

**Health Services Research and Development Service
Cost Analyses
Information for Applicants and Reviewers
March 2004**

This informational memo describes HSR&D expectations for proposals involving health care cost determination and other types of economic analysis.

Types of Economic Analysis.

Proposals should describe the type of economic analysis to be done. Common types of analysis include cost-identification, cost-consequences, and cost-utility analysis.

- A Cost-Identification Analysis determines the cost of a health care program, service, or intervention.
- A Cost-Minimization Analysis compares the costs of alternative treatments under the assumption that they have equivalent effects on patient health.

The following three are examples of cost-effectiveness analysis:

- A Cost-Consequences Analysis examines all costs associated with an intervention, including its effect on health care utilization.
- A Cost-Outcome Analysis determines a ratio of the cost of an intervention to its impact on a nonfinancial outcome, such as changes in the number of deaths or the number of services used.
- A Cost-Utility Analysis examines the incremental effect of health care interventions on both cost and outcomes. Outcomes are measured in units of morbidity-adjusted survival, called the Quality-Adjusted Life Year (QALY).
- A Cost-Benefit Analysis is a cost-utility analysis that expresses outcomes in dollars rather than QALYs.

Standard Methods of Cost-Effectiveness Analysis.

Most proposals that assess cost-effectiveness will refer to the standard method described by the U.S. Public Health Service advisory panel on cost-effectiveness (Gold et al., 1996). Those that do not should explain why that method is not suitable.

Among the key elements of the standard method (or “reference case”) are the following:

- The analysis finds the incremental effect of an intervention by comparing it to a reference group, often the current standard of care. This yields the incremental cost-effectiveness.

- Costs and outcomes are discounted to reflect the reduction in economic value that occurs when cost or benefit is deferred.
- The analysis adopts the perspective of society. Patient-incurred cost is measured.
- Outcomes are valued, usually in terms of Quality-Adjusted Life Years of survival.
- Uncertainty should be addressed with statistical testing and sensitivity analysis.
- A statistical model may be needed to estimate the lifetime stream of cost and benefit associated with the intervention.

Determination of VA Health Care Costs

Researchers may determine VA health care costs by one or several methods. They may directly measure costs. They may use VA cost and utilization databases and apply non-VA measures of relative value to estimate VA health care cost. They may use estimates from the Health Economics Resource Center (HERC) or the Decision Support System (DSS). A combination of methods is often needed. HSR&D proposals should identify each source of VA cost and utilization data and describe how any relevant limitations of the data will be addressed.

Articles describing how to find VA costs were published in a 1999 supplement to the journal Medical Care. A 2003 supplement to the journal Medical Care Research and Review provides additional examples and describes new data resources. Both are available on request from HERC.

Sources of VA utilization data include the following:

- The Patient Treatment File (PTF) is a hospital discharge data set that characterizes hospitalized patients and the care that they received in acute, observation, and extended care stays.
- The Outpatient Clinic File (OPC) contains data on ambulatory care provided by VA. It characterizes ambulatory patients and the diagnoses assigned and procedures performed in their outpatient encounters. This data source is alternately called the National Patient Care Database.
- The Decision Support System (DSS) is a computerized cost-accounting system that determines the cost of VA departments, patient care encounters, and specific health care products used in an encounter. DSS is based on extracts of other VA data systems (i.e., VISTA, PTF, CALM, PAID, CDR). Most data are kept in production databases organized by medical center or network, but national data extracts (NDEs) have been created of the cost of VA inpatient stays and outpatient visits.

The annual NDEs and the combination of PTF and OPC contain very similar numbers and types of records. HERC has prepared an in-depth comparison of DSS and PTF/OPC databases, available for download from the HERC web site.¹

- Prescriptions dispensed by VA pharmacies may be found in two databases:
 - The VA Pharmacy Benefits Management (PBM) database for outpatient prescriptions.
 - The DSS National Data Extract for pharmacy services.

