

Workbook 5

Cost Evaluations

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WHO
World Health Organization



UNDCP
United Nations International Drug Control Programme



EMCDDA
European Monitoring Center on Drugs and Drug Addiction

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Overview of workbook series

This workbook is part of a series intended to educate program planners, managers, staff and other decision-makers about the evaluation of services and systems for the treatment of psychoactive substance use disorders. The objective of this series is to enhance their capacity for carrying out evaluation activities. The broader goal of the workbooks is

to enhance treatment efficiency and cost-effectiveness using the information that comes from these evaluation activities.

This workbook (Workbook 5) is about cost analysis. In general terms, it involves evaluating the use of resources ‘spent’ on the treatment of people with substance use disorders



Introductory Workbook

Framework Workbook



Foundation Workbooks

Workbook 1: Planning Evaluations

Workbook 2: Implementing Evaluations



Specialised Workbooks

Workbook 3: Needs Assessment Evaluations

Workbook 4: Process Evaluations

Workbook 5: Cost Evaluations

Workbook 6: Client Satisfaction Evaluations

Workbook 7: Outcome Evaluations

Workbook 8: Economic Evaluations

What is a cost evaluation?

A cost evaluation assesses the use of resources ‘spent’ on the treatment of people with PSU disorders. There are three different levels of costing studies. Instructions for how to complete each of these types of cost evaluations are located later in this workbook:

- Evaluating resource use **within one particular agency**
- Comparing the costs of different interventions **across two or more agencies**
- Wider studies of the **fuller social cost consequences** of different interventions

Cost evaluations can be done by different groups of people with different purposes.

Different groups include treatment services, the funders of the services, wider regulatory authorities, or supporting agencies. Treatment providers may be most interested in tracing their own resource use, and/or the consequences of any changes in service provision. The funders of services or regulatory authorities may be interested in comparisons between agencies. In contrast, a wider society perspective attempts to examine all the resource consequences, regardless of who bears these costs. Taking a societal perspective can considerably extend the work required, but allow for better comparison across agencies.

Why do a cost evaluation?

Questions might include: how much will costs increase if the number of outpatient visits rises? What would be the fall in costs and resources if the number of PS users treated decreases?

The economic technique of cost evaluation is one of the tools available to help choose wisely from a range of alternatives and to design and implement efficient programs. Cost evaluations assess the gains and the costs of carrying out a set of activities. The purpose of this analysis is to identify ways to do the most with a limited budget. In other words, it is designed to identify the most efficient approach.

Resources available for treating those with PSU disorders are limited in all countries. A number of different groups, including treat-

ment providers, want to monitor resource use. In addition to such monitoring, they want to understand the relationship between levels of activity and resource use and costs. Questions might include: how much will costs increase if the number of outpatient visits rises? What would be the fall in costs and resources if the number of PS users treated decreases? Other questions assess the overall level of resources and how this relates to population needs; the distribution of resources among different groups of the population with varying problems, and the efficiency of resource use within individual services.

How to do a cost evaluation: general steps

Before doing a cost evaluation, it is important to review **Workbook 1 of this series, which outlines general steps to evaluation planning**. In addition, review these three common steps within each of the different types of costing studies: (1) identify the resource use for the appropriate unit of activity; (2) measure resource use per activity level; and (3) value this unit of activity.

After this section, three specialised ‘how to’ sections are presented, for the three different levels of evaluations:

- Evaluating resource use **within a particular agency**
- Comparing the costs of different interventions **across agencies**
- Wider studies of the **fuller social cost consequences** of different interventions

1. Identify the costs associated with PSU services

There are three broad cost groups of PSU interventions:

- the direct costs of service provision
- the costs to the individuals or their families
- the costs (or averted costs) falling on other agencies as the result of the ‘treatment’ episode

The direct costs of services can be further broken down into:

- capital costs - building, equipment furniture and fittings
- building related expenditure - heating, lighting, property taxes, maintenance
- staff costs
- other service related expenditure - stationary, telephone, travel costs, etc.
- overhead costs - management and administrative expenses often shared across interventions or services

These types of costs have different relationships with the level of activity of the service. Fixed costs (e.g., building rent, heating, etc.) do not vary with the level of activity. In con-

trast, other costs are variable, for example, the travel costs associated with caring for clients at home will vary directly with the number and location of these clients. Staff costs (e.g., salaries) tend to be of a semi-fixed nature and are important because for most PSU services they make up most of the costs of service provision. Staff may undertake some additional ‘caseload’ but there are limits to the numbers any one person can handle. Expansion of the service at this point would require some extra staff.

The mixture of fixed and variable costs determines how average costs change as levels of activity change. For example, a service with a large fixed cost element, say a large stand-alone residential unit, would yield a high cost per inpatient stay if occupancy of the unit was low. The average cost would fall as the unit approaches capacity and would rise again if some new accommodation was needed. Marginal cost is the cost at any point of providing one extra unit. It is important for planning purposes to calculate marginal as well as average costs.



The costs borne by individuals and their families will vary across health care systems. Some care has to be taken to count genuine resource use, but not simple transfers. For example, individuals may receive benefits from the state or an insurance scheme if they are participating in treatment. This is not a resource but a transfer between one group, the taxpayer or other members of the insurance scheme, to those who are ill. The resource loss in this situation (especially where inpatient or residential care is concerned) is that of the 'productivity' or leisure time of the individual. These indirect costs may be borne by the individual or the employer. There is considerable discussion about the role of such indirect productivity losses in economic evaluations. Generally, the advice is to show these costs as a separate item so that overall results can be calculated with and without allowance for these costs (Drummond et al., 1987). Individuals may have direct costs of treatment such as out of pocket expenses, and the time costs of treatment which will

not be included in any traditional, service-oriented tracing of resource use. Some treatment, particularly inpatient treatment may involve individuals' loss of working or leisure time. As well as these tangible items there are more intangible elements to interventions. These include the 'pain, grief and suffering' of the PS user and their families.

The last group of costs are those borne by other agencies. Some interventions may require input from other social, welfare and health care agencies. On the other hand, some interventions may reduce future demands for such services provided by other agencies. These are the type of costs which are identified for social cost type of study.

The first case example at the end of this workbook (French and McGeary) presents a structured and scientifically-based instrument for estimating costs of treatment services. This instrument, the DATCAP, includes costs from a variety of relevant categories.

2. Measure resource use per unit of activity level

Units could be in many forms. Some common examples would be counselling visits, inpatient stays, assessment interviews, or some division per time period such as cost per type of care per hour, per week etc.

Units of activity have to be measured along with the resources needed to deliver them. The 'units' of activity will be determined by the purpose of the study, available data and the type of intervention being delivered. Units could be in many forms. Some common examples would be counselling visits, inpatient stays, assessment interviews, or some division per time period such as cost per type of care per hour or per week. If comparisons are being made across different organisations, it is essential that units of activity are measured in a standardised way.

If the purpose of the study is to provide some general idea of overall resource use within a treatment agency, then direct costs of provi-

sion would generally be measured on annual data. However, capital costs (such as buildings or equipment) will not necessarily be incurred in that year, although they are one of the resources being used to provide care for PS users. The value of these assets can be included by estimating their actual value or replacement cost, and spreading this cost over the expected lifetime of the asset. Buildings are often estimated to have a 'life' of 60 years, whereas other capital equipment is estimated to have a life of five to ten years depending on the item. Using an interest of 6%, for example, a building worth \$1 million would have an annual value of \$61,876 (the calculation can be made using standard interest rate tables).

The choice of the time period over which some of the wider consequences of an intervention are measured is not clear cut. If, after treatment, individuals quit smoking or reduce drinking or other PSU, the potential savings in consequent health care costs could be spread over the rest of their lifetime. However, direct observation and measurement of such costs would not be possible. In some cases epidemiological modelling can be employed to calculate these potential savings in health and other welfare costs. However, if

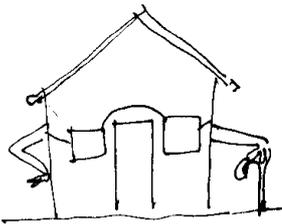
reliable models are not available, measurement may be curtailed to some arbitrary period after the end of the intervention.

The DATCAP case example located at the end of this workbook demonstrates how the basic cost estimate can be expressed in a variety of units: total annual cost per service, weekly cost per client, and cost per treatment episode. In the case example, conclusions differed depending on the unit of activity.

3. Value this unit of activity

Most agencies will have some information about costs in their routine accounting information system. You can use this information to value your units of activity.

As mentioned earlier, the value of capital items such as buildings or office equipment may be the actual value or replacement costs and this cost would be spread over the expected lifetime of the asset. Buildings are often estimated to have a 'life' of 60 years, whereas other capital equipment is estimated to have a life of five to ten years depending on the item.



In most instances, people, buildings, and vehicles have multiple functions. It is important to identify cost sources that are shared by other activities, and to find a reasonably accurate way of dividing these costs among the various activities. This process is called *cost allocation*.

Examples of Cost Allocation:

1 One room in a PSU treatment centre (annual cost estimated at \$3,000) is used for a prevention programme. The room is 900 square metres and the whole centre is 20,000 square metres. The annual value of the space for the prevention programme is: $900/20,000 \times 3,000 = 0.045 \times 3,000 = \135

2 A nurse receives \$900 per year. In the past year, 20,000 patients were seen at her treatment centre and 1,000 were patients in the prevention programme. The allocation fraction is 0.05 (1,000/20,000). This means that \$45 of her annual salary should be allocated to prevention programme costs.

