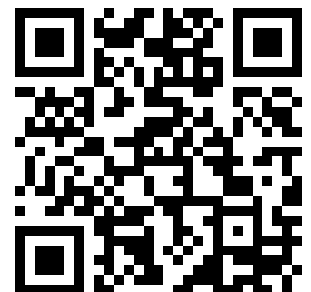


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# DETERMINING THE **UNIT COST** OF SERVICES

A GUIDE FOR  
  
ESTIMATING THE COST OF SERVICES  
  
FUNDED BY THE  
  
RYAN WHITE CARE ACT OF 1990

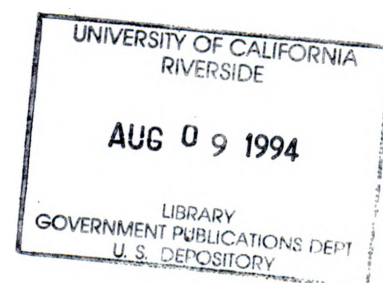


U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES  
Public Health service  
Health Resources and Services Administration



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In the Spring of 1992, HRSA's Bureau of Health Resources Development (BHRD) assembled a workgroup to examine ways to provide guidance on estimating unit costs for services funded under Title I and Title II of the Ryan White Comprehensive AIDS Resources Emergency Act of 1990 (CARE Act). The workgroup recommended that HRSA provide standard categories and definitions for direct and indirect costs as well as standard definitions and units for major service categories. The workgroup shared information and reached consensus on common cost and expenditure categories and encouraged HRSA to provide sample methods for computing unit costs. A summary of these discussions is contained in "Meeting Summary for Workgroup on Unit Costs and Cost Effectiveness of Services Supported Under Title I and Title II of the Ryan White CARE Act of 1990," prepared by Mary Harrington, Mathematica Policy Research, Inc. October 21, 1992.

The authors of this guidebook appreciate the assistance of Mary Harrington and the following members of the workgroup: Mary Lou DeCiantis, Rhode Island Department of Health, AIDS/STD Division; Herbert Fillmore, M.S.W., New York State Department of Health; John Fleishman, Ph.D., formerly with the Center for Gerontology and Health Care Research, Brown University and currently with the Agency for Health Care Policy Re-

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Of course, any outstanding errors remain the responsibility of the authors.

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# INTRODUCTION

**T**he Bureau of Health Resources Development (BHRD) of the Health Resources and Services Administration (HRSA) prepared this guidebook specifically to help recipients of funding from the Ryan White Comprehensive AIDS Resources Emergency Act (CARE) estimate their average unit cost of services. Entities receiving CARE Act funds are usually health and human service organizations, and for them the process of estimating the average unit cost of services can be very valuable. It is also important for HRSA to obtain estimated unit costs for the HIV services supported by the CARE Act since, as part of its management responsibilities, it must report to Congress on the use of CARE Act funds. Thus, HRSA is vitally interested in having providers report accurate unit cost information which can be used for these reports and for planning purposes.

## Who should read this guidebook?

This manual is a tool for Ryan White service providers, State consortia, and local planning councils. Typical providers include those providing primary health care services, consortia which provide direct services, agencies which provide multiple social services, and single service agencies. Services funded under the Ryan White CARE Act cover an array of home- and community-based care, such as primary health care visits, home health care, counseling, case management, housing, adult day care, and transportation assistance.

Specifically this guidebook is for agency administrators who are probably already overwhelmed with paperwork. It is written in a straight-forward step-by-step format with lots of examples. A busy administrator should be able to read this guidebook and apply the methodology in less than a day.

## What Is Unit Cost?

**"Unit cost" is the cost to produce or deliver one unit of a product or service.** Estimates of unit cost are based on actual direct and indirect cash expenses incurred to provide a service, as well as the value of depreciated capital assets and donated goods and services. The unit cost of a product or service is information that directors, managers, and funders can use to improve the quality of client service, to save money, and to increase revenue. Few other modern management tools have such a broad application in

improving the management of the health and human service delivery system as the process of unit cost analysis.

Much of the private sector, particularly the manufacturing industry, uses unit cost analysis as a basis for pricing and efficiency improvements. The determination of unit cost in health and human service settings is less widespread, particularly among not-for-profit community service agencies (Gambino, 1981, Hairston, 1985), due to the relative difficulties of defining the "unit" of service and capturing "full" cost. Estimating unit cost may require only a few hours of analysis; however, more time is required for determining more precise unit cost measurements. The methodology described in this guidebook does not require a sophisticated cost accounting system; it does require some basic program budgeting. This guidebook serves nonprofit managers and other providers who want to estimate unit costs, but do not need or want to take a cost accounting class designed for the for-profit sector (Hairston, 1985).

## What unit cost is not

Average unit cost is generally not the fee that is charged to the client or a third party. Fees may be heavily subsidized below the average cost or inflated above cost to generate a profit. Average unit cost is not usually the average expenses per client, because different clients use services at varying levels of intensity and volume. Unit cost is not the same as the average amount of grant or contract funds per client or per service.

It is important to note that an estimate of unit cost does not relate to agency funding sources. For example, whether an agency receives a small or a large percentage of funds from the Ryan White CARE Act does not directly affect the estimate of its average unit cost. A service that is fully funded from one source should not have a different unit cost from a service that has many sources of funds, all expenses held equal.

Finally, estimates of unit cost are seldom exact. This guidebook emphasizes how to estimate average unit cost in a generally acceptable, practical, and uniform manner with a high degree of accuracy. However, no group of independent cost accountants is likely to arrive at the same exact estimate of unit cost because of conceptual differences in definitions of the service

units, methods of depreciation, relevance of historical data, valuation of donated goods and services, and the various methods of categorizing and allocating direct and indirect costs.

### How this guidebook can improve management

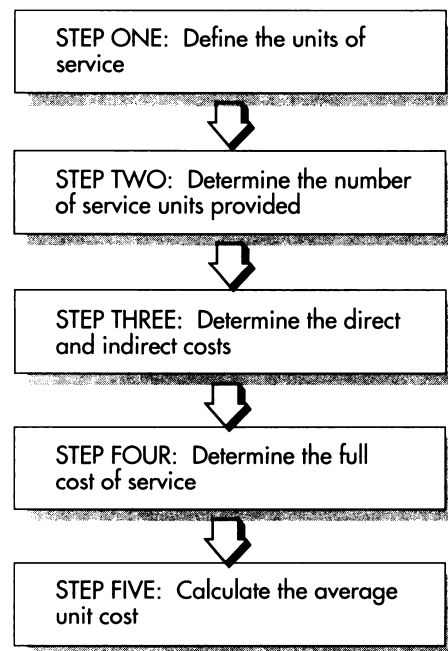
Despite the lack of a common accepted methodology and other difficulties, many administrators have used unit cost analysis as a powerful tool to increase donations, reimbursements, and overall efficiency. A few brief examples illustrate its value:

- Recently a counseling agency reviewed the cost of providing 1-hour of individual counseling as a first step towards revising the fee schedule. The agency discovered that the high end of the existing fee scale did not cover the full cost of the service. By setting the middle of the fee scale equal to the full cost of the service, the agency was able to increase revenue from insurance payments. Lower and higher fees balanced each other and the agency was better able to recover its costs.
- Another agency that provides housing for people with AIDS conducted unit cost analysis and discovered that their unit cost was over \$150 per night - greater than the cost of housing clients in a fine hotel. However, the agency was soon to open another apartment complex which would double the number of residents it served. As a result, the agency could achieve greater economies of scale and reduce the average unit cost to a more reasonable \$85 per night. Plans are underway to acquire another housing facility which will result in additional economies and bring the unit cost in line with State and federal reimbursements.
- A not-for-profit organization that provides construction skills training to low-income women with children determined the unit cost (one 3-month course per student) to be \$1,600. This information was then used as a highly successful fundraising tool because some donors were willing to underwrite the full tuition for one student. The unit cost estimate was also used in a cost-benefit study to show the cost effectiveness of their organization's job training program.

### The Basic Steps

The process of determining unit cost has five basic steps: (1) define the exact units of service; (2) count the total number of units in a given time period; (3) determine the direct and indirect expenses of producing the

units of service; (4) add the components of "full" cost for the same time period, which include depreciation of capital assets and a valuation of donated resources other than cash used to deliver the service; (5) divide the full cost by the total number of service units to arrive at the average unit cost during a particular time period. Again, these basic steps are:



This guidebook discusses each step, then, in the final section, discusses issues related to unit cost analysis (including economy of scale), cautions against inter-agency comparisons, details the value of determining fixed and variable costs, and addresses automation issues. Case studies illustrate different approaches to estimating unit cost.

