is one record
 - Per person per day
- MCA sometimes groups two prescriptions into one record if they are for the same national drug code (NDC) and the same person on the same day

MCA Pharmacy Variables

- Medication: drug name, NDC, formulary indicators, VA drug class
- Dispensing: fill date, quantity dispensed, days supplied
- Patient: SCRSSN, date of birth, gender, age
- Ordering provider: provider ID, provider treating specialty
- Note: Clinical information on related visits/stays can be linked to Rx data using SCRSSN.
- Cost: VA cost including direct labor, indirect costs of the pharmacy department, and supplies
 - Total VA cost prescription = ACT_COST + DISPCOST
 - Costs can be negative, ex: return to pharmacy

Pharmacy Copayments

- VA charges some copayments.
 - Depends on income, disability percentage
 - Rules & eligibility levels change year to year
 - Rules available on VA internet
- MCA does not show copayments; they show VA's expense.
- Medical Care Cost Recovery (MCCR) files could show reimbursement from private insurance, if collected

Cost Outliers in MCA

- Users should look for cost estimates that are unexpectedly high given characteristics of care
- Mismatch of cost and utilization can result in unit costs that are very high cost, or negative
- MCA quality assurance efforts
 - Monthly audits and reconciliations performed.
 - Extremely high outliers are identified when MCA NDEs are built

Advantages of Using MCA

- MCA costs estimate reflect facility differences in productivity, efficiencies, economies of scale, etc
- MCA has pharmacy data
- MCA has state nursing home stays

HERC Average Costs Datasets

HERC Average Cost Data

- Developed by HERC researchers for use by researchers.
- Top-down method to take VA budget and assign to specific services.
- Methods vary by type of care.

HERC Method to Estimate Costs

- Acute medical/surgical stays
 - Estimate of what stay would have cost in a Medicare hospital, based on a regression model
- Other inpatient care
 - Length of stay
- Outpatient care
 - Hypothetical Medicare payment based on procedure codes assigned to visit

HERC: Medical/Surgical Stays

- Cost regression estimated using Medicare data
 - Length of stay
 - Days of intensive care
 - Diagnosis Related Group (MS-DRG)
 - Stay is assigned to one of DRG groups based on diagnosis and procedures
 - Medicare relative value weights for DRG

HERC: Medical/Surgical Stays

- HERC identifies acute medical/surgical components of stays in the VA Patient Treatment File (PTF)/CDW Inpatient file
 - Consistent with non-VA hospital definition
 - Contiguous medical-surgical bed section segments

HERC: Medical/Surgical Stays

- HERC applies regression parameters to VA stays to estimate what stay would have cost in a Medicare hospital
- Estimates adjusted to reflect actual VA expenditures from MCA

HERC: Other Inpatient Stays

- Costs assumed to be proportional to length of stay
 - Rehabilitation
 - Blind rehabilitation
 - Spinal cord injury
 - Psychiatry
 - Substance abuse
 - Intermediate medicine
 - Domiciliary
 - Psychosocial residential rehabilitation
 - Long-Term Care

HERC: Outpatient costs

- HERC assigns hypothetical payment
 - Based on RVUs assigned to Current Procedure Terminology (CPT) and HCPCS codes, up to 20 per visit
 - Physician reimbursement rates from Medicare and other payers
 - Facility reimbursement rates from Medicare
- Adjusted to reflect expenditures in the category of outpatient care, defined using clinic stop
- Specific factor for each category used to convert the relative value to a VA cost estimate

HERC: Outpatient costs

- HERC categories of outpatient care
 - Outpatient Medicine
 - Outpatient Dialysis
 - Outpatient Ancillary Services
 - Outpatient Rehabilitation
 - Outpatient Diagnostics Services
 - Outpatient Prosthetics
 - Outpatient Surgery
 - Outpatient Psychiatry
 - Outpatient Substance Abuse Treatment
 - Outpatient Dental
 - Outpatient Adult Daycare
 - Home Care

HERC Cost File:

Person-Level Annual Cost

- One person per record
- Total VA cost and costs of five inpatient and five outpatient categories, LOS for inpatient care
- Includes MCA outpatient pharmacy
- Stays that cross fiscal years are assigned cost in proportion to the days in fiscal year.

MCA or HERC

Which to Choose

- We are often asked which to use.
- Criteria
 - Is costing method consistent with study goals?
 - Precision and Accuracy

Is costing method consistent with study goals?