For PSU services, another common valuation problems is the use of volunteers to deliver part of the treatment programme. Volunteers may involve some direct costs to the services, for example, in reimbursing their expenses, training and administrative costs, but their labour time does not appear in the accounts. However, volunteers are also contributing time which may have an alternative value, for example, in work for a wage or leisure activity. One method would be to value volunteers' time by some market wage rate, say, the unskilled wage rate or a rate based on their past or current occupation. It is also clear that volunteer resources can not be assumed to be directly substitutable with time from the professional workers. They may be less flexible in how much time they can offer to the service and they may choose to avoid some of all the activities of paid staff. As with many other aspects of costing methodology, there is no single answer. In general, most studies would give volunteers an initial zero value but explore the impact on

results of the cost analyses by valuing their time by different amounts.

The costs of resources which would be used in the future are generally valued less than those in the current period. This is called *discounting* and is a means of

bringing all costs to a present value. Costs are usually discounted at the prevailing general interest rate. Drummond and colleagues (1987) provide tables that provide the conversion from future amounts to this present value, given the interest rate.

One additional point: Allocating costs to units of activity top down or bottom up?

The top-down approach involves estimating the total resource use for any organisation for a specified period and then allocating the resource use to the units of activity.

The bottom up approach involves directly recording the resource use for each intervention including the appropriate share of overhead and capital costs.

Ideally, costing studies should use the bottom-up approach for the costs of major interest.

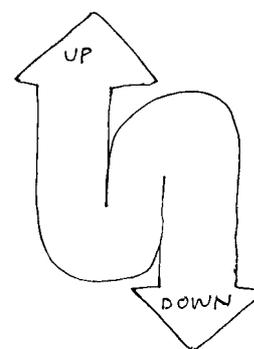
There are two basic methods for determining the direct cost of any intervention: 'top-down' and 'bottom-up'. The **top-down approach** involves estimating the total resource use for any organisation for a specified period and then allocating the resource use to the units of activity. This method ensures all the observed resources are allocated to the activities of the unit.

The **bottom up approach** involves directly recording the resource use for each intervention including the appropriate share of overhead and capital costs. With good resource management and time monitoring systems, this approach can give accurate estimates of costs for individual units of activity (e.g., cost per hour of assessment) or clients (e.g., average cost per client). This methodology will only value the resources that are used and any 'spare' capacity would not be valued. In this situation the total value of resources could be below those shown in the accounts. Conversely, if staff are working more than their contracted hours, the total amount of resources may be above the official budget.

Ideally, costing studies should use the bottom-up approach for the costs of major interest. However, in practice it may only be possible to use a top-down approach in situations with limited data. Some costs, particularly overheads and capital, may always be allocated in a top-down fashion.

In some instances, both a top-down and bottom-up approach may be needed. A simple example would be a service delivering just one type of standardised intervention. In this case a simple top-down estimate of average cost per unit of activity would be straightforward to calculate from the estimate of all resources and all activity. However, this method would not indicate whether there was any variability in the costs. It may be, for example, that younger clients are in receipt of more counselling sessions than older clients. To examine this variability, some bottom-up costing would be needed.

The next four sections provide more detailed information about different types of cost evaluations.



Evaluation type 1



How to do cost evaluations within one agency

The process of doing cost evaluations within one agency can be broken down into seven main steps:

- outline of the purpose of the study
- describe the service organisation and the interventions under review
- identify the resources needed to deliver the interventions
- collate the existing data sources

- develop an analysis plan
- conduct new data collection
- conduct full analysis

The information provided in these steps is complementary to that outlined in Workbooks 1 and 2 of this series. **Be sure to review Workbooks 1 and 2, if you have not already done so**, follow the steps outlined in those workbooks.

1. Outline the purpose of the study

For agencies with no current cost information, a first step may be to devise unit costs for different interventions offered

There may be several reasons for undertaking a cost evaluation within a particular organisation. For agencies with no current cost information, a first step may be to devise unit costs for different interventions offered. This may be undertaken with a narrow focus, tracing only the resources directly used in the interventions offered by the agency. This would normally be undertaken during a set period of time, (usually a year), and with data retrospectively. One different kind of this type of study would be to investigate the cost across clients rather than units of activity. However, this may need a differ-

ent time period and be undertaken prospectively to trace the use of resources for a group of clients. This type of study would usually be undertaken as part of an economic evaluation (Workbook 8), even if some data were available through patient billing systems.

Other studies may be undertaken with specific changes in service provision in mind. For example, you may want to predict the consequences of increasing or decreasing the frequency of maintenance therapies. Or, you may be contemplating more drastic re-organisations of the whole agency. For this

type of study, it is necessary to relate current resources with the units of care that can be delivered and how changes in different programmes may interact with one another. This requires knowledge of the potential caseload of different workers taking into ac-

count both the contact time with clients and the non-contact time, for example, in coordinating with other agencies or writing up case notes. Planning such studies requires close partnership between the clinical staff and those doing the costing study.

2. Describe the service and interventions

The next step in any costing study is to examine the service and provide some breakdown of the activities. Development of programme logic models will help identify the specific services and activities to be costed. The purpose of the breakdown of activities within specific services is two-fold. First, it provides an overall framework over which the resources needed for the whole service

can be allocated. The second purpose is to determine the units of activity for costs to be calculated. The detail of your breakdown will be related to the purpose of your study.

Have you completed a programme logic model, as described in Workbook 1 of this series? Retrieve and review your programme logic model now, or complete one if you have not already done so.

3. Identify the resources needed for each intervention/unit of care

When ‘free’ resources are included, you will be costing the service from the societal perspective. When they are excluded, you will have adopted the agency perspective.

The next step is to consider what types of resources are required to deliver each type of care. As described earlier, the components will be staff time, consumables, space and building related expenditure, and administrative and management expenses. The consumables will include items such as postage, telephone, stationery as well as medication costs, testing procedures and travel costs directly linked to client care. Providing care can involve a long list of different items including insurance, training, and recruitment expenditure.

Some items should be included even though they may not appear on the budget. For example, treatment services may have a number of ‘free’ resources, in free or subsidised property, or seconded staff from other welfare agencies or volunteers. Although these resources are free in financial terms, they are not without value. Also, services may not be replicated at the initial cost and failure to take account of free resources in planning could have financial implications.

4. Collect and collate available data

The more detailed the activity database, the more detailed can be the cost analysis.



Most agencies will have some data already available, for example, hours of work, classification and costs of staff. You can use this database for your data analysis.

The ability to use current information to allocate resource use across activities will depend in part on how the organisation manages its finances. In some agencies, there will be clear cost accounting across activities and some confidence may be placed on the current tracing of resources if 'cost centres' are in operation. However, some care must be taken with such divisions. For example, in one study of a local agency (Godfrey et al., 1995), it was found that the whole of the director's salary was allocated to the core services even though the director also managed the work within prisons. This was a historical allocation based on sources of funding rather than actual resource use.

It is also necessary to examine current data sources for levels of activity. In some systems, detailed utilisation of services may be kept with details of each client. In general, however, some data will be available on total levels of activity of a unit, for example, the total number of clients seen, the total number of counselling appointments, etc. The more detailed the activity database, the more detailed can be the cost analysis.

The final source of information is records of individual staff's working practices. Some will only be assigned to certain activities while others may work in a number of areas. Some organisations will have time budgets for their staff but, as with other budgets, there is a need to check that resources are used in line with the budgets. The cost of staff should include all employers' costs such as payroll taxes and pension contributions. Other expenditures are usually available from the expenditure accounts.

5. Develop an analysis plan

There are four main aspects of planning the analysis of a costing study: choice of units of activity; measuring and valuing of resources; allocation mechanisms for related resources to units; and choice of simulations from the calculations.

The choice of units will relate to the purpose of the study, the activity breakdown, and viability of collecting data. Some of the general measurement and valuation issues have been discussed in preceding sections. You will need to decide whether to value resources by the actual value in the service or by some national average rate. Staff, buildings and many other resources may have dif-

ferent values according to the locality of the service. National valuation figures may be useful for generalising results, but for providers and funders of services, local variations in the cost of resources will be important. In general, it is useful for all costing studies to report resource use in physical units (e.g., 3 buildings: 20,000 square metres) as well as their value.

The next step of the analysis plan is to consider the means of allocating resources to units of activity and the mixture of top-down and bottom-up methodology to be adopted. This plan will depend on the type of service and the information available on suitable

allocators. For most PSU treatments, staff resources make up the majority of the reported resources. As discussed earlier, percentages of total time taken in face-to-face contact (or if available the total time including non-contact) is one of the most efficient ways to allocate staff expenses. Similarly, building and space-related expenditure such as rent (capital cost), maintenance, heating, lighting, cleaning, etc., could be allocated by the proportion of floor area used in different activities.

The main part of the analysis plan for most studies is to obtain some current average cost per unit of activity, for example the cost per counselling appointment. Where available, it may be possible to examine how different units of activity are combined for the cost of an intervention, for example, cost per client for an outpatient programme. These aver-

age costs, however, will depend on the overall level of activity of the unit and may not remain the same if activity rises or falls. Calculating the marginal, or extra, costs for an increase or decrease in activity is a useful addition to the analysis. For example, Bradley et al (3) calculated the cost for one additional client and an extra 25 clients for a methadone treatment programme.

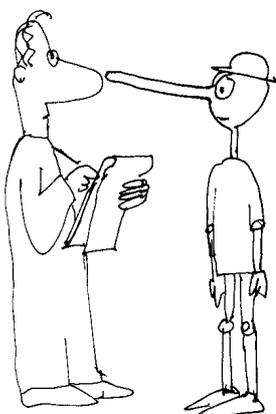
All cost calculations require assumptions to be made, and the analysis plan should include what attempts are to be made to assess the effects of changing these assumptions. Using the results in a number of simulations of treatment changes may also be part of the analysis plan. This sort of exercise may include some of the factors which may influence the future costs of delivering PSU treatments and types of interventions.