---

## STEP ONE

### Define the Units of Service

**S**tart by defining the units of measurement for the most common services. This step is essential, but can be a challenge because many health and human services are difficult to define. To begin, think about the programs your agency budgets for and operates. Identify the distinct outputs of each program. Program outputs might include an hour of counseling, a day of respite care, or a dental care visit.

Most large health and human service agencies have several departments, divisions, and programs, each of which may deliver one or several services, while smaller agencies may only offer one specific service. For example, multiple service agencies might deliver case management services in one department, but operate a food bank or a housing assistance program in another department. Rather than grouping these services, defining a unit of service for each program would generate more meaningful and mutually exclusive definitions of units. Organizations such as home health agencies, that charge or are reimbursed for services according to the skills and other resources used, often define units of service to take these differences into account. For example, agencies distinguish personal attendant care from skilled nursing and often define a food bank service by the number of bags of food.

Health and human service agencies classify units of service by one of four characteristics: amount of time, episode or activity, material good, or outcome (Bowers, 1976). Many services can be measured in more than one way, that is, individual counseling could be counted in hours, sessions, or therapeutic outcomes. A unit of case management might be time (e.g., 15 minutes to manage a client's case) or episode (a single contact with the client such as a visit or telephone call).

The basic nature of health and human services makes it difficult to define standard, industry-wide units of service. Community services change and definitions evolve over time; new services arise to meet emerging, unmet needs; and multiple models of care are developed to serve different clients. Certainly the services provided to persons with HIV and AIDS have changed as our knowledge has grown. For these reasons, even though this guidebook offers some suggestions for unit definitions, providers may have reasons for using their own definitions.

As a starting point, this guidebook recommends using the definitions developed by BHRD for use with the Uniform Reporting System (URS), an information system BHRD will be implementing to collect client and service utilization data from providers funded under Titles I and II of the Ryan White CARE Act.

The URS asks for the total units of various services. While providers can (though not always) save time by using the same URS definitions for unit costs, they may choose to estimate unit costs for some units of service in greater detail than the suggested URS definition. Units of time may be easy to match to the personnel providing the service and thus to specific salaries, benefits, and other expenses. For instance, the cost of 15 minutes of case management is primarily the salary and benefits of the case manager for that 15-minute period. Units of time also are more homogeneous than counting a service as simply an encounter or contact. For example, since a 5-minute telephone conversation is less costly than a 2-hour intake interview, counting units in 15-minute increments provides more accurate information.

Table 1 describes the services most commonly funded under the CARE Act (column 1), what URS unit of measurement(s) applies to that service, and, in the last column, alternative units of measurement that are more detailed. If you choose to use a more detailed measurement, make sure you are able to convert that unit back to the more general URS units of service for purposes of reporting the number of services.

Choosing which type of unit to count is largely operational. For example, a counseling agency might decide whether to count hours, sessions, or outcomes based on several factors including:

- Which unit does the URS count?
- Which unit is easiest for service staff to count accurately given the current record-keeping system?
- Which units are already defined and reimbursed by third parties, including Medicaid, private insurers, and any client fees?
- Is the time intensity of the unit a significant determinant of cost?

The services in Table 1 are defined as units of measurement. Because standards of care and protocols

**TABLE 1**  
**RYAN WHITE CARE ACT UNITS OF SERVICE AND MEASUREMENT**

<b>SERVICE</b>	<b>UNIFORM REPORTING SYSTEM UNITS OF MEASUREMENT</b>	<b>ALTERNATIVE DETAILED UNITS OF MEASUREMENT</b>
Primary Medical Care	<ul style="list-style-type: none"> <li>• number of contacts/medical care visits (includes diagnostic tests, early intervention)</li> </ul>	<ul style="list-style-type: none"> <li>• visits (not including medications, lab fees)</li> <li>• visits with specialist care provider</li> </ul>
Primary Medical Care - Medications and Lab Fees		<ul style="list-style-type: none"> <li>• visits, including medications and lab fees</li> </ul>
Oral Health Care	<ul style="list-style-type: none"> <li>• number of visits</li> </ul>	<ul style="list-style-type: none"> <li>• preventive care visits</li> <li>• more extensive visits</li> </ul>
Mental Health Therapy/ Counseling	<ul style="list-style-type: none"> <li>• number of contacts/treatments, therapy, counseling visits</li> </ul>	<ul style="list-style-type: none"> <li>• visits</li> <li>• hours</li> </ul>
Case Management	<ul style="list-style-type: none"> <li>• number of case management encounters (face-to-face and other)</li> </ul>	<ul style="list-style-type: none"> <li>• hours (15 minute increments)</li> <li>• encounters (telephone contact with client)</li> <li>• clients (active caseload)</li> </ul>
Substance Abuse Treatment/ Counseling	<ul style="list-style-type: none"> <li>• number of treatment/counseling visits</li> </ul>	<ul style="list-style-type: none"> <li>• visits</li> </ul>
Rehabilitation Care	<ul style="list-style-type: none"> <li>• number of rehabilitation service encounters</li> </ul>	<ul style="list-style-type: none"> <li>• visits</li> </ul>
Home Health Care	<ul style="list-style-type: none"> <li>• number of para-professional care visits (4 hours = 1 visit)</li> <li>• number of professional (skilled) care visits (2 hours = 1 visit)</li> <li>• number of specialized care visits (2 hours = 1 visit)</li> </ul>	<ul style="list-style-type: none"> <li>• hours</li> <li>• visits</li> </ul>
Hospice Care In-home Residential	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• days of hospice care</li> </ul>
Adoption/Foster Care Assistance	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• placements</li> </ul>
Buddy/ Companion Services	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• hours</li> <li>• contacts</li> </ul>
Day and Respite Care	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• days of care per client</li> </ul>
Direct Emergency Assistance	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• \$ value of assistance provided</li> </ul>
Food Bank/Home Delivered Meals	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• meals</li> </ul>
Housing (Group) and Housing Related Services	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• nights of housing per client</li> <li>• housing placements</li> <li>• \$ value of rental assistance</li> </ul>
Client Advocacy	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• hours</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• number of one-way trips per person</li> </ul>
Other Services	<ul style="list-style-type: none"> <li>• number of unduplicated clients served</li> </ul>	<ul style="list-style-type: none"> <li>• hours of specific service</li> </ul>

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are not included as part of service definitions, and lack complete definitions, different providers may deliver two services by the same name that are very different in content, intensity, and quality. And, if a provider changes the content of a service, the unit cost will increase or decrease. While we recognize this problem of comparing "apples and oranges," unit cost is still very valuable management information for describing a provider's service (Lohmann, 1980).

In some cases, the common output of a single program should be further segmented, or broken down into units that are based on cost-related factors. For example, a child care program that serves infants to preschool age children may use only one service unit, e.g., a day of child care. However, infant care involves significantly higher costs than care for preschoolers because additional staff are required. So, defining the service unit as a day of care for children of all ages leads to inaccurate cost estimates. The child care agency would obtain more useful information by calculating the cost of care for infants and the cost of care for preschool children separately.

Among the typical Ryan White CARE Act services, costs may vary by the stage of illness. For example, primary medical service may be defined at two levels: for symptomatic clients and for asymptomatic clients. The unit cost for the same service might be calculated separately based on where the service is provided, such as a rural or an urban clinic, since the costs in these settings differ. If the cost of care for children, women, and men is substantially different, then the service unit definitions should be distinct.

A few services should be "unbundled" and described as component services. For example, the cost of a primary medical care visit can vary widely depending on where medications are provided and laboratory services used. Therefore, medication and laboratory components should be considered as an added cost to the primary medical care visit cost. Similarly, adult day care services should separate transportation and the actual care into two distinct units.

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## **STEP TWO - Determine the Number of Units**

**T**his step may be relatively easy if you maintain an automated information system based on client records that totals the number of services provided. Otherwise, you must manually review client records. Some agencies may have to institute simple data collection procedures to determine the number of service units produced, which may involve a review of client files to count the number of each unit of service delivered. You can also sample 20 to 50 percent of the client files if a review of every client file is too time consuming, or you may have other paper records that can be used to count the number of services provided. A health care clinic, counseling agency, or day care center might maintain sign-in sheets or appointment books. A van or bus driver might keep a travel log of each one-way trip.

