

Assigning Costs to Health Service Use: Options and Consequences

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Paul A. Fishman, PhD

Group Health Center for Health Studies
and University of Washington

Mark C. Hornbrook, PhD

Kaiser Permanente Center for Health Research
and Oregon Health & Science University

Aims

- Define and contrast “production costs,” “prices,” and “relative costliness/service intensity”
- What algorithms are used to cost out health services?
- What consequences follow from alternative costing models and data structures?
- How does choice of costing model affect different economic research and evaluation questions?
- How does choice of costing model influence the design and conduct of studies?

Definitions

- Production costs
 - Opportunity cost of all inputs used to produce a well-defined output
- Prices
 - List prices
 - Transaction prices
- Relative costliness
 - Indices of relative costliness across a set of outputs that are expressed relative to a selected numeraire procedure, re: herniorrhaphy

Options for Assigning Dollars to Health Care Services

- Production Costs
 - Micro-costing
 - Step-Down Allocation Models
 - Macro-costing
- Prices
 - Fee Schedules
 - Allowable charges
 - Paid amounts
- Relative Costs
 - RVU/RBRVS-based models

Micro-costing

- Description
 - Measure quantities and costs of all labor and capital inputs used by a firm to produce a well-defined output
- Strengths
 - Focuses on actual production costs for a specific firm
- Weaknesses
 - Very labor intensive method
 - Non-standardized cost accounting systems
- Data requirements
 - Detailed payroll, supplies, overhead, and capital expenses data
 - Detailed specifications of types and quantities of outputs
 - Functional accounting system so that inputs can be tied to specific outputs

Why Micro-Costing?

- Micro-costing is the desired method when you want to study variations in production activities, input purchasing practices, and relative production efficiencies across multiple firms and/or across multiple departments/plants in a multi-product or multi-plant firm
- Example: Economies of scale in angioplasty procedures

Step-down Allocation Models

■ Description

- Calculate average costs of departmental outputs using standard financial accounting reports

■ Strengths

- Don't have to conduct time-and-motion studies to determine how workers allocate their time across joint products

■ Weaknesses

- Medicare cost reports are actually pricing schemes designed to optimize reimbursement

■ Data requirements

- Medicare Cost Reports or general ledgers of providers and integrated health systems

Why Step-Down?

- Gives the user a better idea of fixed versus overhead costs
- Gives the user a better idea of how production is organized into functional units in complex multi-product firms, such as hospitals and HMOs
- Uses existing financial data

Macro-costing

- Use linear regression to estimate incremental medical care costs attributable to some variable—specific disease, location, time period, demographic characteristic, system attribute
- Dependent variable: total medical care expense per case
- Independent variables: morbidity vector, socio-demographic vector, health care system vector, time vector, organizational vector, etc.

Why Macro-Costing?

- Regression models can account for interaction effects not captured by cost accounting or actuarial models
- Specific diseases may interact with comorbidities to increase utilization and costs
- Diseases may interact with age, gender, and residence location in determining costs

Fee Schedules

- **Description**
 - Medicare fee schedule, Blue Cross/Blue Shield Fee schedules, average fee schedules compiled by consulting firms
- **Strengths**
 - Easy availability of local and national fee schedules
- **Weaknesses**
 - List prices contain varying markups
 - Different fee schedules may not be aggregable
- **Data requirements**
 - Utilization data matched to fee schedule codes

Why Fee Schedules?

- Easy to obtain and easy to use
- The greatest challenge is converting all utilization data to standardized codes within and across health care providers
- Not bothered by distortions introduced by loss-leader prices and demand-based pricing

Allowable Charges

- **Description**
 - Captures sum of payer liabilities and patient out-of-pocket expenditures, removing outlier prices
- **Strengths**
 - Counts resources expended, whether paid for or not
- **Weaknesses**
 - Does not capture who paid for what
 - Distorted by monopsony power of 3rd party payers
- **Data requirements**
 - Third-party claims data

Why Allowable Charges?

- User wants a relative resource intensity measure that is not affected by who is paying what portion of the health care bill
- User wants to eliminate some of the variation in prices reflective of profit margins set in response to demand inelasticity

Paid Amounts

- Description
 - Sum of monetary outlays from payers and patients
- Strengths
 - Actual cash flows from all sources
- Weaknesses
 - Patient copayments require extra data processing effort
 - Allows for price discrimination (by volume, bargaining strength, bad debt write-offs) and cost-shifting
 - Unpaid bills show up as zero cost
- Data requirements
 - Itemized bills and accounts receivable from provider electronic billing systems

Why Paid Amounts?