6. Conduct new data collection

One of the main purposes of the analysis plan is to consider whether existing data are sufficient to fulfil the objectives of the study. If not, some plan has to be made to collect new data. This may be in the form of an observational study. For example, staff in settings such as an inpatient facility could be observed for a set period and resource use directly noted. This could form the basis for a detailed bottom-up costing study. There are problems with this type of data collection. It can be expensive, people may behave differently if observed, and the process may seem threatening to staff or disruptive to the care process.

An alternative is to use questionnaires or diaries with staff and/or clients. It is the allocation of staff time across the different activities performed which is most often missing. Asking staff to note use of time in a diary for a set period is a reasonable way to understand how services work and give some information about the resources required for

different activities. It is particularly useful for examining the amount of non-contact time required for each treatment event. The first step is to explore all categories of staff time so that the full working day can be accounted for by the staff. For example, it is important to include training time, team meetings, supervision, case note writing, liaison work and travelling time. In some cases, it may also be useful to note the resources used by clients either by asking them to complete diaries or attaching recording forms to case notes. There are similar problems with data collection by survey as those encountered by observational study. Although the method may not be so intrusive, there are problems with validating self-reports. Often this will need to be examined in relation to other sources of data such as the level of activity. The timing of surveys are also important. For example, while a two-week survey may yield sufficient data, there would be problems if the weeks chosen fell, for example, in a main holiday period. In most cases, some cross-



checking can be made with other sources. For example, total yearly time available can be calculated from the contracted hours minus holidays and average time off for sickness.

Gathering information requires resources. One question is whether these costs should be included as part of the costs of treatment. Again, there is no universal answer. Part of

any good quality intervention should be systems to ensure quality. Monitoring systems including resource tracing can be seen as part of normal care and hence costs included. Similarly, there is a need to include some development costs in any situation. However, other costing studies may be undertaken as part of a wider research exercise, and if the costs of data collection are for research purposes, these costs should be excluded.

7. Conduct full analysis

Only with the previous steps in place can the full analysis be undertaken. It is useful as part of the analysis to build in a number of checks on the calculations. For example, do the data on staff time correspond to the total number of hours available according to their contracts? Are resources being 'over' or 'under' used and hence is the current level of activity sustainable for the future? Are the new

data collected in line with staff expectations or have some resources, including time, been omitted? It is important to state in the discussion of the results what items were excluded from the analysis.

For more details on data analysis and reporting of results, see Workbook 2 of this series.

Evaluation type 2



How to do cost evaluations across different provider agencies

Data need to be generated in a similar form across agencies.

Data need to be generated in a similar form across agencies. The ease of this process will depend on the comparability of existing data between agencies and developing comparable new data collection methods. This may be easier when comparisons are being made between stand-alone services than where the PSU treatment is being undertaken in a larger organisation, for example a hospital (Bradley et al., 1994). To facilitate comparability, it may be necessary to develop a checklist of the resources required for each unit or type of intervention to check that all have been included.

It also is easier if programmes of care are delivered according to a similar protocol across agencies. While there is a need to have comparable methodology, it could be counter-productive to have an overly rigid system of accounting for every type of resource use. It may be impossible given current information systems for allocations to be made at the level of detail of all individual resources and a rigid system may lead to inaccuracies. Again, the needs depend on the purpose of the study and the detail of the analysis of any figures required. A more feasible approach may be to aim for broad comparability as a first round and then undertake more detailed analysis where large discrepancies between agencies delivering seemingly similar interventions or activities are found.

There are also particular valuation issues to be addressed when making comparisons over more than

one agency. Local valuations of the same amount of resources may vary. It would be expected that if there is any substitutability of resources these local variations in values may affect the treatments offered. However, the purpose of the study may not be to compare the values but the resource use itself. In that circumstance, figures giving values alone may be misleading.

You should work with each agency and devise a system which will meet the overall aims of the study and also provide useful information to individual agencies. Unless the agencies see the purpose of the costing exercise and not feel overly threatened by the analysis, data reliability and continued data collection cannot be guaranteed. Over large areas, such as a country, such detailed work may not be possible and there may be a reliance on charges or expert opinion on treatment costs (see, for example, Holder et al., 1991).

Another application for information on resource use across agencies is to examine the distribution of total resources compared to population needs. For this purpose, the focus is on measuring and valuing all resources rather than accurately measuring the resources needed for each intervention. This type of study may take place at a more aggregate level and consist only of broad average costs. However, the loss of detail often means that no sensible comparisons could be made across services.

Evaluation type 3



How to do cost evaluations of wider social costs of PSU interventions

People with PSU disorders can have a number of health, social and legal problems. These problems can incur costs to a range of agencies and other members of society. Wider social cost studies attempt to trace out the full resource implications of PSU treatment (French et al., 1994; Godfrey, 1994). While these studies are commendable in their efforts to be comprehensive, they are typically too complicated to conduct and have

been criticised on a number of methodological issues.

The second case example located at the end of this workbook (by Williams and Gerstein), describes an evaluation of wider social costs and benefits for treatment programmes in the State of California, USA. Evaluators examined social costs and benefits of PSU treatment, such as criminal activity and employment earnings.

Identifying the range of costs



PSU treatment can involve costs for clients, families, other agencies and the rest of society. However, the treatment may also reduce future health and other welfare costs. A large range of effects could potentially be identified for inclusion in these types of studies. For example, some studies have been undertaken from the narrow focus of the health care sector, comparing the costs of PSU treatment to reduced future health care costs attributed to that treatment (for example, Holder and Blose, 1987; Goldman et al.,

1991). While such studies may be useful for advocacy purposes, there is a problem if comparisons are being made across programmes because the one with the highest savings in future health care costs may not necessarily be the one with the highest total benefits, including those to the individual client.

Most studies adopt a societal perspective and include only resource costs. Others, however, have attempted to trace out the impact on state finances or the taxpayer (see, for example, Gerstein et al.,

1994). The taxpayer perspective will focus on who bears the costs. Thus, some transfer payments may be included to trace who loses and who gains as a result of the treatment process.

The main areas considered are:

- health and other welfare care use
- criminal costs
- productivity loss

Health and welfare use could include additional costs as a result of treatment or future savings as a consequence of a successful treatment. Lost productivity has already been mentioned. As well as any losses as a consequence of treatment *per se*, there is also the potential effect on future job productivity.

Measurement and evaluation issues

In general, however, self-reported outcomes have to be used. These are usually valued by taking an average cost figure from some official source of data.

The tracing of resource use after treatment usually requires a comparison at a client level. In other words, you need to trace a cohort of clients. However, this raises a major measurement problem of attributing any future costs to the intervention itself and not to other factors. Because most existing studies have used a comparison of costs before and after treatment for the same individuals, the data are subject to biases the decline in resource use and costs may not be directly attributable to the treatment intervention. Another major problem of these studies is the lack of information about the social costs of those not in treatment.

With such wide effects to measure, there has to be some compromise with accuracy. In some systems, actual health care costs (or at least charges) can be traced. In general, however, self-reported outcomes have to be used. These are usually valued by taking an average cost figure from some official source of data. Some potential and costly effects, for example, a road traffic accident, may be so low in incidence that either a very large sample or a long time period would be needed to get an accurate measurement. In some cases, epidemiological risks are known and, therefore, future probable consequences can be modelled via computer analyses.

A particular evaluation problem occurs with measuring the costs of criminal activity. The response to crime from the criminal justice system is one cost. More debatable is whether the value of goods stolen should be

included as a social cost. It could be argued that the value of the goods in itself is not a resource loss. These goods are not lost but are 'transferred' to others in society. The resource costs of such crime are fear and other intangible costs, the criminal justice response and extra resources devoted to security measures which may result from high levels of crime. As with other controversial areas, a final decision will be linked to the study purpose. For purposes of generalisability, it is useful to present results which are capable of re-analyses for those who want to make other assumptions.

The measurement and evaluation of lost productivity poses other problems. These indirect costs can be large for long residential and in-patient care and overshadow all other costs. However, evaluating the time spent in treatment, as if someone was fully employed, is likely to overestimate the resource loss to society. Also, it can rarely be assumed that successful treatment will result in large productivity gains if there is a high level of unemployment in the economy.

The final issue is the time period over which such studies are conducted. Some effects could be life long, although the longer the period from the intervention the more difficult is it to attribute any resource change to the intervention rather than to some other factor. In general studies are limited to relatively short periods of follow-up (e.g., one to three years).



It's your turn

Put the information from this workbook to use for your own setting. Complete these exercises below.

Remember to use the information from Workbooks 1 and 2 to help you complete a full evaluation plan. Review that information now, if you have not already done so.

1 Decide the scope of your study. Will you evaluate costs within an agency, across several agencies, or evaluate wider social costs?

- Within an agency
- Across several agencies
- Wider social costs

2 Determine what 'unit' of activity you will measure. Your unit of activity level will depend largely on your research question (see Workbook 1). It could be a specific component of the programme: common examples would be counselling visits, inpatient stays, assessment interviews, or some division per time period such as cost per type of care per hour, or per week.

3 List programme cost sources that you want to evaluate. If evaluating services across agencies, decide the common measurement(s) you will use. Meet with planners from the other agency(ies) to achieve consensus on the evaluation methods.

For right now, do not assign specific monetary amounts to these sources — just record the different areas. We have started the list as an aide for you. Cross out the sources that do not apply to your situation, and add others that are not already listed.