Time sheets filled out by employees can be used to easily measure service units. For example, if a case manager spent 100 hours last month in direct client work, then measuring case management service units in 15-minute increments converts to 400 units (100 hours x 4 units per hour = 400 case management service units). This is another advantage of defining service units in increments of time, particularly if labor is the main cost factor (Bowers, 1976).

At this point, it is important to decide what time frame you will use in estimating the unit cost. You may want to determine the unit cost during the last month, quarter, or year. The time period used should match the timing on accounting reports. For instance, you should capture annual service utilization data for the same fiscal year period used by the accounting department.

If a service is new or the number of clients is increasing rapidly, it is valuable to forecast the unit cost for the next quarter or year. Forecasts generally use historical or comparable experience as a basis for

estimating the future number of services and associated costs. However, trying to calculate and monitor unit cost for human services on a weekly or daily basis is seldom worthwhile because volume variations naturally occur.

---

## **STEP THREE - Determine the Direct and Indirect Costs**

**T**he number of service units provided is just one side of the unit cost equation; the other is determining the full cost of providing the services. The most common method of cost accounting for health and human services divides costs into direct and indirect costs. Your business manager or accountant will probably be of great help at this step.

If an agency produces only one type of service, then total expenses will equal the direct and indirect costs. However, most agencies have multiple service units, so they must determine the direct costs for each unit and then add an appropriate percentage of indirect costs. If your organization uses a cost accounting system, determining direct and indirect costs will be relatively easy. If not, you will probably need to do some estimating and allocating to derive the direct and indirect costs for each type of service unit. Be consistent and use the same time period for all your calculations. Your total of direct and indirect costs for all of the service units should equal the total agency expense for the given time period.

### **Direct Costs**

The easiest way to determine the full cost is to add all of the direct costs associated with providing each type of service unit. Direct costs are those expenses which you can easily relate to the provision of a specific product (Gambino, 1981). Typical direct costs include: the wages and benefits of employees who directly provide the services; the cost of materials, equipment, and supplies to produce the service; and any other direct expenses. Do not restrict direct costs either to discretionary expenses or to payment obligations (Neumann, 1988).

How should you identify direct costs? Most health and human service agencies group costs by either functional area or program area. Program budgets are common among nonprofit organizations even if they are not a part of the formal accounting system (Henke, 1989). Starting with program budgets makes it relatively easy to identify direct costs.

One challenge in allocating direct costs relates to staff who provide more than one type of service unit. For instance, a nurse might provide primary health care visits, case management contacts, and occasional home

health care visits. An agency director may spend the majority of time in administrative and fundraising chores, but also spend some time providing direct service.

Staff time should be computed and charged to each of the direct services provided. This may require that personnel who perform multiple services maintain time logs. For example, some agencies ask employees to keep a daily, weekly or monthly time report which indicates total hours or the percentage of time spent in each program area (as well as sick leave, vacation, and overtime). An agency might also ask staff to sample their program time during a test period and extrapolate the results to the entire year. Personnel involved in direct client services should count the time spent with a client, and the time spent on a client's case before and after the contact, including the time spent getting ready for the client visit and the follow up after the visit.

Other expenses which might seem like indirect costs can be allocated as direct costs by program area. Rent or mortgage payments, for example, should be allocated by program area based on square footage estimates. Office expenses, such as telephone charges and postage, should also be allocated equitably among the program areas.

### **Indirect Costs**

Indirect costs include all expenses which are shared by more than one program area. As a result, the indirect costs must be allocated to each program. If the total direct costs for the agency are assigned to each program first, then all of the remaining expenses of the agency will be indirect costs.

Which costs are considered "indirect" will vary among different providers. Typically indirect costs include: facility expenses (utilities, furniture, phone systems, etc.), agency administrative salaries (director, accountant, etc.), and fundraising expenses. All of these costs generally support the entire agency, rather than just one program. Use the budget structure of the organization to identify many indirect costs. Some categories of indirect costs, such as "general and administration" and "fundraising" are tracked as separate budget categories and should be allocated among the direct service programs. For instance, a nursing division in a primary health care clinic may have its own budget and ex-

penses which need to be allocated among the service areas.

"Indirect costs" and "overhead costs" are terms often used interchangeably. However, overhead costs can refer to the expenses from another separate layer of the organization. For example, a local health department may have overhead costs related to certain State health programs, a share of which might be included in the determination of unit cost as "indirect administrative cost." Similarly, a local organization may pay dues to a national organization to maintain accreditation and consider these dues as an overhead cost.

Total indirect costs should be equitably allocated among the various departments, products, and service units. For instance, a percentage of the cost for a general financial audit should be allocated among the various program areas. To do this, select a basis for allocation. Typical bases for allocations include the square-footage of the facility, the sources of revenue, the gross salaries within each program, or the percentage of each program's direct costs to the total direct costs.

When the benefit to each of the agency programs from the indirect costs is approximately the same, it is acceptable to choose one allocation base. (OMB, 1980). For example, you might use the percentage of total square footage occupied by a program as the program's percentage of indirect costs. More commonly, however, the percentage of a program's direct cost to the total agency's direct cost is used as the base. The following simple example shows an agency with only two programs:

Program A: Direct Costs	= \$100,000
Program B: Direct Costs	= \$200,000

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Agency: Total Direct Costs	= \$300,000
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In this example, direct costs for Program A are one-third of the total direct costs and direct costs for Program B are two-thirds of total direct costs. You can use these ratios to divide the indirect costs between Programs A and B.

If the indirect costs vary among different programs, it may be more accurate to use more than one basis for allocating the indirect costs. For example, a multiservice agency can use a square foot estimate as a basis for allocating the indirect costs of the agency's utility bills. If 90 percent of the facility is used as a day care center and only 10 percent as office space, then 90 percent of the facility costs should be allocated to the day care

program. It is important to accurately allocate an indirect cost to a specific program to avoid incorrect unit cost estimates. Inaccurate cost estimates create budget problems in the long-term when an agency sets fees or negotiates service contracts based on unit costs which may be too low or too high.

Fundraising is a common expense category in a nonprofit budget; it costs money to raise money. As an indirect cost for all programs, fundraising expenses can be allocated among the service units based on the amount each receives from this revenue source.

Laboratory and medication costs should be allocated appropriately among the health care programs. Use caution in allocating these expenses. All health care visits do not include laboratory tests and medications, and so these costs should be identified separately from the primary health care visit.

For simplicity, and at the risk of losing some precision, we recommend that very large organizations use a "direct" method of allocating indirect costs. The direct allocation method is commonly accepted within the nonprofit accounting profession (OMB, 1980; Kettner, 1987). Cost accountants have several sophisticated methods of allocating indirect costs including the step-down method, the double distribution method, and the simultaneous equation method. In a sense, all of these methods convert the indirect costs into direct costs.

#### To use the direct allocation method:

- First, determine the indirect costs, that is, all of the costs that could not be assigned directly to one specific program.
- Next, choose the allocation basis for distributing each category of indirect costs (or choose one allocation basis for all of the indirect costs).
- Lastly, allocate each category of indirect costs among the direct program areas.

Table 2 includes typical direct and indirect costs. However, account categories used by nonprofit organizations vary considerably.

#### Example - City Community AIDS Services

Let's use a fictional example to make this step clear. Our agency, "City Community AIDS Services," provides three services: adult day care, comprehensive case management, and transportation (van service to and from adult day care center). The spreadsheet (table 3) illustrates how direct and indirect costs are allocated to each program or service area. The "management

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**TABLE 2**  
**TYPES OF DIRECT AND INDIRECT COSTS**

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**DIRECT COSTS: Costs directly assigned to the production of the service unit**

Program Personnel	• Salaries and wages multiplied by a percentage of time per person spent in each program
Benefits and Taxes for Program Personnel	• Benefits and taxes multiplied by a percentage of time per person spent in each program
Facility costs	• Rent or mortgage payments multiplied by a percentage of square footage used by each program (see indirect costs)
	• Utilities (e.g., electricity, telephone) used by each program or allocated to each program based on square footage or another basis (see indirect costs)
	• Maintenance allocated by program by square footage or another basis (see indirect costs)
Equipment	• Equipment used to produce/deliver the service
Transportation	• Actual costs or mileage rate
Telephone, Postage, Copies	• Local telephone may also be an indirect cost allocated among all programs (see indirect costs)
Supplies	• Supplies used to produce the service or a percentage of the total agency supplies allocated by program (see indirect costs)

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**INDIRECT COSTS: Costs incurred by the overall agency that are not readily assignable to one service**

Agency Management	• Executive office staff and Board expenses
Agency Operations:	
Accounting	• Including financial audits
Insurance	
Personnel	• Costs of hiring new employees, training, etc.
Purchasing	
Licenses	
Contract professional service	
Fundraising	• Any expenses and staff time spent on fundraising
Overhead costs	• State or national organization dues or expenses
Other	

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and general budget" column is indirect cost. The indirect costs allocated to each programs are based on the ratio of program direct costs to total direct costs.