- Study to determine cost-effectiveness for U.S. health care system
 - HERC uses non-VA relative values
 - HERC costs more like costs typical of non-VA health care settings
- Study to determine efficiency of different VA providers
 - MCA costs reflect differences in productivity, efficiencies, economies of scale, etc.
 - Strong assumptions make HERC estimates inappropriate for this type of study

Precision and Accuracy

- Precision
 - Bottom-up approaches, such as MCA can be very precise.
 - HERC data are less precise than MCA given costing method
 - If you use MCA data, you want to control for geographic wage differentials
- Accuracy
 - Bottom-up approaches can lead to rare irregularities
- Recommendation: use both; one as primary and one as sensitivity analysis

Chapko, M. K., Liu, C. F., Perkins, M., Li, Y. F., Fortney, J. C., & Maciejewski, M. L. (2008). Equivalence of two healthcare costing methods: bottom-up and top-down. *Health Economics*.

Example #1: MCA Costs

- Carey, K., Stefos, T., Zhao, S., Borzecki, A.M. and Rosen, A.K., 2011. Excess costs attributable to postoperative complications. *Medical Care Research and Review*, 68(4), pp.490-503.
- Estimates excess hospital costs due to adverse safety events, e.g. hospital-acquired infections.
- Used MCA costs in primary analysis to account for range of products, activities, supplies to treat adverse events.
- Compared estimates using MCA and HERC Average Costs.

Example #1: MCA Costs

Table II. Descriptive statistics

Variable	Mean or proportion (standard deviation)
Dependent	
DSS costs (dollars)	14461 (34169)
HERC costs (dollars)	13252 (29624)
Independent – patient level	

- For individual safety events, some had higher costs with MCA (DSS) system, others had higher costs with HERC system.
- Using goodness-of-fit tests, MCA costs had lower average error.
- Concluded that MCA data captures costs of very high-cost patients more accurately.

Example #1: MCA Costs

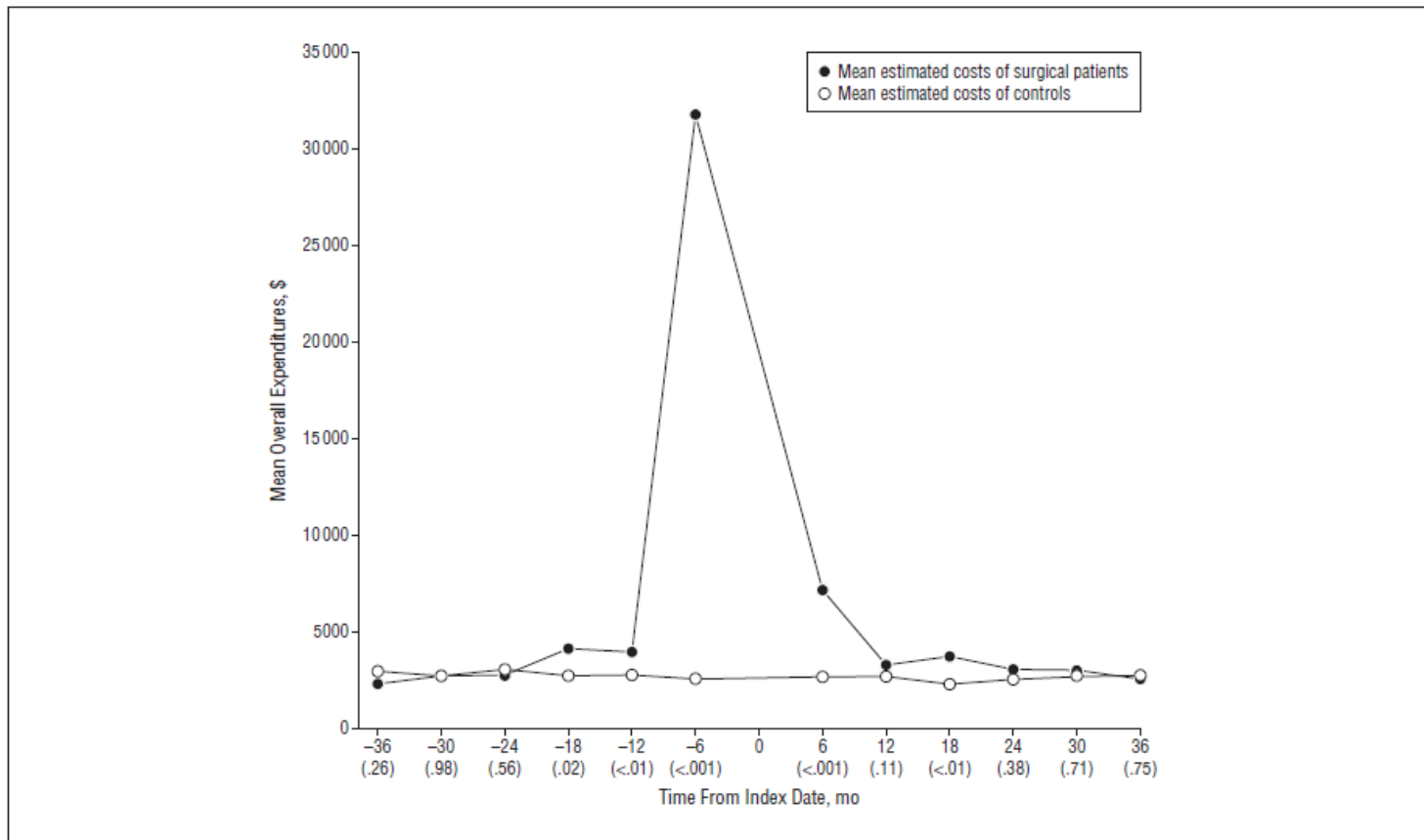
- Study involved questions of efficiency of care within a hospital stay.
- MCA costs more precise, pick up differences in efficiency that HERC cost data do not.