Capital costs

- building
- equipment

- furniture
- vehicles

Building related expenditure

- heating
- lighting
- property taxes
- maintenance

Staff costs

- salaries
- fringe benefits

Other service related expenditure

- stationary
- telephone
- vehicle operating costs
- travel costs

Overhead costs

- management and administrative expenses

4 Assess the data that are available to you from existing sources, such as patient billing records, payroll accounts, etc. Determine what information you have available, and what other information you will still need to find out. If you need to collect additional data, decide what method you will use to do this. Review Workbook 2 to help you choose an appropriate data collection measure.

5 Use your list of your programme's cost sources to begin to assign specific monetary amounts — per unit of activity level. Consider capital costs, cost allocation, volunteers, and discounting in your calculations. If you do not have all the information right now, make note of what you know and also make note of what you need to find out later to complete the list. Decide whether you will use a top-down and/or a bottom-up approach for estimating costs. Consider your research resources and your available data while making this decision.

Example Case:

A research group was interested in measuring the cost of the prevention component of their programme during 1996. They compiled the following list:

Capital costs	
• building (building value/60 years — then divided by 4 because prevention programme occupies only 25% of building)	15,000
• equipment (equipment value/10 years)	5,000
• furniture (furniture value/10 years)	2,000
• vehicles (vehicle value/10 years)	1,000
Building related expenditure	
• heating	500
• lighting	200
• property taxes	1,000
• maintenance	300
Staff costs	
• total prevention staff salaries plus benefits	120,000
Other service related expenditure	
• stationary	400
• telephone	1,200
• vehicle operating costs	670
• travel costs	2,000
Overhead costs	
• management and administrative expenses	80,000
Total 1996 costs	229,270

Conclusion and a practical recommendation

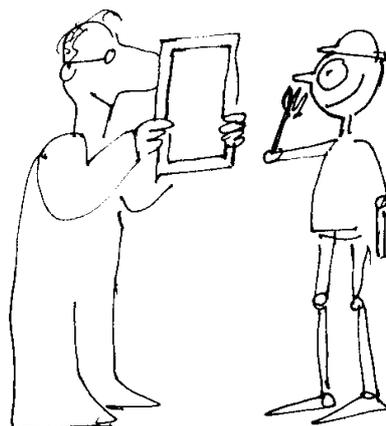
In this workbook, we have outlined the basic principles and practices of cost evaluations within PSU services and systems. In undertaking cost evaluations, it is essential that you pay close attention to the principles and practices of planning and implementation as outlined in Workbooks 1 and 2. Trade-offs have to be made as to the **rigour** with which you collect and analyse information to answer your evaluation questions, and the **resources** you have available. You must strive to achieve the best possible information with the time and resources available to you. You must carefully document the limitations of your findings and conclusions. With these principles in mind, you will be able to undertake practical and useful cost evaluations within your treatment service or system.

After completing your treatment evaluation, you want to ensure that your results are put to practical use. One way is to report your results in written form (described in Workbook 2, Step 4). It is equally important, however, to explore what the results mean for your programme. Do changes need to happen? If so, what is the best way to accomplish this?

Return to the expected user(s) of the research with specific recommendations based on your results. List your recommendations, link them logically to your results, and suggest a period for implementation of changes. The example below illustrates this technique.

Based on the finding that operating costs in programme A are 20 percent lower than operating costs of programme b, yet serve the same number and type of clients, we recommend that programme administrators study information about client outcomes in these two settings. If outcomes are similar, it may be feasible to adopt the practices of programme A on a larger-scale basis.

Remember, cost evaluations are a critical step to better understanding the day to day functioning of your PSU services. It is important to use the information that process evaluations provide to redirect treatment services. Through careful examination of your results, you can develop helpful recommendations for your programme. In this way, you can take important steps to create a 'healthy culture for evaluation' within your organisation.



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Comments about case examples

The following cases present evaluations related to different aspects of cost evaluation. In the first case, Michael French and Kerry Anne McGeary describe the rationale and development of a cost data collection instrument called the Drug Abuse Treatment Cost Analysis Program (DATCAP). The second case, written by Ellen Williams and Dean Gernstein, presents an evaluation of wider social costs and benefits for PSU treatment in California, USA.

The DATCAP was developed and refined over a five year time period. The evaluators' goal was to create a structured and scientifically-based instrument for estimating the economic cost of PSU treatment services, thus providing a tool for making comparable cost estimates across agencies and over time. The DATCAP includes cost estimates from a variety of categories, such as major equipment, contracted services, and personnel. 'Free resources' such as volunteers also are included at estimated fair economic value. The basic unit of analysis is total cost for an individual treatment programme, but this figure can be transformed to other units such as weekly cost per client. Examples of evaluations using the DATCAP are provided.

The California cost evaluation (CALDATA) was undertaken to provide scientific justification for continued PSU treatment costs. This was a broad-based evaluation, examining costs of several treatments as well as the wider social impact of delivering these treatments in terms of clients' criminal activity, hospitalisations, employment earnings, and substance use. Evaluators used computerised record abstraction and client interviews to collect data. Results were generally supportive of PSU treatments, indicating that the economic benefits of PSU treatment outweighed the costs of providing treatment.

Authors of both cases point out the importance of obtaining reliable data for cost evaluations. In some settings, a majority of cost data are compiled already for accounting purposes. In other settings, no such data are available, or may be insufficient and/or unreliable. Evaluators must consider always whether they believe that existing data is sufficiently reliable to use in their cost evaluation. If not, alternate and more reliable sources of data should be considered.

Case example of a cost evaluation



The drug abuse treatment cost analysis program*

The authors alone are responsible for the views expressed in this case example.

* This paper is a revised and condensed version of an earlier manuscript by French M.T., Dunlap L. J., Zarkin G. A., McGeary, K.A. and McLellan A. T. (1997).

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Who was asking the question(s) and why did they want the information?

Drug abuse treatment providers need to know the cost of the services they provide. Indeed, continued public and private funding is now being linked to cost and outcome measures, and providers can use financial data to improve organisational efficiency.

One of the dangers, however, of promoting cost studies for treatment programs is that most program staff are not technically prepared to perform cost analyses and little user-friendly information is available to offer them assistance. Furthermore, not all cost methods are consistent, which can lead to non-comparable estimates that are difficult to use for policy or planning purposes. Our paper provides treatment programs with a much-needed technical assistance tool. Specifically, we present a structured and scientifically-based instrument for estimating the economic

cost of treatment services? the Drug Abuse Treatment Cost Analysis Program (DATCAP). The components of this instrument are outlined and findings from three actual case studies are presented.

Program evaluation research has a long tradition in health care with several evaluation methods that are scientifically developed and empirically tested. Evaluation of substance abuse treatment programs is, however, a relatively new endeavour. Although the demand for such analysis is extensive, the availability of techniques and methodologies has been lacking. The recent increase in the demand for these evaluation studies has fostered the growth of distinct ways to conduct cost analyses. However, a lack of standardisation in cost analysis for the substance abuse field has led to an uneven set of initial studies that have varied considerably in terms of methods, terminology, and perspectives (e.g., Cruze, et al., 1981; Harwood, et al., 1984; Rice, et al., 1991; Annis, 1986; McLellan et al., 1983; Holder and Blose, 1992; McCrady et al., 1986; NIDA, 1987; Horgan, 1991; CALDATA, 1994; Finigan, 1996). Consequently, most of the early studies cannot be compared across programs or to more recent studies because the measures are not equivalent (French, 1995; Dunlap and French, In Press). As more economic evaluations are conducted, there will be an increasing need for comparable estimates of treatment services for treatment planning and policy recommendations. Performing a cost analysis is the first step in any complete economic evaluation of treatment interventions (Gold, et al., 1996; French, 1995). If the cost analysis is unstructured or methodologically flawed, then a subsequent cost-effectiveness analysis, medical cost-offset analysis, or benefit-cost analysis will be compromised. Given the critical importance of following a structured and methodologically sound approach for estimating treatment cost, the primary

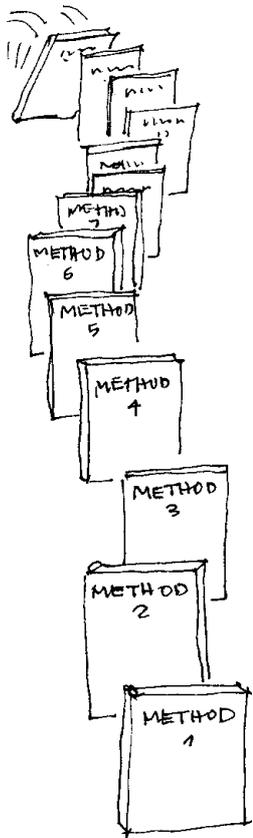
purpose of this paper is to introduce a standardised data collection procedure that can meet these objectives.

The Drug Abuse Treatment Cost Analysis Program (DATCAP) has evolved over five years of research into a flexible cost instrument that follows economic principles, provides useful information to treatment programs and funding sources, and is user friendly. One of DATCAP's most appealing features is that the data and cost estimates from any particular program can be directly compared with similar data and estimates from other programs, and for individual programs over time.

The discussion and analysis that follow provide a conceptual framework for economic cost estimation and offer practical guidance on how to use the DATCAP instrument for substance abuse treatment programs. First, economic cost estimation through the DATCAP instrument is discussed followed by the evolution of the instrument into its present form. Second, we review each section of the instrument and describe the information necessary to answer pertinent questions. The final sections outline current applications and limitations of DATCAP¹ along with policy implications and recommendations.

What resources were needed to develop and implement this instrument?

This instrument was developed over five years and with the assistance of several funding grants. The programs usually invest approximately two to three days to assemble the information and complete the instrument.