This is not a complete budget and does not consider depreciation expenses or the value of donated resources (including volunteers). These "in-kind" donations are vital to this organization, as they are to many other Ryan White CARE Act providers, so we will discuss them in Step 4.

**TABLE 3**  
**PROGRAM BUDGETS BY TYPE OF SERVICE AND COST CATEGORY**

<b>COST CATEGORIES</b>	<b>DIRECT COSTS</b>			<b>INDIRECT COSTS</b>	<b>TOTAL</b>
	<b>ADULT DAY CARE</b>	<b>CASE MANAGEMENT</b>	<b>VAN SERVICE</b>	<b>MANAGEMENT &amp; GENERAL</b>	
Salaries	\$ 50,000	\$108,000	\$ 25,000	\$35,000	\$218,000
Benefits and Taxes	10,000	22,000	5,000	7,000	44,000
Rent	25,000	10,000	1,000	3,000	39,000
Utilities	5,000	2,000	500	500	8,000
Building Maintenance	5,000	1,000	300	700	7,000
Equipment Maintenance	500	500	6,000	500	7,500
Telephone, Mail, Copies	2,000	3,500	1,000	1,000	7,500
Other Supplies, Gas	2,000	2,000	5,000	1,000	10,000
Accounting/Audit				4,000	4,000
Insurance			5,000	3,000	8,000
Personnel				1,000	1,000
Other	500	1,000	1,200	3,300	6,000
<b>TOTAL</b>	<b>\$100,000</b>	<b>\$150,000</b>	<b>\$50,000</b>	<b>\$60,000</b>	<b>\$360,000</b>
DIRECT COSTS AS PERCENT OF TOTAL DIRECT COSTS	33.33%	50.00%	16.67%		100%
ALLOCATION OF INDIRECT COSTS	\$20,000	\$30,000	\$10,000		\$60,000
TOTAL DIRECT AND INDIRECT COSTS BY PROGRAM	\$120,000	\$180,000	\$60,000		\$360,000

## STEP FOUR - Determine the Full Cost of Service

**W**hat are "full" costs? Full costs include all of the expenses which are directly and indirectly necessary to provide a product or service. This definition includes the depreciation of capital expenses and the value of donated goods and services (volunteers) used to deliver the service. Written as an equation, full cost can be presented as follows:

$$\begin{array}{r}
 \text{DIRECT \$ COSTS} + \text{INDIRECT \$ COSTS} \\
 = \\
 \text{TOTAL \$ OPERATING COST} \\
 + \\
 \text{DEPRECIATION} \\
 + \\
 \text{VALUE OF DONATED GOODS AND SERVICES} \\
 = \\
 \text{FULL COST}
 \end{array}$$

Capital expenses commonly include the purchase of a building, computer system, photocopy machine, or medical equipment. Buildings and equipment wear out, so any measure of full cost should include this depreciation. Ignoring capital expenses results in significant understatement of the full cost of some services and may inhibit long term planning. If a hospital clinic constructs a new facility, or a housing agency builds apartments, construction costs must be counted even if donations and grants allowed the agency to complete the project without incurring a mortgage. The cost of the equipment and materials should be counted as direct costs and allocated evenly throughout the lifetime of the asset, even if the capital item (e.g., building, equipment, appliance) was paid for in one year.

Depreciate capital costs over the estimated lifetime of the asset using any generally accepted method such as "straight line depreciation" in which equal amounts of the total cost are counted each year. In this way, the cost of capital assets is allocated appropriately during the period in which unit cost is calculated. This method is helpful for budgeting because it results in the distribution of expenditures for large ticket items across time periods.

The straight line depreciation method divides the initial cost of the asset, minus the value of asset at the

end of its useful life, by the number of useful years of service. The formula is as follows:

$$\frac{\text{INITIAL COST} - \text{END VALUE}}{\text{YEARS OF OWNERSHIP}} = \text{COST PER YEAR OF USEFUL LIFE}$$

For example, if you buy a van for \$20,000 that will last for 10 years before it is sold for \$5,000, then annual depreciation is \$1,500. The calculation is as follows:

$$\frac{\$20,000 - \$5,000}{10 \text{ years}} = \frac{\$15,000}{10 \text{ years}} = \$1,500/\text{year}$$

If the van is not sold at the end of 10 years and is not expected to be in use any longer, then the amount of annual appreciation would be \$2,000:

$$\frac{\$20,000}{10 \text{ years}} = \$2,000/\text{year}$$

Donated goods often play a very significant role in the delivery of many health and human services. The market value of donated resources used to deliver services should be included in the calculation of full cost. Significant donated goods might include use of equipment such as a copy machine or van, or donated office or meeting space.

Volunteer time should also be included at the "market" value. The market value of a volunteer is the cost of hiring someone if volunteer time were not available. While some volunteer time may only be valued at minimum wage, other donated services such as legal assistance may have a high market value. If volunteers do work which is similar to other employees, use the employee wage rate as the market value. For instance, a volunteer who answers the phone part-time should be valued approximately the same as a paid receptionist who does similar work.

There are several reasons for estimating the value of donated goods and services. First, these goods and services may not always be available to the organiza-

tion and their replacement will become a cash expense; therefore, one should recognize their value today. Secondly, information about the importance of volunteers and other donated resources are valuable for coordinating fundraising, for volunteer appreciation, and for future planning.

Guidelines proposed by the American Institute of Certified Public Accountants and United Way of America suggest the following:

- Record donated materials at their fair market value when received if (A) their omission would cause expenses to be misleading and (B) the organization has an objective, clearly measurable basis for the value. If the nature of the donated materials is such that valuations can not be determined, then do not record the value.
- Record donated services if the services performed "are a normal part of the (agency's) program or supporting services and would otherwise be performed by paid personnel." If the organization does not exercise control over the employment and duties of the volunteers, then do not record the value.
- Additionally, some written record of volunteer hours, such as a time log, is helpful if the value of the time is included in the full cost.

These guidelines suggest that volunteer services such as the contributions of Board members and assistance with periodic fundraising should not be included in cost estimates. Note that some written record of volunteer hours, such as a time log, is helpful if the value of the time is included in the full cost.

Both capital assets and donated resources might be used by more than one program. If so, you should divide the depreciation or donation value among the different programs, using some reasonable allocation basis. For example, if a donated van is used in two programs, divide the annual depreciation amount between the two programs based on an estimate of the percentage of time each program uses the van.

### Example

In the example of the City Community AIDS Services introduced in the last step, we determined the direct and indirect dollar costs for each program. In addition, this agency also uses volunteers to help staff the adult day care center. During the past year, twenty different volunteers spent 5 hours each week helping to staff the adult day care center. The value of their time is set at \$5.00/hour which is just above minimum wage,

but at about half the salary level of the paid, full-time staff supervisor. The total value of the volunteers is \$26,000 (20 volunteers x 5 hours/week x 52 weeks x \$5.00/hour = \$26,000).

This agency also received a private foundation grant to purchase the van used for transportation services. The annual straight-line depreciation of the van is determined to be \$2,000, since it cost \$20,000 and will last 10 years without being re-sold.

The full cost for this agency's programs is now:

	OPERATING COST	DEPRECIATION	VALUE OF VOLUNTEERS	TOTAL FULL COST
Adult Day Care	\$120,000	-0-	\$26,000	\$146,000
Case Management	\$180,000	-0-	-0-	\$180,000
Van Service	\$60,000	\$2,000	-0-	\$62,000

If it is too difficult to place a value on the donated resources, there are other ways to show the importance of volunteers and in-kind gifts. For example, nonprofit agencies frequently report the number of volunteers, number of volunteer hours, and volunteer accomplishments.