The contents of each database are described in the VIREC Research User Guide: VHA Pharmacy Prescription Data, which may be downloaded from the VIREC web site (www.virec.research.med.va.gov).

- Information on dispenses prosthetics appears in the National Prosthetics Patient Database (NPPD). It includes both external and internal prostheses of every variety, as well as certain types of medical equipment such as catheters, monitors, and external fixture devices. A guide to the NPPD was published in the *VIREC Insights* v. 2 no. 3, available on the VIREC web site.
- The Veterans Integrated Health Systems Technology & Architecture (VISTA) provides detailed clinical and utilization data for every individual treated at each VA medical center. It is the source of utilization data in all other VA databases. It is difficult to create electronic extracts from VISTA, and so proposals to use VISTA should explain that data cannot be found in other VA databases and should describe a specific plan for extracting data.

Sources of VA cost data include the following:

- Financial Management System (FMS) is a summary of the VA expense journal that reports the cost of supplies and the quantity and cost of each type of staff. Expenditures are reported for each medical center by cost center, a reporting unit that does not correspond to any particular patient care department (e.g., the cost center for nursing service is not divided into inpatient wards or outpatient clinics). This source does not identify the cost of patient care programs, particular services, or patient encounters. This data was formerly called the Centralized Accounting for Local Management (CALM).
- The Personnel and Accounting Integrated Data (PAID) system provides occupational and payroll data on all VA employees. PAID includes confidential data and access to it is not routinely granted.
- The Monthly Program Cost Report (MPCR) reports costs of departments at each VA medical center. Costs reported in FMS are allocated according to staff workload data in the DSS NDEs. Proposals for projects that will use MPCR data to find costs incurred by patients should describe the method to be employed. The MPCR was implemented in FY2004. Data for prior years may be obtained from the Cost Distribution Report (CDR),

¹ "Research Guide to Decision Support System National Cost Extracts FY1999-FY2002."

which was similarly constructed but based workload data on service chief estimates. CDR and MPCR are both available for FY2004.

- The Veterans Equitable Resource Allocation (VERA) system allocates funds to VA regional networks based on information in a database created by the VA Allocation Resource Center. The VERA database includes patient level costs estimated using the CDR, OPC and PTF, and other sources. It does not include the cost of specific encounters. Proposals that rely on this data source should explain how the study question will not be sensitive to the assumptions used in creating these cost estimates. This source was formerly known as the Resource Planning and Management (RPM) database.
- HERC Average Cost Data Sets. The HSR&D Health Economics Resource Center is creating a comprehensive set of estimates of the cost of each VA health care encounter that has occurred since October 1, 1998. These estimates are based on the costs reported in the CDR, utilization from the PTF and OPC, and non-VA data on the relative costs of health care encounters. These data rely on the assumption that VA uses the same relative quantity of resources as non-VA providers, and that encounters with the same characteristics have the same cost. Proposals that rely on this data source should explain how the study question will not be sensitive to the assumptions used in creating these cost estimates.

Many proposals rely on non-VA cost data. Non-VA data are used to estimate comparable costs where none exist in VA, to identify the costs of non-VA healthcare utilization of VA patients, and to serve as benchmarks for VA costs.

Sources of non-VA cost data include the following:

- Medicare databases include enrollment, entitlement and claims history information on all Medicare beneficiaries. Claims data include records of individual inpatient stays and outpatient visits. Medicare also releases annual hospital financial reports. VIREC has produced a dataset of Medicare records for users of VA services. The matched VA-Medicare data are described on the VIREC web site (<http://www.virec.research.med.va.gov>).
- Medicaid is a federally funded, state-operated medical care program for the poor and disabled. Researchers should be aware that there are differences across states in Medicaid policies, services, and datasets. There are multi-state Medicaid data sets, and an emerging national database. Medicaid is overseen by the Center for Medicare and Medicaid Services (CMS). The Medicaid web site (www.cms.hhs.gov/medicaid) contains information on publicly available data.
- American Hospital Association (AHA) Annual Survey is a voluntary survey of hospitals. The publicly extract, available for a fee, features data on workload, staffing, revenues and expenses at the facility level, including VA medical centers.