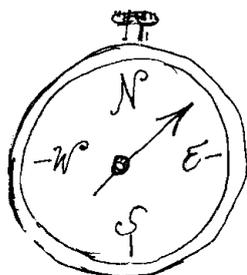
¹ For a more extensive and detailed discussion of the DATCAP instrument see French et al., 1997.

How were the data collected?

Conceptual framework for cost estimation

The following five elements are important steps to ensure reliability in cost estimation.

- 1 Select a single measurement perspective that is flexible, standardised, and widely supported (e.g., economic (opportunity) cost).
- 2 Focus on a single analysis perspective that is workable, standardised, and policy driven. In our case we use the treatment program as our perspective for analysis.
- 3 Define a fixed set of cost categories that are consistent with standard economic theory and used in other cost analyses.
- 4 Develop and define a standard set of questions to arrive at cost estimates within each category.
- 5 Propose a relatively narrow range of acceptable sources for the resource use and cost data that will be used to calculate the estimates.
- 6 Describe and follow a consistent method for estimating costs for each category of data used.



The elements noted above can be considered strategic steps in the collection of reliable and accurate treatment cost estimates. Each step has been incorporated into the DATCAP instrument. By clearly defining and following these perspectives and steps, the reliability of the cost estimates will be maximised. The remainder of this section explains these steps in greater detail and how they are operationalized through DATCAP.

Regarding the actual content and organisation of DATCAP, the instrument reflects standard economic resource and cost variables that have appeared throughout the economic literature for many years (Mishan, 1975; Sugden and Williams, 1979). Specifically, the heart of economic cost analysis is opportunity cost or opportunity value (Drummond, Stoddard, and Torrance, 1987). Economists measure the cost of program resources based on the value of those resources in their next best use, while accountants and practitioners in most other disciplines typically estimate program costs based on actual expenditures (Horngren, 1982). The opportunity cost framework is operationalized in the DATCAP instrument, which fosters standardisation and comparability.

The concept of opportunity cost and other economic principles related to DATCAP are best explained in the context of examples. Recall that economic costs hinge on the opportunities that are foregone by using a resource. Thus, the economic cost of utilising a treatment counsellor for 40 hours per week over the course of a year is the value of the next best use of that counsellor's time. Accountants, on the other hand, would normally view the cost of this counsellor as the salary that she earned for a year of work. If the counsellor's salary was equal to the next highest value of her time, then economic cost and accounting cost are equivalent. However, if the counsellor was being paid a salary below the rate that she could obtain in the next best use of her time, then economic cost would be greater than accounting cost. Since competitive organisations do not typically acquire resources at a rate that is greater than market-clearing prices, accounting costs are almost always less than or equal to economic costs.

Economists are more concerned with opportunity costs than accounting costs because program evaluations require standardisation. For example, it would be unfair to compare the accounting costs of program A with program B when program A received significant

donated resources and program B had to pay full market prices for essentially the same resources. If both of these programs used exactly the same resources within a particular year, program A would show a much lower accounting cost than program B, but the economic costs would be equal. In comparing the programs, the economic approach is the superior method because it is not distorted by program-specific differences in resource costs. In addition, program replicability would require information on economic costs rather than accounting costs because economic costs are a pure measure of resource value.

Another important issue for cost estimation is the perspective of the analysis. Depending on the study objectives, costs can be estimated from the perspective of treatment clients, treatment programs, third-party organisations (e.g., insurance companies), or society as a whole. Each perspective requires a different data collection process and estimation strategy. For example, treatment clients incur costs related to travel time, lost work time, and child care. Costs to the treatment program include personnel time, equipment, and facility rental. The DATCAP instrument adopts a treatment program perspective for data collection and analysis because programs require financial information for funding and performance measurement. Resource allocation rules are best developed for treatment programs; the treatment program is generally the unit for licensing and quality assurance evaluation, and the program is typically the contracting unit.

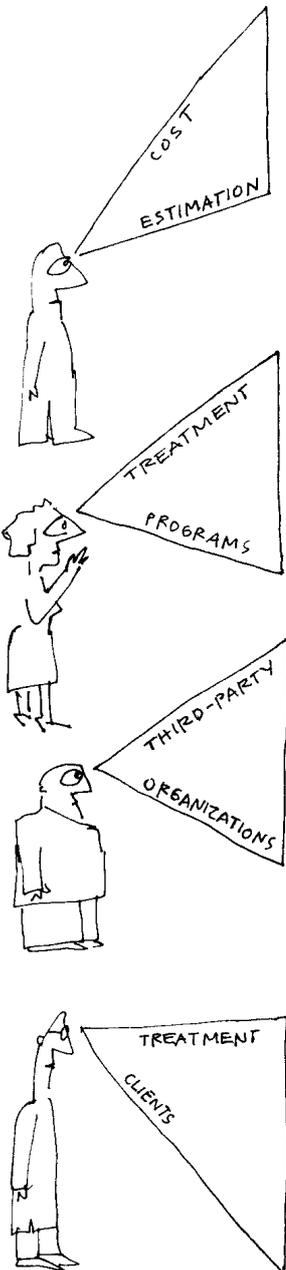
The final conceptual issue involves the actual presentation of economic costs. Most cost analyses will be based on annual costs because of record-keeping convenience and because one year of time represents a reasonable period to reflect a pattern of resource usage. The first variable that can be computed from annual data is total annual cost. This measure includes the cost of all treatment services and operations throughout the year. Total costs can be in turn divided into fixed and

variable components. Fixed costs such as physical capital and facilities are invariant to the number of treatment clients served. Variable costs such as personnel vary with the size of a treatment program.

Information on total annual cost and client caseload can be combined to estimate average annual costs such as the cost of treating one client continuously for one year. Average cost estimates are useful because data are normalised so that treatment programs that vary widely in size can be directly compared. For example, program A could have a much higher total annual cost than program B, but a smaller average cost due to the fact that these costs are distributed over a much larger client base. This concept is referred to as economies of scale.

The total cost variable is an important measure for understanding the financial implications of program expansions. Specifically, marginal cost represents the incremental change in total cost due to a small change (e.g., one client) in program production or output. Depending on program operations, marginal cost may be very low up to a threshold level of additional clients (e.g., 10 or 15 clients) and then increase sharply because a new counsellor is needed or facility space is required as additional clients are enrolled in the program.

In summary, DATCAP collects resource use and cost data to enable the estimation of **both** economic and accounting costs since each measure serves a different purpose. The unit of data collection and analysis is the individual treatment program rather than the client, the insurance company, or the taxpayer. Information from DATCAP can be used to estimate the total annual cost for a particular program, along with measures of average and marginal cost. Lastly, the basic structure of the DATCAP instrument has a long history in the economics literature, which strengthens the comparability and the ability to generalise the findings.



Design and organisation of DATCAP²

DATCAP is usually administered as a face-to-face interview for treatment provider sites that collects and organises detailed

information on the resources used in treatment operations and the associated economic costs (e.g., French, Dunlap, Zarkin, and Galinis, 1994). Table 1 presents the broad resource categories included in DATCAP along with specific items.

TABLE 1: Resource use and cost categories in the DATCAP instrument

Personnel	Supplies & materials	Major equipment	Contracted services	Buildings & facilities	Miscellaneous resources	Not recorded elsewhere
Direct salaries	Medical	Office furniture	Laboratory	Total space	Utilities	Goods
Fringe benefits	Office	Computers	Repairs/maintenance	Total usable space	Insurance	Services
Volunteers	Housekeeping	Electronics	Security	Rate of use	Taxes	Contracts
		Food	Medical	Housekeeping	Rental rate	Telephone Printing
			Residential	Advertising		

These categories are generally set up to encompass the range of economic costs associated with many treatment programs. It is left to the program director to itemise resources and (with the assistance of an experienced administrator) estimate economic costs within each category. In some cases we have provided a list of items that may be appropriate only for a specific type of treatment program. Therefore, items may be added or omitted based on the program's needs. To ensure that the reliability of the instrument is not compromised by allowing this flexibility, the sections were developed to include cross checks so that the data are accurate and consistent. The strategy here is to maximise reliability of information by (1) defining and standardising a fixed number of questions to use in determining each cost cat-

egory; (2) facilitating the interpretation of the question; and (3) recommending the types of data that will be acceptable to answer those questions. In general, the economic cost data are collected from general ledgers, personnel reports, expenditure reports, equipment requisitions, and inventory reports rather than from budgets because budgets do not always coincide with actual resource use.

In focusing on the total economic costs involved with treatment, DATCAP also asks program directors to list free and/or subsidised resources used in treatment provision (e.g., volunteer workers). The market value of free/donated resources can be estimated by multiplying the share of a resource used by the drug abuse treatment program by the estimated fair-market value of

² Given the precise formatting and length of DATCAP, it would be difficult to reproduce the instrument within this manuscript. However, the latest version of the DATCAP instrument and User's Guide is available from either Dr. French or Dr. McGeary at the University of Miami. Please direct all inquiries (e-mail preferred) to Dr. French or Dr. McGeary at the address on the first page of this paper.

the resource. For example, the estimated market value of a volunteer worker is the salary he or she could earn in a paid position doing similar tasks. Thus, the costs reported from DATCAP should include the values for all the resources used by a program in providing treatment regardless of whether the program actually incurred an expense for the resource. We believe that this costing method provides a realistic measure of economic cost and more accurate comparisons between programs because it does not distort the true resource cost for programs that have better access to free, donated, and/or subsidised resources. The data collection process for DATCAP also includes questions on program revenues and client case flows. This information provides a useful link between the costs of the program, treatment services, and the sources of funds for the program (French, et al., 1996). By collecting resource use and cost information we are able to gain a better understanding of treatment operations, which will enable a full economic evaluation.