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## STEP FIVE - Calculate the Average Unit Cost

**A**fter you calculate the full costs for a particular service, you are ready to determine the unit cost. Unit cost is equal to your total, full cost divided by the total number of service units provided during a certain time period.

$$\text{UNIT COST} = \frac{\text{FULL COST}}{\text{TOTAL NUMBER OF SERVICE UNITS}}$$

It may be helpful to calculate the average unit cost in two ways: with and without depreciation and the value of donated goods and services included. This calculation gives an accurate perspective on the cash cost per unit, and emphasizes the importance of depreciation and donated goods and services. The average unit cost should be re-calculated periodically so that it will reflect any significant changes in the full cost or number of service units produced.

Let's return to the City Community AIDS Services agency example. We can create some total numbers of service units provided during the last year, and then calculate the unit cost of the services. To do this, assume that the agency provided 6,525 days of adult day care, 3,600 case management encounters, and 13,050 one-way van trips, during the last year. The unit cost would be as follows:

	UNITS	# OF UNITS (A)	FULL COST (B)	UNIT COST (B ÷ A)
ADULT DAY CARE	Days	6,525	\$146,000	\$ 22.38
CASE MANAGEMENT	Encounters	3,600	\$180,000	\$ 50.00
VAN SERVICE	One-way trip	13,050	\$ 62,000	\$ 4.75

In order to emphasize the value of volunteers in the adult day care program the unit cost can be computed with just the total direct and indirect cash expenses. The cash expenses of \$120,000, divided by 6,525 units, yields a unit cost of \$18.39 per day. The difference between the full unit cost and the operating unit cost is approximately \$4 (\$22.38 - \$18.39). In other words, volunteers save the agency approximately \$4 each day per client.

After you calculate the average unit cost for each program, double check the process and the math for accuracy. The total of all the unit costs multiplied by the total respective service units should equal the total agency expenses for the period. A common mistake is to allocate too little or too much of the indirect expenses among the program areas. Another way to verify the process is to have the unit cost calculated independently, perhaps by an accountant. A third method to verify results is to compare the unit cost with your past experience or with cost estimates reported by other organizations. There are limitations to comparing unit cost among agencies and we will discuss these later. However, such a comparison may help to determine if the estimate of unit cost is reasonable or obviously inaccurate.

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## SPECIAL ISSUES RELATED TO UNIT COST ANALYSIS

### **Cautions about direct comparisons**

**A**void direct comparisons of unit costs between two organizations. Unit cost data are descriptive information and, by themselves, do not measure efficiency or effectiveness. The name of the service and unit of measurement may be the same among several providers, but the model of care, intensity of service, and quality of care may be very different (Hay, 1985). However, discussing the differences in unit cost may highlight the issues related to the substance of each service unit (see the Washington, D.C. case study).

Although Boards of Directors, funders, and others may judge a provider's unit cost as too high, remember that the goal of nonprofit organizations is often to provide services not otherwise available. Their services are not necessarily provided at the lowest cost (Gambino, 1981). Many projects which receive grant funds from the Ryan White CARE Act are "start-up" projects which are typically more expensive per unit than established services. Until the programs have been operating for some time, the operating costs reflect essential start-up activities that are difficult to separate from ongoing expenses. In addition, many new providers serve rural areas where expenses may be higher. The variation in cost of living among different geographic regions makes direct unit cost comparison difficult.

Analysis of trends in unit cost within one agency can often provide management insights. An increase in unit cost over time may signal an increase in resource cost, a decline in productivity, or a change in the content or quality of the service provided. The changes in unit cost flag these situations, but they do not explain what is occurring (Kelley, 1984). Data from the previous month, quarter, or year can determine the average unit cost in the past. Forecasts of service utilization and budget data can be used to predict future unit cost.

### **Economies of Scale**

"Economies of scale" means that if you increase the total number of units produced, you can reduce the average unit cost. A small program may have a high average unit cost because the service has high fixed costs (e.g. rent and equipment); money can be saved per unit if more units are provided. Two independent providers might produce identical services and have

very different average unit costs, because they differ in the volume of services provided. If the full cost of service is \$10,000 for ten units of service, the unit cost is \$1,000. However, because some costs will not increase with the production of five more units, the full cost for fifteen units might only be \$12,000, yielding an average unit cost of \$800. This reduction in unit cost is called "economy of scale."

When setting reimbursement rates or deciding whether to expand a program, the knowledge of a program's economies of scale is valuable. To determine the economies of scale, the average unit cost must be calculated at different volumes of service. Nonprofit programs may be small because they lack resources, and, as a result, the average unit cost may be very high. Resources from several small programs might be combined into a larger program with a lower unit cost. For example, programs might share space, a copying machine, or telephone lines and reduce the unit cost of providing services. Similarly, a program might expand its services at a small additional cost because some resources are not increased.

### **What if reimbursement rates are less than the unit cost?**

Knowing what portion of the average unit cost is variable and what portion is fixed can also be valuable, particularly when developing a fee policy. Fixed costs are those expenses that do not vary in the short-run with the number of service units provided. Rent or mortgage payments will not increase unless you rent a larger space. Many indirect costs such as utilities and management expenses are fixed in the short-run. Some direct expenses are fixed over a range of service units provided. For example, the annual salary of a counselor does not change until the caseload reaches its maximum and another counselor is hired.

Variable costs are those expenses that vary with additional service units provided. Most of the cost to provide a home-delivered meal is variable, such as the cost for the food and fuel to deliver each client's meal. The cost of buying a van to deliver the meals, however, is a fixed cost in the short-run.

Reimbursement should at least cover the variable costs of providing the service. The fixed costs will not

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change in the short-run (the rent must be paid regardless of a change in the number of services), so reimbursement rates must at least cover the variable costs. As long as the agency can cover the variable costs and part of the fixed costs it can continue operating, if there is a reserve fund and/or services are subsidized. In the long-run the agency would go broke unless income covers the fixed and variable costs.

### **Allowable Costs**

Some local, State, and Federal programs which operate under a cost-based reimbursement system use the concept of "allowable" costs which are all the costs which an agency can claim as necessary to produce a service and for which the agency is eligible to receive reimbursement. For instance, the purchase of a van for a transportation program is typically an allowable cost; however, the purchase of a luxury car would generally not be allowable. When subject to rules regarding allowable costs, an agency might choose to estimate their unit cost in two ways: once including all costs and once just including allowable costs.

### **Automation**

Developing unit cost estimates may take some time to calculate manually. Computerized management information systems, however, offer the opportunity to automatically calculate unit cost. Information systems can track the number of service units provided, the relevant

direct and indirect costs, and the time and value of volunteers. Based on experience of others, it may be easiest to develop the client information system and program accounting system separately using the same service units, and then integrate the systems after both are working well (Bowers, 1976).

Since most nonprofit organizations have limited automated information systems, we recommend starting with a manual calculation of unit cost. First, streamline your system of tracking the number of services provided and the allocation of direct personnel time. Even automated information systems require staff to input service data and keep track of their time spent in each program area. The computer calculation of unit cost will only be as accurate as the information used. A good manual system of estimating unit cost will validate the initial test of a computerized system.

If you have a choice, choose accounting software packages, which can be integrated with your other management information systems and client databases. Flexible software will allow account codes to tag both functional cost categories as well as the direct costs of each program. For instance, the numerical code for a social worker's account can indicate both a "salary" category and a "counseling" category. From this, you can generate reports which total the salary expenses for the entire agency, as well as the salary expenses and other direct costs for just the counseling program.

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## CASE STUDIES AND KEY LESSONS

The following case studies profile efforts by several organizations to determine their unit cost of service. The first examples from Dallas, Texas follow the basic methodology presented in this guidebook. The Texas Department of Health, HIV Services Division, requires the contract agencies which receive CARE Act funds to report the unit cost (not including donated values) following a method similar to this guidebook. The Texas Department of Health also is creating a relative value scale for public health services, and then estimating the cost of each unit of service at each local health department. The New York State Department of Health uses a "standard cost" methodology for setting reimbursement rates based on a review of the cost of input resources to provide one typical unit of service. The last case example from Washington D.C. illustrates how a planning council can use unit cost data to negotiate with contractors. Each of these case studies provides key lessons and alternative methodologies which may help you and your organization estimate unit cost.