VA investigators may learn more about cost and utilization databases from the following centers:

Information on VA cost databases may be obtained from the VA HSR&D Health Economics Resource Center. HERC maintains a web site (<http://www.herc.research.med.va.gov>) with resources for researchers. HERC staff may be contacted by e-mail (herc@med.va.gov), or by phone (650-617-2630).

Information on VA utilization databases may be obtained from the VA Information Resource Center (VIREC). VIREC has a web site (<http://www.virec.research.med.va.gov>) and may be contacted by e-mail (virec@research.hines.med.va.gov), or by phone (708-202-2413).

The VA Management Science Group (MSG) has information on sources of non-VA cost and utilization data that are available to VA researchers. MSG make several datasets available at the VA Austin Automation Center, including Medicare cost reports, AHA Surveys, and state discharge data sets. The MSG may be contacted by phone (781-687-2678). Information on Medicare databases can also be obtained from VIREC or from the Research Data Assistance Center (RESDAC). RESDAC is a resource center for all researchers who wish to work with Medicare data. It maintains a web site (<http://www.resdac.umn.edu/>) and may be contacted by e-mail (resdac@umn.edu) or by phone (888-973-7322).

The VISN Support Service Center (VSSC) offers a wealth of financial and utilization data on its web site (<http://www.vssc.med.va.gov>). Data sources accessible through VSSC include the “KLF Menu,” a tool for accessing DSS and certain other databases in real time and viewing results on the user’s screen; FMS finance data; and a growing number of other data sources.

Issues Addressed by Proposals for Economics Research

Proposals to identify health care costs may need to consider the following issues:

- Economic costs may not be entirely captured in cost or utilization databases.
- Charges do not equal cost.
- Costs are affected by geographic variations in wages.
- Health care products are diverse, and their cost may be affected by severity of illness.
- The definition of individual health care products may differ across institutions.
- Cost and utilization data often require validation.
- Some type of direct measurement of cost and utilization may be required.

The economic analysis section of an HSR&D proposal ordinarily addresses the following:

Research Question(s)

1. The study question is described. Cost questions are posed in an answerable form.

2. The type of analysis is indicated (cost-identification, cost-consequences, etc.)
3. Comparator groups (or usual care) are clearly described.
4. The proposal details the study's relevance to VA and non-VA providers or patients.
5. The proposal identifies the perspective of the analysis (e.g., the patient, payer, provider, society at large). This perspective is considered in defining cost.

Cost Methods

6. Cost is defined. All important and relevant costs for each alternative are identified. The investigator may wish to consider the cost of non-VA healthcare costs, and the costs of capital, such as buildings and equipment.
7. Data and methods are described. The proposal demonstrates an understanding of the limits and appropriate use of data sources. It discusses the strengths and shortcomings of each data source, and its validity and accessibility. The proposal describes what permissions must be obtained, and costs incurred, to obtain data.
8. If costs will be measured directly, the method of determining personnel cost is described, including the means of allocating personnel time. Studies of new interventions explain how costs that pertain to the intervention will be distinguished from costs incurred in researching its effect.
9. The proposal considers any special circumstances that may make cost measurement difficult and describes appropriate strategies.
10. If indirect costs or non-healthcare costs are to be considered, the proposal describes how they will be measured. The proposal indicates whether time lost from work or the value of the time of unpaid caregivers will be included.

Outcomes and Benefits

11. If the proposal is a cost-effectiveness or cost-benefits analysis, then the method of measuring outcomes is described. The proposal clarifies whether indirect costs will be counted as a cost or as an outcome. Cost-effectiveness studies ordinarily measure outcomes in Quality-Adjusted Life Years. Such proposals describe the method of measuring the utility associated with different health states.

Analysis

12. The analysis plan addresses uncertainty by including statistical tests and sensitivity analyses.
13. The effect of time on costs and outcomes is considered through discounting.
14. If a model is necessary, it is completely described.