Example #2: HERC Average Cost Data

- Maciejewski ML, Livingston EH, Smith VA, Kahwati LC, Henderson WG, Arterburn DE. Health expenditures among high-risk patients after gastric bypass and matched controls. Archives of surgery. 2012 Jul 1;147(7):633-40.
- Matched patients who received bariatric surgery with similar patients who didn't receive surgery.
- Compared VA inpatient and outpatient total health care costs with HERC Average Cost data for 3 years before surgery and 3 years after surgery.

Example #2: HERC Average Cost Data

VA health care costs of Patients with Gastric Bypass Surgery and Controls



Example #2: HERC Average Cost Data

- Study goal is to compare health care costs related to 2 different treatments.
- Question related to quantity of health care utilization following surgery.
- Local differences in costs not part of key question.
- Generalizable outside of VA

Poll 3: Is MCA (versus HERC Average Cost data) better for?

- A. Conducting CEA for 2 interventions used in and outside of the VA.
- B. Prescription drug costs for VA prescriptions.
- C. Comparing efficiency between two VAMCs.

Responses:

1. A, 2. B, 3. C, 4. A and B, 5. B and C

What Cost Data Do VA Studies Use?

Number of Peer-Reviewed Publications on VA Costs			
VA Cost Method	1980-2007 n (%)	2008-2012 n (%)	All n (%)
HERC Average Cost Data	12(9.0%)	31 (24.8%)	42 (16.2%)
MCA Cost Data	26 (19.4%)	95 (76.0%)	121 (46.7%)
Micro-costing	115 (85.8%)	36 (28.8%)	152 (58.7%)
Community Care	1 (0.7%)	11 (8.8%)	12 (4.6%)
Total	134	125	259

Data Resources

MCA Data Access

- Access to MCA data should be requested through CDW/VINCI and National Data Systems (NDS).
- MCA Program Office Web Site (VA Intranet MCAO web site)
- All MCA files were removed from AITC in 2013, but FY2001-FY2012 MCA SAS 'legacy' files are on CDW/VINCI servers.
- MCA NDE SQL data are available in CDW from FY05 to current year.
 - Accessed through CDW Raw server 'VHACDWA06.vha.med.va.gov'
- MCA data also available in VHA Managerial Cost Accounting (MCA) reports from MCA intranet site.

HERC Data Access

- Access to HERC data should be requested through CDW/VINCI and National Data Systems (NDS).
- All historical files 2001-2012 are available from AITC.
- SQL tables on CDW static server, `vhacdwr01.vha.med.va.gov`, database `VINCI_HERC`
- SAS datasets on [\\vhacdwsasrds01\HERC](#)

HERC Cost Data Guidebooks

<http://www.herc.research.va.gov/include/page.asp?id=guidebooks>

- Research Guide to the Managerial Cost Accounting National Cost Extracts
- Guidebooks for HERC's Average Cost datasets

MCA Pharmacy Resources

■ VIREC's Pharmacy Prescription Data Guide

- VIREC research user guide on MCA and PBM pharmacy prescription data

<http://www.virec.research.va.gov>

■ HERC Technical Report:

- Comparing Outpatient Cost Data in the MCA National Pharmacy Extract and the Pharmacy Benefits Management V3.0 Database

<http://www.herc.research.va.gov/include/page.asp?id=technical-reports>

HERC Series: Conducting Cost-Effectiveness Analysis with VA Data

Next Lectures

Wed
3/2/2022
2 PM ET

Mark
Bounthavong,
PhD

Pharmaceutical Costs
for Cost-Effectiveness
Analysis

Wed
3/9/2022
2 pm ET

Risha
Gidwani, DrPH

Estimating Transition
Probabilities for a Model