### **Dallas Ryan White Planning Council**

During its first year of Ryan White funding, several of the providers of HIV and AIDS services in Dallas, Texas decided to use a common method of determining their average service unit cost. These agencies worked individually with a consultant to determine their unit cost and used methods similar to those described in this book. Several lessons can be learned from the experiences of the agencies which completed the process, particularly Open Arms, Inc. and the AIDS Interfaith Network.

#### **Open Arms, Inc.**

Open Arms was founded in 1987 as the AIDS epidemic began to affect more children, both those with HIV and those whose parents were infected with HIV. The agency started as a child care center with limited capacity for overnight care. Like most new AIDS service agencies, Open Arms experienced rapid growth, adding transportation, public education, and emergency assistance programs. In addition, medical care and other license requirements increased for child care staff. The agency completed a major renovation and expansion project, tripling the service capacity and its annual operating budget.

In 1991, the agency received approximately equal funding from government and community sources. Like most AIDS organizations, Open Arms had a minimum of administrative staff who could spend time on things like "unit cost analysis." When free consulting assistance was offered, the agency recognized its value, particularly the desirability of recovering its full cost from third-party insurers.

The first step was to define all of the distinct service units provided by Open Arms. A list of all of the possible service units was developed in consultation with the staff. From this list some unit definitions were combined and others eliminated, resulting in the following distinct service units:

- One hour of child care (medically-managed day care, respite care, and residential care)
- A one-way transportation trip (local trip less than 20 miles)
- Distribution of \$1 worth of goods (diapers, formula, food, baby equipment)
- A community awareness contact (for example, phone call to the helpline, audience member at a speaking engagement)
- Distribution of \$1 of emergency financial assistance
- One non-medical client consultation (with client, parent or with another social service provider)

No distinction was made between daytime or nighttime child care because the cost was relatively the same. Open Arms provided many public education services, defining them as "community awareness contacts" for counting purposes. Rather than count the audience for a public service announcement, the agency counted only personal contacts at speaking events or telephone calls to the helpline. A contact or telephone call counted as one unit of service. Counting most of the service units listed proved rather easy because the agency served an average of 20 children per day in child care, and less than 50 families with transportation, material, and financial assistance. Open Arms did ask their van driver to keep a clip board in the van to record each one-way trip.

Calculating the full cost proved to be rather difficult because the agency was growing so rapidly. Direct program costs for the previous quarter and past year did not reflect current costs. Since historic cost information was less relevant, Open Arms decided to estimate the costs for the next 6 months and combined these with projections of the number of service units. Indirect costs were totaled and divided proportionately among the service units, based on the ratio of direct costs for each unit to the total of all direct costs.

Since Open Arms had two full-time volunteers, 4 half-time volunteers, and over 100 other volunteers, the value of their time was included in the full cost. The full cost calculation included the value of donated in-kind goods used in the operation of the child care program and in the distribution of goods to client families.

A benefit to Open Arms from the unit cost process was improvement in the accounting system so that reports by program area could be generated.

### **AIDS Interfaith Network**

After discussions with the staff, the AIDS Interfaith Network (AIN) decided on the following five distinct service units, all based on time:

- 1 hour of group counseling per client
- 1 hour of home chore assistance
- 1 hour of minority client assistance
- 1 hour of individual counseling
- 1 hour of public education/coordination

The staff separated "group" and "individual" counseling because the cost of individual counseling is much higher per unit. One hour of minority client assistance was differentiated from the other service units because

the assistance involved aspects of all of the other units, and the education and counseling outreach was more specialized and intensive. In addition, AIN wanted to track the unit cost separately for minority assistance because several current and potential funding sources placed emphasis on developing minority outreach programs. AIN used historical data to estimate the number of service units each month.

After defining the service units, the staff calculated the direct costs associated with each unit and a percentage of the indirect costs. As an example, the following budget outline includes the categories used by AIN to provide individual counseling.

### **DIRECT COSTS OF INDIVIDUAL COUNSELING PROGRAM:**

- 50% of salary/benefits of the Director of Client Services
- 20% of salary/benefits of the Chaplain
- 20% of salary/benefits of the Executive Director
- Local Travel
- Meeting Space
- Printing

### **INDIRECT COSTS**

(ALLOCATED TO THE PROGRAM BY PERCENT OF TIME):

- Salary/benefits of the Executive Director (time spent in administration)
- Salary/benefits of the Clerical Staff
- Annual Financial Audit
- General Office Expenses (telephone, supplies, postage, copies, etc.)
- Insurance

**FIGURE 1  
SAMPLE SERVICE UNIT COST ANALYSIS REPORT FORM**

Agency XYZ  
Staff Member Director  
Date 3/94

Service Unit: One hour of Individual AIDS Counseling Time frame:				
A	B	C	D	E
Total # of service units provided during time frame	Total direct and indirect \$ costs	Value of donated goods and services	Average cost per unit of service (B/A)	Average full cost/unit (B+C/A)
3,50	\$ 150,000	\$ 20,000	\$ 42.86 per unit	\$ 48.57 per unit

Both Open Arms and the AIDS Interfaith Network used the preceding "Service Unit Cost Analysis Report Form" (Figure 1) to calculate and report the average full unit cost. The average unit cost is determined with and without adding the value of donated goods and services. This approach highlights the use of volunteers to provide direct services, and their value to the organizations.

### **New York State Department of Health: Cost-Based Reimbursement for HIV and AIDS Services**

Prior to establishing its Medicaid reimbursement rates for HIV/AIDS services, the New York State Department of Health conducted significant research on the cost of AIDS services. The State bases its enhanced Medicaid rates on annually updated estimates of cost to provide care, not fees charged. The services include "primary care provided by health facilities and private physicians, outpatient care provided by acute care hospitals, long-term care, home care, and foster care."

The reimbursement rates are established by estimating direct and indirect costs of service. The cost to provide a unit of service is based on the average personnel time and other resources consumed in order to provide a quality standard of care, method of service delivery, and staffing level. The original reimbursement rate schedule, created in 1987, has been updated and revised annually to reflect inflation and changes in treatment protocol.

In 1989 the State divided rates into two tiers: primary care and acute care. The primary care services emphasize early diagnosis and include counseling and testing, clinical evaluation, asymptomatic disease monitoring, and other services. Reimbursement rates are also indexed by illness category (asymptomatic, symptomatic), type of setting (hospital, free-standing clinic), and geographic location (upstate-rural, upstate-urban, and New York City).

Personnel time sheets, salary surveys, and Blue Cross ancillary fee schedules provide cost data. A 1987 provider cost report provided data on administration, operations, malpractice and liability insurance, and other general facility costs. Capital cost estimates are based on construction industry standards by the square foot. These various cost components are added together to "build-up" the reimbursement rate. If any of the cost components are based on past information, they are adjusted for inflation.

For example, the rate for an HIV Pre-Test Counseling Visit in New York City (one visit equals one unit) is based on the following cost factors:

Administration	\$ 31.12
Capital Cost	6.11
Labor (Social Worker/Internist)	29.24
Supplies	5.00
Trend for Inflation since 1989	18.56
<hr/>	
TOTAL	\$ 90.03

In the original reimbursement schedule, case management was measured in minutes. "Case management" itself is not reimbursed under primary care although many providers provide some clinical case management. Currently, some case management services are reimbursed in increments of 15 minutes, and base rates on budgeted costs divided by an estimate of the amount of case management staff time spent working on client cases. Adult day care is currently reimbursed based on nursing home rates, although new cost-based rates are being created. The new rates define a model adult day care program including medical and functional component services and attach costs to these services.

Providers are generally pleased with the cost-based reimbursement schedules. Most complaints have focused on the cost of some pharmaceuticals and testing procedures which have risen faster than the annual rate increases. The two-tier system may be revised to clarify the service categories for providers.

### **Texas Department of Health HIV Services Division, Quarterly Reporting**

Since 1990, the HIV Services Division at the Texas Department of Health (TDH/HIV) has required all recipients of funds from the Ryan White CARE Act and other State sources to complete a quarterly report form which focuses on the calculation of unit cost. TDH/HIV is divided into 26 service delivery areas, each with a lead administrative agency and sub-contractors. The quarterly unit cost report is required from each lead agency and sub-contractor, unless the sub-contractor is a direct fee-for-service provider such as a primary care physician.