- User wants transaction prices and wants to preserve geographic, inter-firm, and temporal variations in resource intensity
- If patient copays are fixed percentage of health care bills, could use only the amounts paid by third-party payers, but this does not count private pay services

RVU/RBRVS Methods

■ Description

- Establishes relative resource intensity of physicians' services, incorporating physician time, skill, risk, and practice costs
- Four separate scales: E&M, surgery, pathology, radiology

■ Strengths

- Everyone is familiar with the RBRVS and virtually every health care organization providing physicians' services is using it

■ Weaknesses

- RBRVS is really a pricing system designed to support Medicare reimbursement

■ Data requirements

- Standardized coding systems on all medical care services

Why RBRVS?

- User wants a standardized, replicable relative intensity scheme that is not affected by inflation or regional differences in input costs
- User wants to select the RVU conversion coefficient

Choosing a costing model

- Research and study design issues that impact selection of costing model
 - Does data availability rule out options
 - Is a study single or multi-site
 - Characteristics of sites and impact on costing model
 - Integrated systems
 - Pure versus blended payment models
 - Billed charges versus allowed costs versus paid amounts

Examples

- Evaluation of the 'Medical Home' model of primary care delivery
- Cost Consequences of False Positive Mammography
- Incentives to Improve Physician Productivity
 - Describe each study
 - Review the challenges of cost assignment
 - Motivation for selected approach

Medical Home

- Vision for new approach to delivering primary care
- Create home within primary care setting with which patients have most if not all of their contacts
- Goal: all patient needs are met by a specific team
 - Improve continuity of care and reduce segmentation
 - Increase patient satisfaction and reduce turnover

Group Health Experiment

- Medical Home introduced in one of our 20 owned clinics
- New MD led team hired to support reduced panel sizes to scale that model requires
- Clinic chosen for experiment has no specialty providers, urgent care, pharmacy or after hours services

Designing Cost Analysis

■ Research Question:

- Evaluate clinic specific impact and project system wide implications
- Ideally – estimate a production function and assess costs associated with alternative delivery models

■ Challenge:

- Clinic organization results in systematically different fixed and variable cost structures
- How to measure cost to isolate the intervention and develop projections

Considerations

- Goal was not to generalize to nation but provide plan specific analysis
- Production cost model deemed appropriate
 - Because Step Down approach includes clinic specific overhead it might preclude detection of marginal impact of intervention
 - Difficult to back overhead out of step down approach

Solution

■ Micro-Costing

- Allows recreation of overhead from bottom up
 - And supports analysis of either/or fixed and variable cost
- Allows for direct comparison of similar fixed and variable inputs across clinics even if organized in different ways
- Allows for projections to entire system because costs are available at resource level

Cost Consequences of False Positive Mammography

- Research question:
 - Estimate costs to payers of services and procedures related to diagnostic testing among women with false positive mammograms
 - Develop national estimates based on experience of single (GHC) health plan
 - Input into a cost-utility model of women's choices regarding screening

Designing Cost Analysis

- Retrospective analysis of women that had abnormal screening mammograms
 - Based on determination two years following abnormal reading
- Estimate marginal costs relative to True negatives, true positives and false negatives

Challenges

- GHC step down cost allocation approach introduces wide variability of dollar assignment to specific procedures
 - Would GHC specific costs support projections relevant for national experience given specific delivery model?

Considerations

- GHC specific production costs not relevant
 - Assumes clinical decisions are made independently of these costs
- Finite and potentially small set of relevant procedures and easily defined clinical pathways

Solution

- Prices allow for relevant procedures and services allow for greatest generalizability
 - Eliminates variability of production costs for services and procedures both within and over time
 - Interested in payer perspective so prices are appropriate margin
 - Relevant services are universally covered by third party payers so fee schedules that allow for replicability are available

Incentives to Improve Physician Productivity

- Variety of initiatives to improve physician productivity such as pay for performance
- GHC initiative
 - Bonus for meeting target number of encounters
 - Increased same-day appointments (reduce no-shows)
 - Mitigating effects:
 - Elimination of gate keeper role
 - Implementation of EMR and other productivity reducing innovations

Designing Cost Analysis

- Time series design to measure within and across physician effect
- Components of initiative (bonuses and EMR implementation) rolled out in phases
- As with Medical Home face challenge of different clinic cost structures
- Additional burden of time series and changing cost relationships over time

Considerations

- Production cost approach most desirable but lack requisite input configuration to isolate relationship between inputs and physician specific
- Prices would not reflect relationship between inputs and outputs
 - Emphasis on quantity – but might not effectively adjust for effort
 - Additional challenge of time series and impact of inflation adjustment
 - Do changing prices impact coding or practice patterns

Solution

- Relative Costs using work RVUs
 - Capture both quantity, and in theory, quality of effort
 - Relatively stable over time
 - Allows for conversion to both internal and external cost weights
 - In conjunction with measures of encounters allows for assessment of tradeoff between more rather than more intense services

Discussion



Contact Information

- Paul A. Fishman, PhD
 - fishman.p@ghc.org

- Mark C. Hornbrook, PhD
 - mark.c.hornbrook@kpchr.org