For each program, it is desirable to conduct a half-day site visit to administer the DATCAP instrument. However, much of the data collection can be done prior to the visit. Approximately one week before the site visit, the instrument can be sent to the

programs with instructions on how to complete as many data categories as possible before a trained data collector arrives. Data collection often continues for a few days after the site visit to ensure that complete and accurate information is provided for all sections of the instrument.

How were the data analysed?

As noted earlier, DATCAP is a program-level instrument and data collection would normally occur annually at each program. The specific variables that will be available from the instrument are diverse. For example, DATCAP information allows us to calculate the average cost of servicing one client continuously for one year at each program. This variable normalises the annual cost information so that average cost estimates can be compared across programs of different size and durations of treatment for the average client. Once again, these ratios convert the aggregate information into units that can be compared across programs for a standard period of time. The diagram below is an example of the type of information that can be compiled from DATCAP data.

Client/Program Characteristics	Opportunity costs		Revenue
	Fixed	Variable	
• Clients served	• Equipment	• Personnel	• Federal
• Average length of stay	• Office supplies	• Equipment	• State
• Static caseload	• Capital	• Medical supplies	• Local
• Licensed capacity	• Facility	• Physician services	• Client fees
• Range of services	• Rent	• Advisory board	• Private grants
• Type of program	• Contr. services		• Donations

What did they find out?

Recent case studies using DATCAP

Table 2 reports the results of three case study cost analyses that were completed late in 1996. The economic variables that are calculated for each site are total annual economic cost, weekly economic cost for a typi-

cal client, and economic cost per average treatment episode. All three programs are private, not-for-profit entities. Generally, public programs may have slightly lower economic costs compared to private, not-for-profit programs. However, if public programs are heavily subsidised at the federal, state, or local level, their accounting cost would be significantly lower than a similar private program in the same modality.

TABLE 2. Characteristics and costs of case study *Treatment Programs* (1995)^a

Prog.	Financial Structure	Modality	Average length of stay (Weeks)	Average daily census	Total annual economic cost	Weekly Economic Cost per Client	Economic Cost Per Treatment Episode ^b
A	Private, not-for-profit	Methadone maintenance	150	559	1,973,601	67.90	7,662
B	Private, not-for-profit	Outpatient drug-free	16	165	718,921	83.79	1,341
C	Private, not-for-profit	Outpatient drug-free	22	148	618,748	80.40	1,778

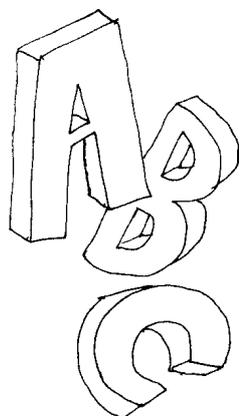
^aThe cost measures are reported in 1995 dollars.

^bEconomic cost per treatment episode may not exactly equal the product of weekly cost per client and average length of stay due to rounding.

For our case studies, we found the two outpatient drug-free programs to have similar average lengths of stay C 16 and 22 weeks. These two programs were comparable in size, based on an average daily census of 165 and 148 clients. However, a substantial difference of about \$100,000 in total annual economic cost is present between the two programs. This total cost differential leads to some differences in other economic cost measures such as the average weekly cost to service one client and the average cost for a treatment episode. Higher total and average costs for Pro-

gram B relative to Program C can be partially explained by significant relocation and renovation expenses incurred by Program B during the relevant time period.

Cost differences are also found when comparing estimates across modalities. For example, Program A is a methadone maintenance clinic with an average daily census of 559 clients and an average length of stay of around 150 weeks. Given these relatively high caseload statistics, the estimated total annual cost at Program A was considerably higher



than Program B or C. The estimated cost per treatment episode C weekly economic cost per client multiplied by the average daily census C was also relatively high at Program A because methadone maintenance clients typically have a longer length of stay. However, the weekly cost per client for Program A is lower than the other two programs. Therefore, the methadone maintenance program distributes its higher economic costs over a larger number of clients. In the field of economics this concept is known as economies of scale. While the purpose of these case studies and cost estimates is to illustrate the type of information that can be derived from DATCAP, comparisons with other DATCAP findings can be made by referring to French et al. (1996).

Table 3 presents a different perspective on resource use by showing the distribution of costs across resource categories. As expected, labour is clearly the dominant resource with cost shares around 50 percent or higher. Building and facility costs account for a large proportion of Program A's total annual opportunity costs. This situation is unusual because Program A is using two very large facilities to accommodate their large case flows. The building and facility costs for Program B and C are more representative of an average distribution. Additionally, we found that the distribution of costs across resource categories both within or across modalities is

highly program specific. Program B had a large distribution of costs for major equipment. This is primarily due to the renovation and relocation expenses mentioned earlier. Program C had much lower major equipment purchases, and a significantly larger percentage of Program C's resources were allocated to labour compared with Program B. Otherwise, the small variation in the distribution of costs across programs is consistent with the organisational structure of most treatment programs and the reliance on labour-derived services.

Potential limitations of the DATCAP

The information reported in Tables 2 and 3 represents a significant improvement in the way treatment cost data have been collected, analysed, and reported. However, a few potential limitations are still present with the DATCAP approach to cost estimation. For example, some programs were not able to locate actual records to describe all resources used by their clinics. In these cases we had to rely on recall approximation and expert judgement. Obviously, reliability cannot be as high under these circumstances. Second, to estimate the opportunity cost of some resources we sampled local markets to estimate existing prices (e.g., real estate markets for rental rates of commercial property). These calculations may have some sampling error because we

TABLE 3. Distribution of costs across resource categories*

Prog.	Financial Structure	Modality	Labour	Supplies and Materials	Buildings and Facilities	Contract Services	Major Equipment	Other Items
A	Private, Not-for-Profit	Methadone Maintenance	62	3	20	5	4	6
B	Private, Not-for-Profit	Outpatient Drug-Free	58	2	5	3	30	3
C	Private, Not-for-Profit	Outpatient Drug-Free	71	5	4	8	4	8

*Percentages may not add to 100 due to rounding.

generally relied on a small number of vendors or agents for price quotes. Lastly, the most important contribution of DATCAP to treatment research is still limited by the relatively small sample of cost and effectiveness studies that have been completed to date. When standardised cost estimates are available from a larger sample of programs we will have much more accurate information on treatment cost and cost-effectiveness. The method and data summarised here are certainly informative, but it would be incorrect to assume that the cost estimates are representative of all or even most substance abuse programs in the United States.

How were the results used?

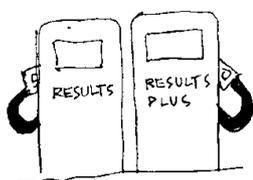
Few studies have examined the costs of treatment programs, especially alcohol, drug, and mental illness treatment programs. The shortage of useful policy-relevant information in this area is especially unfortunate for federal and state agencies that are responsible for the allocation of public funds to treatment programs. These agencies often make policy decisions using outdated cost estimates and rough averages in their decision rules for Block Grants and other disbursements to individual programs. The lack of financing and cost information is also unfortunate for individual drug abuse treatment program directors as they try to develop strategies in anticipation of changes in health care markets and financing; and more generally to improve the operation and efficiency of their clinics.

In addition to the lack of cost and financing information noted above, proposed international health care reforms threaten to place new restrictions on availability of funds

for substance abuse services, causing challenges to the financial viability drug treatment programs. In this changing environment, it is unclear whether treatment programs will receive more attention and possibly more funding from policy makers. However, policy makers lack critical information on the concerns and potential responses of substance abuse treatment programs to proposed changes.

We have tried to take the first step in addressing a part of the information gap faced by agencies at all levels, and by treatment program managers, by developing DATCAP. DATCAP provides timely, accurate, and comparable cost estimates for all of the purposes and constituents noted above. This ensures that resource allocation decisions are made more reliably and accurately at the federal, state, and local levels. By focusing on economic cost, program administrators will be able to better estimate the opportunity costs of their services and identify which funding sources hold the most promise for continued growth. As more programs use DATCAP, more accurate and informative comparisons can be made across patient types, treatment modalities, and variations in therapeutic services.

Results from these types of cost analyses will provide program directors, other policy makers, and researchers with useful and current information on the cost and financial structure of a range of drug abuse treatment programs. Our past experience show that program directors who completed DATCAP were grateful to have quantitative information. These directors have unanimously stated that the benefits of having these cost estimates significantly outweighed the investment of their time and other resources to assemble the data and participate in the data collection exercise.





It's your turn

What are the strengths and the weaknesses of the presented case example? List three positive aspect and three negative aspects:

Strengths of the case study

1 _____

2 _____

3 _____

Weaknesses of the case study

1 _____

2 _____

3 _____

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Case example of a cost evaluation



The California Drug and Alcohol Treatment Assessment (CALDATA): The costs and benefits of treatment

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Who was asking the question(s) and why did they want the information?

The California Drug and Alcohol Treatment Assessment (CALDATA) evaluated publicly supported drug and alcohol treatment programs delivered in the state of California from 1991 to 1992. The project involved an analysis of costs and benefits that applied to all drug users discharged from the major

types of programs in the state. Before CALDATA, every U.S. study was somewhat limited either by the treatment facilities being selected for convenience or the study focusing on only some subgroup of participants. For example, researchers might study patients in facilities that co-operated because of professional affiliation with the research team. Other studies originated because of interest in special treatment philosophies or approaches—studying the effectiveness of medical, psychological, or social treatment models or of various combination approaches at facilities chosen for special pur-

poses. Evaluations based on these limited samples, were suggestive but could not be confidently projected to treatment outcomes or costs in U.S. facilities at large, or in some large subdivisions like the state of California (with one-eighth of the U.S. population.)