Prior to the first quarterly report, staff from the State office visited all participating providers to train them to calculate unit cost and fill out the forms. Follow up training is available whenever key agency staff change. TDH/HIV staff believe that providers understand the need to report unit cost data, not just the contract cost per client. Many lead agencies benefit from the unit cost data, particularly when they negotiate new service contracts with sub-contractors.

**TABLE 4 - SERVICE UNITS FOR TDH/HIV**

<i>Type of Service</i>	<i>Type of Measurement</i>	<i># of Units</i>
Day Care/Respite, Housing, Hospice	Day	1
Meals	Number provided	1
Transportation	One-way trip for 1 person	1
Physician Care	Visit	1
Home Health Care:		
Skilled Nursing Care	Visit	
Home Health Aide	Hour	1
Homemaker	Hour	1
Hotline/Information and Referral	Client contact	1
Case Management/Case Work	15-minute contact	1
Peer Counseling/Support Group	Session	1
Mental Health/Professional Counseling	Session	1
Dental	Visit	1
Food Pantry	Visit	1
Workshop/Seminars	Session	1
Insurance Premiums	Month or year	1
Prescriptions	Prescription	1
Examples:		
Meals on Wheels	Lunch/dinner	2
Skilled Nursing	IV drug therapy	1
Case Management	45-minute intake	3
Food Pantry	2 visits in 1 week	2
Group Counseling	10 people	1

During the development of the report forms TDH/HIV held several meetings with the lead agencies and sub-contractors to achieve consensus about the definitions for units of service. The most difficult unit to define was case management, although the final consensus was to count 15-minute increments. The final list of services is presented in table 4.

The budget for each State-funded HIV program includes direct (client services) costs and indirect (administrative) costs. Indirect costs are based on the ratio of each service's direct cost to the total direct costs of all HIV services. Two examples of the calculation of direct and indirect costs by service area are presented in tables 5 and 6.

This unit cost method differs slightly from the method outlined in this guidebook. TDH/HIV does not include the value of donated resources in the calculation of unit cost nor does it ask the agencies to indicate other sources of funding. The agencies only submit budgets for the services which receive State funding. Some capital expenses which the State cannot pay for directly are excluded from the program budgets. As a result, the unit cost to the State understates the agency's actual unit cost. In effect, the reported unit cost is primarily current "operating unit cost," exclusive of debt service and depreciation of capital assets.

**TABLE 5  
EXAMPLE OF A CATEGORICAL BUDGET**

<i>BUDGET CATEGORY</i>	<i>AMOUNT</i>	<i>TYPE</i>
Personnel:		
Director	\$ 1,000	A
Case Manager	17,000	S
Fringe Benefits:		
Director	250	A
Case Manager	4,250	S
Travel	3,000	A
Equipment	0	A
Supplies		
Office Supplies	2,000	A
Medical Supplies/Drugs	4,000	S
Contractual Activities:		
Sub-Dental Care	4,000	S
Sub-Counseling	4,000	S
Sub-Nursing Care	10,000	S
Other:		
Client Transportation	\$ 3,000	S
Phone	2,400	A
Printing	1,000	A
Audit	2,000	A
Rent	9,000	A
<b>TOTAL COSTS</b>	<b>\$ 66,900</b>	
Administrative Costs (A)	20,650	
Client Service Costs (S)	48,250	

**TABLE 6**  
**CONVERSION OF CATEGORICAL BUDGET TO A PROGRAM BUDGET**

PROGRAM	DIRECT COST CLIENT SERVICES)	DIRECT COSTS AS PERCENT OF TOTAL COSTS	ADMINISTRATIVE COSTS	TOTAL COSTS
Case Management	\$ 21,250	45.95	\$ 9,489	\$ 30,739
Medical Supplies	4,000	8.65	1,786	5,786
Dental Care	4,000	8.65	1,786	5,786
Counseling	4,000	8.65	1,786	5,786
Nursing Care	10,000	21.62	4,465	14,465
Client Transportation	3,000	6.48	1,338	4,338
TOTAL	\$ 46,250	100.00	\$ 20,650	\$ 66,900

Table 6 illustrates how a categorical budget is converted to a program budget in order to calculate unit costs. The following are the quarterly expenses by budget category for the 'Happy Health Department.' Type 'A' expenses are categorized as 'administrative costs' while type 'S' expenses are categorized as 'client service costs.'

Table 6 illustrates how the Happy Health Department computed the quarterly cost for each service program. After determining the total program costs, estimate the unit cost by dividing the total costs by the number of units provided during the quarter. For example, suppose there were 500 case management encounters during the time period for the above cost estimates. The unit cost of case management would be \$60.48 (\$30,739/500).

### Prospective Costing System

The Texas Department of Health (TDH), in conjunction with the Centers for Disease Control and Prevention (CDC), is currently instituting a "Prospective Costing System" for local public health agencies. While these agencies provide a range of services in addition to HIV and AIDS services, the costing methodology may be of interest to Ryan White Planning Councils and Consortia.

The prospective costing system uses a relative value scale not unlike the one used to establish Medicaid cost-based reimbursement rates. However, the goal of TDH is not to create rate schedules. The immediate, intermediate, and long-range goals are well-defined and include (TDH, 1992):

#### Immediate Goals:

- to allow local health departments to bill third parties for the actual costs of providing services
- to allow local health departments to set reasonable fees based on cost

#### Intermediate Goals:

- to provide a mechanism for TDH to contract for services rather than for positions, travel, equipment, etc.
- to assist local health departments in making more accurate budget projections

#### Long-range Goals:

- to use this mechanism for legislative appropriations requests
- to perform cost/benefit analyses for prevention versus acute care costs

TDH hopes that the relative value scale will prove to be an easier methodology to determine unit costs than cost accounting because the local health departments provide a large number of heterogeneous services. Such a large variety of services in a wide range of geographic and clinical settings would require a very sophisticated cost accounting system to track the costs associated with each distinct type of service delivered.

Instead, a relative value scale first defines the variety of distinct services and then determines the amount of personnel and other resources consumed by each service. TDH has already defined many of these services as "Identified Service Activities" (ISAs) and established protocols for service delivery. The services are then ranked on a common scale by the level of resources consumed in the delivery of the service. For instance, an immunization might have a relative value of one, while a well-baby clinic visit, which requires more doctor's time and other resources, might have a relative value of ten.

Once the services are ranked on a common scale, an individual health department can use total service utilization data and aggregate budget information to determine the cost of one unit on the relative value scale. From the cost of one scaled unit, the cost of each distinct unit of service can be determined.

**TABLE 7**  
**CALCULATION OF NUMBER OF RELATIVE UNITS**

Service	Number of Service Units	Relative Value Score	Number of Relative Units
A (Adult Day Care)	100	1.00	100
B (Case Management)	200	1.50	300
C (Van Service)	300	.50	150
<b>TOTAL</b>	<b>600</b>	<b>3.00</b>	<b>550</b>

The following illustrates the relative value scale approach to unit cost determination. Assume an agency provides three distinct services "A, B, and C" with a total agency budget of \$100,000. During the year the agency provided 100 units of Service A, 200 units of Service B, and 300 units of Service C.

Based on a study of the amount of resources needed to provide each service, a relative value scale is created. In this case the relative value for Service A = 1, Service B = 1.5, and Service C = .50. A score of 1 on the relative value scale does not mean that the service requires one hour of provider time. By itself the relative value score is meaningless. A score of one is only meaningful relative to the other services. In this example, Service A requires twice the amount of resources as Service C since the score is twice as high.

The total number of relative units would be calculated according to table 7. The cost per relative unit can then be calculated by dividing the total annual budget by the total number of relative units. In this example, one relative unit equals \$182 (\$100,000/550 relative units). Finally, the cost of a relative unit is multiplied by the relative value score of each service to derive the unit cost per service. In this example, the unit cost for Service A = \$182 (relative score of 1 x \$182), Service B = \$273 (1.5 x \$182), and Service C = \$91 (.5 x \$182).

While TDH is still testing this system, it hopes to automate the calculation of unit cost in the near future. This may be possible once an integrated service delivery and accounting system is on-line among local health departments. The relative value scale is a complicated approach to determining unit cost, but it may be useful for providers such as local health departments which offer a large variety of services. Automation will eliminate the need for each provider to follow a complicated formula for arriving at the unit cost.