15. Qualifications of research staff, including their familiarity with VA data sources, are noted. Not every cost study requires a health economist.

Involving a Health Economist

Some cost analyses may be straightforward enough to be conducted by an experienced VA researcher without economic training or costing experience. Other analyses will require the assistance of a health economist. Although there are guides to using VA cost systems, be prepared for many challenges if no one on the research team has prior experience with VA costing. There are no formal rules about when to use a health economist, but there are some good rules of thumb.

An economist is not needed for every health services study involving cost. If cost is the secondary rather than central outcome of the study, if the study takes the payer's perspective, or if the study is limited to an examination of the cost of the intervention, an experienced health services researcher or biostatistician may be able to carry out the study without the assistance of an economist. An example of this type of study is a cost identification analysis in which the payer's perspective is used and the cost of a single intervention is determined (e.g., the cost of pill A versus pill B). Some very experienced researchers may be able to conduct cost-effectiveness studies without the assistance of a health economist. Familiarity with VA databases may be at least as important as health economics training. Health economists who are unfamiliar with the VA system will need to learn VA cost determination methods.

An economist may be needed for complex studies. Greater complexity requires greater expertise. A health economist may be needed if the study will determine all health care costs, if it adopts a societal perspective, if it examines cost-effectiveness, or if costs and outcomes are to be discounted. Adoption of the societal perspective requires methods to measure patient-incurred cost and costs that VA patients incur in visits to non-VA providers. Studies that require modeling may require research staff who are experienced in constructing decision analysis models.

A list of VA economics researchers is maintained at the HERC web site at:
<http://www.herc.research.med.va.gov/findexpert.asp>

References on VA Cost Determination

Barnett PG. 2003. Determination of VA health care costs. *Medical Care Research and Review* 60(3 Supplement):124S-141S.

Phibbs CS, Bhandari A, Yu W, Barnett PG. Estimating the costs of VA ambulatory care. *Medical Care Research and Review* 2003;60(3 Suppl):54S-73S.

Smith MW, Barnett PG. Direct measurement of health care costs. *Medical Care Research and Review* 2003;60(3 Suppl):74-91.

Smith MW, Joseph G. Pharmacy data in the VA health care system. *Medical Care Research and Review* 2003;60(3 Suppl):92-123.

Swindle RW, Beattie MC, Barnett PG. The quality of cost data: a caution from the Department of Veterans Affairs experience. *Medical Care* 1996;34(3 Supplement):MS83-90.

Wagner TH, Chen S, Barnett PG. Using average cost methods to estimate encounter-level costs for medical-surgical stays in the VA. *Medical Care Research and Review* 2003;60(3 Suppl):15-36.

Yu W, Wagner TH, Chen S, Barnett PG. Average cost of VA rehabilitation, mental health, and long-term hospital stays. *Medical Care Research and Review* 2003;60(3 Suppl):40S-53S.

References on Cost-Effectiveness Analysis

Drummond NE, Stoddart GL, Torrance GW. *Methods for the economic evaluation of healthcare programs*. 2nd Edition. Oxford: Oxford University Press, 1997.

Gold MR, et al. *Cost-effectiveness in health and medicine*. New York: Oxford University Press, 1996.

Russell LB, Gold MR, Siegel JE, Weinstein MC. 1996. "The role of cost-effectiveness analysis in health and medicine." *Journal of the American Medical Association* 276(14): 1172-1177.

Siegel JE, Weinstein MC, Russell LB, Gold NM. 1996. "Recommendations for reporting cost-effectiveness analyses." *Journal of the American Medical Association* 276(16): 1339-1341.

Sloan FA, ed. *Valuing health care: costs, benefits, and effectiveness of pharmaceuticals and other medical technologies*. Cambridge: Cambridge University Press, 1994.

Weinstein MC, Siegel JE, Gold MR. 1996. "Recommendations of the panel on cost-effectiveness in health and medicine." *Journal of the American Medical Association* 276(15): 1253-58.