Andrew Mecca, Dr. P.H., Director of the California Department of Alcohol and Drug Programs (ADP) in the administration of Governor Pete Wilson, had early experience overseeing drug treatment programs in Vietnam. He had seen outcomes that told him that “treatment works” — drug and alcohol recovery programs changed the behaviour of their participants for the better and were a benefit to society. However, early in the 1990s, Dr. Mecca also knew that his department had no arguments that would rigorously justify use of scarce public funds to pay for treatment costs. A statistical analysis of the treatment experience of a representative sample of clients was missing, even though California, given its population size and the scope of its economy, is larger than many nations. No other U.S. state had undertaken such a study, nor was such information available on a national level. Early in the 1990s, events came together to make the CALDATA analysis possible.

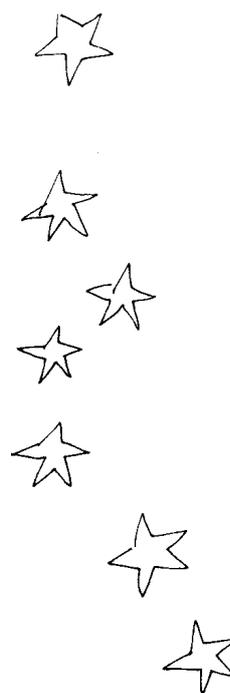
First, California had a database newly in place in 1991 that accounted for treatment programs. The California Alcohol and Drug Data System (CADDSS) collected key data on admissions and discharges from all drug and alcohol treatment facilities legally required to report to ADP. Also in 1991, the National Opinion Research Center at the University of Chicago (NORC) received a federal award to design a survey gathering treatment outcome data from a nationally representative sample of persons discharged from drug and alcohol treatment facilities and to make a cost/benefit analysis of the results. By 1992, the research team at NORC had brought the design of the national treatment outcome study to completion, but a reorganisation of the federal agencies postponed the data collection phase. When Dr. Dean Gerstein, the Principal Investigator on

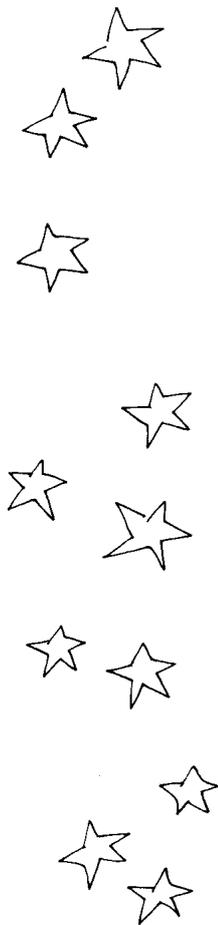
the team outlined the study to a meeting of the state directors of Alcohol and Drug Programs as a preliminary step to gaining their co-operation, Dr. Mecca saw the opportunity to fund a survey for the state of California alone that would anticipate the postponed national study, answering questions about the effectiveness, the costs, and the social utility of drug and alcohol treatment programs that were of critical importance to California.

Using federal funds earmarked for local evaluation research, ADP commissioned NORC to adapt the national design to gather data only in California and in 1994, published the resulting CALDATA analysis of the effectiveness and the social costs and benefits of drug and alcohol treatment at the state level in the U.S. The report set forth the data from interviews with 1,850 individuals recently receiving treatment for drug and alcohol problems in facilities publicly supported by the state of California.

What resources were needed to collect and interpret the information?

Conduct of a study of this scope required the resources of a survey research center experienced in all aspects of survey design — questionnaire development, sample design, informed consent and clearance procedures. Implementing the design required staff experienced in interviewer recruitment and training and field management of data collection in dispersed localities, ranging from massive urban cores to remote rural enclaves. Delivering the data required resources for data-entering and cleaning information submitted on hard copy instruments, and for preparation of final data files accessible to analysis. Completing the data analysis required an expert in policy and clinical issues regarding treatment services, and an economist with general expertise in assessing the costs and benefits of problem behaviour and specific knowledge of drug treatment deliv-





ery systems in the U.S.. NORC undertook to complete all tasks under a U.S. \$2.2 million contract, which included subcontracting the cost/benefit analysis. The necessary staff included Dr. Gerstein as overall director, a sampling statistician, a statistical programmer, a project manager with operational responsibility for instrument design, data collection, data preparation, and budget management, a field project manager with a subordinate staff of five field managers overseeing seventy field interviewers, and a director of field training, with administrative support from NORC's financial centre and technical support from its centre for information services. Henrick Harwood conducted the economic analysis; he was co-author a few years previously with Dr. Gerstein of a major national study, sponsored by the U.S. Department of Health and Human Services, on drug treatment policy and programs. A field office was set up in Pasadena, near the residence of the field project manager, to facilitate communications within the large state of California, where the surveyed programs were as much as 750 miles apart and more than 1800 miles from NORC's central office in Chicago.

How were the data collected?

The CALDATA study was carried out in four stages, 1992-1994: Stage 1 - Facility Sampling and Program Director Interview; Stage 2 - Respondent Sampling and Record Abstraction; Stage 3 - Respondent Interviews; Stage 4 - Analysis. The work in each stage is described in more detail in the sections that follow.

Stage 1 - Facility sampling and program director interview

Information in the CADDs database as of September, 1992, provided the foundation for the sample of drug and alcohol treatment programs used by CALDATA. CADDs included all providers who received any type of public funding via ADP for treatment or recovery services during the current or previous year, including grants, contracts, and

reimbursements from MediCal (the state administered federally funded program of medical care for the poor, the disabled, and the near-poor). State law required that they provide key administrative data about their programs and their participants in treatment. For practical purposes, the CADDs database yielded an exhaustive listing of drug and alcohol treatment facilities in California.

Facility sampling proceeded in three stages, under the direction of Dr. Robert A. Johnson. The ultimate goal was selection of a group of discharged participants that would yield data applicable to the whole population of participants discharged from publicly funded drug and/or alcohol treatment facilities in California in the sample year October 1, 1991 - September 30, 1992. CALDATA'S respondents had to be clustered geographically to economise the costs of interviewer travel. (California extends 1200 miles north to south along the Pacific coastline, with population concentrated in the southern two-thirds, and 300 miles west to east beyond the coast and the central valleys across thinly populated mountains and deserts.) The respondents had also to be related to the specific type of drug and alcohol treatment programs from which they were discharged, so that outcomes could be studied in relation to the kinds of services received and the settings in which they were delivered. The sampling team determined that at least 400 respondents were needed to analyse relationships between each type of treatment program, or modality, and participant outcome. Selection of a multi-stage probability sample met the sampling goals. Statistical accountability required that each member of the population of participants discharged in the sample year be given a known chance of selection, equalised to the extent possible within the strata of locality and treatment modality. At each stage, sample members received numerical weights reflecting the variation from random choice created by clustering and stratification.

To ensure appropriate geographical coverage, the 58 counties in California were first

discriminated into five groups—Los Angeles County, the San Francisco Bay Area, Southern Urban, Central Valley, and Mountain/Rim counties. Because of the size of their treatment systems, six highly urbanised counties were selected with certainty: Los Angeles, San Francisco, San Diego, Orange, Alameda, and San Bernardino. Selection of 10 further counties proceeded by associating the counties with smaller numbers of participants in recovery with geographically neighbouring counties with larger numbers of participants. The final county selection was made from these county clusters, so that Fresno, Kern, Riverside, Sacramento, San Mateo, Santa Clara, Solano, Stanislaus, Tehama, and Ventura counties were added to the six certainty counties.

The final stage of program sampling applied the modality principle—selection according to type of treatment program—to facilities in the 16 selected counties. Based on CADDs data, five distinctive treatment modalities were designated. Four modalities were to be sampled for participant discharges only, while the fifth had added a subsample of participants in treatment. Treatment settings, services, and characteristic population served varied among modalities:

Residential treatment - Facilities offering residential services with a variety of drug and/or alcohol treatments.

Social model recovery - Residential treatment plans specially developed in California that provide 31 days or more of recovery/ treatment services to alcohol users in small programs that stress peer support and communal approaches.

Non-methadone outpatient - Facilities offering a variety of outpatient services and treatment plans. Programs may be large or small, and usually rely on psychological counselling.

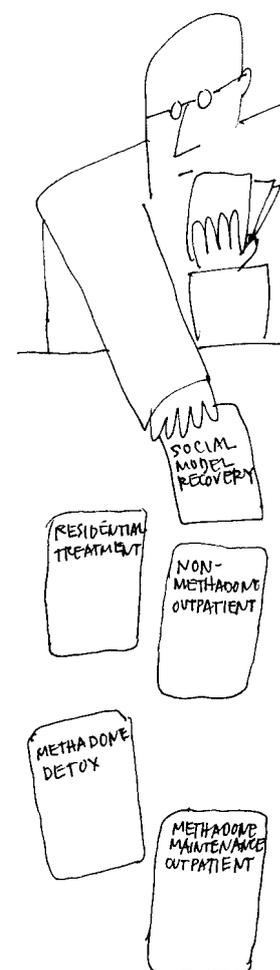
Methadone/Detox - Outpatient facilities offering daily doses of methadone and/or other prescribed medicines to support

planned withdrawal from heroin use, usually for short periods such as 30 days.

Methadone maintenance outpatient - Facilities offering chemical maintenance and other non-residential services for the opiate-dependent.

The CALDATA sampling plan worked with totals of participants *discharged* from treatment at its selected facilities in the course of the sample year, October 1, 1991 - September 30, 1992. Because participants receiving maintenance doses of methadone commonly remain in treatment for years, a subsample of participants currently in treatment at Methadone Maintenance Outpatient facilities (the CMM sample) was added to the study design.