#### **Washington DC Agency for HIV/AIDS**

The Washington D.C. Agency for HIV/AIDS (AHA) is the local planning council responsible for administering the CARE Act funds in the District of Columbia. AHA recently reviewed the unit cost information of its subcon-

tractors to provide health, case management, and support services. The differences between the AHA estimates of unit cost and the actual unit costs written into each contract highlighted the variation in the intensity of care provided by different agencies to clients.

The agencies which receive CARE Act funds reported unit costs using the twenty-six service units (table 8).

Each agency contract specifies the number of clients which are to be served during the contract period. AHA estimates the cost of care per client by dividing the total contract amount by the total number of clients to be served:

$$\frac{\text{TOTAL CONTRACT FUNDS}}{\text{NUMBER OF CLIENTS SERVED}} = \text{AVERAGE FUNDS PER CLIENT}$$

Because this amount differs from the cost of one unit of service, the agencies were also asked to report their unit cost of service. From this information AHA could determine the typical protocol of service or "intensity of service" delivered to the average client. The cost per client was divided by the unit cost of service to determine the average number of service units each client receives during the contract period.

$$\frac{\text{AVERAGE FUNDS PER CLIENT}}{\text{UNIT COST OF SERVICE}} = \text{AVERAGE NUMBER OF UNITS PER CLIENT}$$

This information about the level of service provided to each client has helped in planning efforts. The needs assessment process can more accurately compute the amount of funds needed to serve clients at an acceptable level of service per client. The variation in the level of service needed by clients at various stages of the HIV illness can be estimated. Established service protocols that exist for a few services such as primary medical care can be compared to the level of service which can be provided with the available CARE Act funds. Even though this study represents an initial effort to estimate unit cost and intensity of service, the value of unit cost data for planning purposes is already evident.

**TABLE 8**  
**SERVICE UNITS FOR WASHINGTON D.C.**

	<b>SERVICE AREA</b>	<b>SERVICE UNIT(S)</b>
	<b>Primary Medical Care</b>	
1	Outpatient Medical Care	Ambulatory Care Visit Routine Lab Services Specialty Lab Service Subspecialty Visit TB Screening Pentamidine treatment Face-to-Face Contact Pediatric Referral Drug Prescription Nursing Visit Telephone Contact Radiology/ Diagnostic Test
2	Mental Health	Individual Session Group Session Screening Session Couple or Family Session Neuropsychological Screening Session
3	Emergency Drug Assistance	Drug Prescription Pentamidine
4	Dental Care	Visit Dental Screening Visit Periodontal/Orthodontal Visit
5	Home Health Care	Skilled Nursing Hour Home Health Aide Hour Specialty Hour
6	Rehabilitation	Treatment
7	Hospice	Skilled Nursing Hour Home Health Aide Hour Nursing Visit Case Management
8	Case Management	Face-to-Face Contact Telephone Contact Assessment Visit Care Plan Discharge Packet Therapy Hour
9	Case Finding	Outreach Contact Referral Made Referral Successful Support Services
10	Home Delivered Meal	Meal
11	Food Bank	Visit
12	Nutritional Support	Counseling Hour Nutritional Supplement

	<b>SERVICE AREA</b>	<b>SERVICE UNIT(S)</b>
	<b>Primary Medical Care</b>	
13	Assisted Transportation	One-way Trip
14	Support Groups	Group Session Group Hour
15	Respite Care	Hour
16	Child Care	Hour Placement
17	Homemaker/Chore Aide	Hour
18	Volunteer Coordination	Volunteer Coordinator Hour
19	Entitlements	Entitlement Counseling Hour Entitlement Group Session
20	Interpreter Services	Hour
21	Information and Referral	Contact
22	Substance Abuse Counseling	Individual Session Group Session Individual Hour Group Hour
23	Emergency Housing Assistance	Emergency Assistance Package Housing Subsidy
24	Crisis Intervention	Hour of On-Call Coverage Encounter
25	Day Treatment	Day
26	Capacity Building	Visit Consult Inpatient Physician Visit

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## GLOSSARY

<b>Allowable Cost</b>	A cost which is eligible to claim for purposes of reimbursement as necessary and relevant to the delivery of a particular service.
<b>Average Unit Cost</b>	The full cost of providing a product or service divided by the total number of services provided.
<b>Depreciation</b>	The reduction in the value of an asset during a given period of time.
<b>Direct Cost</b>	The cost that can be directly attributed or assigned to the delivery of one type of product or service. For example the salary of a counselor who spends full-time serving clients in an individual counseling program is a direct cost of that program.
<b>Fixed Cost</b>	The cost that does not increase in the short-run with the number of units of service provided. For example, the mortgage payment on a facility typically does not change until the debt is paid off, the agency expands, or relocates.
<b>Full Cost</b>	The total cost to produce a product or service including all of the direct costs, allocation of indirect costs and the value of all donated resources used to provide the product or service.
<b>Indirect Cost</b>	The cost that is assignable to the delivery of more than one product or service. For instance the salary of an office manager is typically an indirect cost of all of an agency's programs.
<b>Marginal Cost</b>	The additional or incremental cost of providing one more unit of service.
<b>Opportunity Cost</b>	The lost benefit of pursuing an alternative course of action.
<b>Prorate</b>	To divide or assign evenly or proportionately, e.g. 'prorate' an annual salary into one month or one hour.
<b>Relative Value Scale</b>	The rank or order of items in relation to each other. In health care a relative value scale commonly compares level of resources consumed in the production of services.
<b>Standard Cost</b>	The cost to provide the typical unit of service, based on a standardized use of resources.
<b>Unit Cost</b>	The full cost to produce one unit of service.
<b>Variable Cost</b>	A cost which increases or decreases with a small change in the number of units of service provided. For example, the lab fees and pharmaceutical costs of providing primary health care visits will vary directly with each additional client served.



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# **SAMPLE UNIT COST CALCULATION FORM**

**Part A** (Part A is filled out for each distinct service unit)

ORGANIZATION \_\_\_\_\_ SERVICE UNIT NAME: \_\_\_\_\_  
 TIME PERIOD: \_\_\_\_\_ UNIT OF MEASUREMENT \_\_\_\_\_

TOTAL NUMBER OF UNITS PROVIDED DURING TIME PERIOD \_\_\_\_\_

## **DETERMINATION OF DIRECT UNIT COST**

PAID STAFF POSITIONS DIRECTLY INVOLVED IN PROVIDING A UNIT OF THIS SERVICE	TIME (minutes/unit)	AVERAGE WAGE OR SALARY	AVERAGE TAXES & BENEFITS	COST

TOTAL DIRECT LABOR COSTS PER UNIT

LIST OF DIRECT CONSUMABLE ITEMS USED PER UNIT (list)	COST PER UNIT

TOTAL DIRECT COSTS PER UNIT (LABOR AND CONSUMABLES)

TOTAL DIRECT COSTS OF ALL THE UNITS PROVIDED THIS TIME PERIOD:

## **DETERMINATION OF UNIT COST OF DONATED RESOURCES**

LIST OF VOLUNTEER POSITIONS WHICH DIRECTLY ASSIST IN PROVIDING EACH UNIT OF SERVICE	TIME (minutes/unit)	HOURLY VALUE	VALUE PER UNIT

TOTAL DIRECT COSTS OF ALL THE UNITS PROVIDED THIS TIME PERIOD:

LIST OF DONATED SUPPLIES & MATERIALS USED TO PROVIDE EACH UNIT OF SERVICE	PER UNIT

TOTAL DIRECT VALUE OF DONATED RESOURCES PER UNIT

TOTAL DIRECT VALUE OF DONATED RESOURCES FOR ALL UNITS THIS TIME PERIOD

## PART B

ORGANIZATION: \_\_\_\_\_

TIME PERIOD: \_\_\_\_\_

## SUMMARY OF DIRECT SERVICE UNIT COSTS

[illegible]

## DETERMINATION OF INDIRECT COSTS

TOTAL ORGANIZATION EXPENSES (CASH OR ACCRUAL)

TOTAL ORGANIZATION EXPENSES (CASH OR ACCRUAL)	
- TOTAL DIRECT COSTS	
= TOTAL INDIRECT COSTS	
+ VALUE OF DONATED GOODS USED	
+ VALUE OF VOLUNTEER TIME	
+ DEPRECIATION OF CAPITAL EQUIPMENT AND FACILITIES	
= TOTAL FULL INDIRECT COSTS	

[illegible][illegible]





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