NORC's nationally distributed field staff, with broad experience in social science research, was a project asset. Five California-based field managers joined Kay Malloy, CALDATA's California-based project field manager, to make telephone contact with the directors of the selected facilities, following up on an advance letter from ADP. During the initial phone contact, the field staff sought to schedule a site visit from a CALDATA abstractor and arrange a mailing of the CALDATA Provider Questionnaire, an instrument that gathered basic administrative and cost data about the facility. It was expected that most facilities would require input from several staffers to complete the Provider Questionnaire. Individual questions sought data that measured administrative and staff turnover, qualifications of staff members, space owned or rented by the facility, the value of property and the cost of rentals, annual costs of equipment, supplies, external services, and volunteer services, annual treatment revenues and public and private insurance coverages for services, with unit costs for various types of service. The data collection plan called for an advance mailing of the Provider Questionnaire to allow the facility to research answers, followed by a formal administration of the instrument by the abstractor in the course of the site visit.



Another important element in the campaign to gain co-operation of the facilities was Dr. Gerstein's presentation to a meeting of California directors of county alcohol and drug treatment agencies, explaining the methods and objectives of CALDATA. A free-flowing question and answer session allayed their numerous concerns about the approach to respondents, the confidentiality of records and privacy of respondents, and the uses of the data, and gained the assistance of many in reassuring other sampled providers concerned with participation in the study.

Two large chains of proprietary methadone maintenance facilities represented the major problem of provider enlistment, endlessly deferring or categorically refusing appeals for co-operation from field and project staffers. When facility contacting had concluded, the field staff reported an 85% co-operation rate, scheduling site visits covering 83 of the 97 selected providers, which included 110 modalities of treatment. Some facilities were selected for more than one treatment modality; for example, methadone providers commonly offered maintenance as well as detoxification services. Facilities sampled twice for participant record abstraction were counted only once for Provider Questionnaire collection and site visit logistics. One of the 83 facilities withdrew from the study after abstraction was completed.

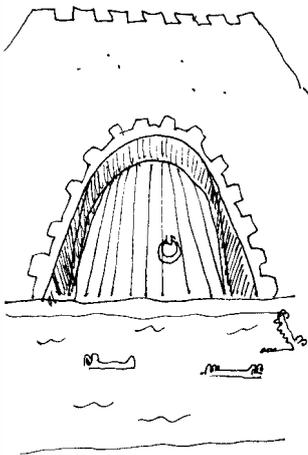
While scheduling site visits, the field staff worked energetically to recruit the required records abstractors. Many of the 55 abstractors trained in November 1992 to complete the sampling and abstraction phase of the study were interviewers with experience on other NORC studies, known to the field management staff and consequently, recruited. However, the sampling and abstracting tasks at a CALDATA facility did not appeal to some experienced interviewers who preferred more traditional interviewing. In contrast, individuals with backgrounds in medical records abstraction or drug treatment counselling were attracted to the CALDATA work.

Confidentiality considerations also constrained staffing. If an employee of the research team had a history of employment or treatment at a local facility, especially one selected for the CALDATA sample, it might appear to facility staff or to respondents that their information would circulate in the local community. That belief, however ill-founded, would compromise the candor of response. All prospective abstractors, both experienced and new to NORC, were screened for associations with California treatment facilities, either in staff or participant roles. Only those without any ties to local treatment facilities were employed.

Respondent sampling and records abstraction

A two-day training session introduced the CALDATA abstractors to procedures for listing and selecting a random sample of discharged participants and for working with facility records to abstract data about each selected participant. Besides practising with sampling procedures and materials, abstractors practised with the two CALDATA abstraction instruments, the Participant Abstraction Record (PAR) and the Participant Locating Record (PLR). They were also trained on confidentiality principles and procedures, on managing their relations with facility staff, and on administering the Provider Questionnaire.

The Participant Abstraction Record was designed to capture analytical data about the sampled treatment episode and about prior participant history from administrative records. The PAR requested data on basic demographic characteristics, sources of payment for treatment, and living arrangements at admission. Other PAR items included sections on arrest and imprisonment, medical history, alcohol and drug history, drug test results, prior treatment, services received, discharge status, and charges for the sample episode. Nothing in the PAR permitted identification of the individual. The Participant Locating Record, by contrast, was designed to facilitate locating. Most of the PLR was



given over to date of birth, Social Security Number, address and telephone number, driver's license, and other official numbers associated with the selected participant, including additional names and contact data on employers, relatives, friends, professional staff, and other treatment facilities.

The abstractors worked with sampling rules for each facility extrapolated from the information in CADDs. Sampling rates varied according to the size of the facility and were designed to yield an average of about 30 selected participants per sampled facility. Each modality at a facility had a set of sampling rules designed for it, furnished to the abstractor on a computer printout. A sampling interval, like *Take each third discharge starting with listed discharge #2*, prescribed the selection rate and the random choice. The printout also described upper and lower limits for total number of discharges in the sample year. The limits of one-half or double the expected number were designed to insure that the number of discharges in the list created on-site by the abstractor corresponded within an acceptable range to the information reported to CADDs. When the total of listed discharges fell outside the limits, the abstractor phoned the NORC sampling department, which provided an adjusted sampling procedure.

In some facilities, sampling proceeded quite smoothly. However, many abstractors discovered discharge totals that fell above the upper limit given in their sampling rules. Since the CADDs database from which the sampling rates were derived was new and contained less than one year's worth of data, the twelve-month discharge estimate for each program had been developed by projecting a straight line from the number of months of discharges that were thought to be reflected in the database. The actual 12-month list of discharges proved to exceed the estimate derived from CADDs by a factor of two or more in 31 of the 87 co-operating modalities. Overall adjustments were required to protect the integrity and statistical properties of the sample design, and also to keep the

number of selected participants within the limits of the data collection budgets.

When the participant sample was successfully selected at a facility, abstraction from program records with the PAR and the PLR usually proceeded without major difficulties. There were field stresses because abstractors found it difficult to work efficiently in many facilities. The drug and alcohol treatment programs were open at irregular or inconvenient hours and their staffs, preoccupied with their own work, often could provide only minimal assistance to the abstractors. Working space was cramped and improvised, and abstractors were forced to develop self-sufficiency at interpreting program record systems and finding the required data in participant records. A common disappointment for abstractors was absence in the record of much of the detail needed for locating, on which success in finding the selected participant for interview in Phase 2 of the data collection depended. A number of completed PLRs had scant identifying detail; sometimes even the participant's name was borrowed from fiction or folklore, like Scaramouche or Humpty Dumpty.

At the close of Phase 1, data collection CALDATA had selected and abstracted data for 2,746 discharged participants at 87 co-operating modalities, with an additional Continuing Methadone Maintenance (CMM) participant sample of 309 selected at 12 of the Methadone Maintenance facilities. (Four modalities were found ineligible at site visit because they discharged no participants in the sample year.) Adjusting for a handful of abstractions determined to be duplicates, a total of 3,045 respondents were to be sought for the Participant Interview. The 19 eligible modalities that refused co-operation represented 31,529 participant discharges in the sample year. Adjusted for participants lost from uncooperative providers as well as for missing records at co-operative providers, the Phase 1 participant abstraction completion rate was 76.5%. Table 1 on the following page summarises Phase 1 sampling and facility co-operation.



TABLE 1: CALDATA phase 1 response rates by modality

Indicator	Discharge sample modality				Methadone maintenance	Total discharge sample	Total CMM sample
	Residential	Social model	Outpatient Non-meth.	Methadone Detox			
Sample providers	19	23	27	19	18	106	18
Participants in target pop.	21,409	6,699	50,963	49,500	8,296	136,867	9,741
Co-operating providers	18	21	23	13	12	87	12
Participants represented in co-operating providers	20,370	6,079	40,034	32,940	5,916	105,338	6,946
Response rate based on co-operating providers	95.1%	90.7%	78.6%	66.5%	71.3%	77.0%	71.3%

Collecting completed Provider Questionnaires, the final Phase 1 CALDATA data collection activity required a good deal of time and patience in the field. The requested information was not readily available at many facilities. Several different facility staffers were often needed to complete the questionnaire appropriately, and their responsiveness, indeed their perception of responsibility for the document, was confused and variable. Diplomacy and persistence eventually produced a completed Provider Questionnaire from 76 of the 82 facilities that contributed to the participant sample.

Respondent interviews

In Phase 2 of the CALDATA data collection, the field staff was increased to 70 interviewers who were assigned the tasks of locating the 3,045 selected participants, explaining the study and securing their cooperation, and administering the Discharged Participant or Continuing Methadone Questionnaire as appropriate. The questionnaires were designed for a face to face interview averaging 1.5 hours.

The interview for discharged participants was structured around sharply defined sec-

tions covering experiences before, during, and after a sample treatment. After preliminary questions about the respondent's ethnic and educational background, the questionnaire repeated in three time frames a series of questions about drug and alcohol use, mental and physical health, illegal activities and criminal status, living arrangements and family, employment, and drug and alcohol and mental health treatments. A calendar designed for use with the questionnaire graphically displayed the three time segments for which behaviour questions were repeated: the 12 months just prior to the sampled treatment episode, the time span of the sample treatment, and the time elapsed since the sampled treatment episode. The questionnaire incorporated design features common to a number of large-scale drug outcome surveys under development at the time. The questionnaire used to interview the participants in continuing methadone maintenance (the CMM Questionnaire) was a modified version of the Discharged Participant Questionnaire. CALDATA Field Managers carried out a pretest of the questionnaire, the calendar, and procedures for explaining the study with 32 respondents in January/February 1993 that was particularly concerned to

test respondents' ability to focus on time segments and keep information within the appropriate time frames, and interviewers' ability to keep the respondent on track through repetitive sets of questions.

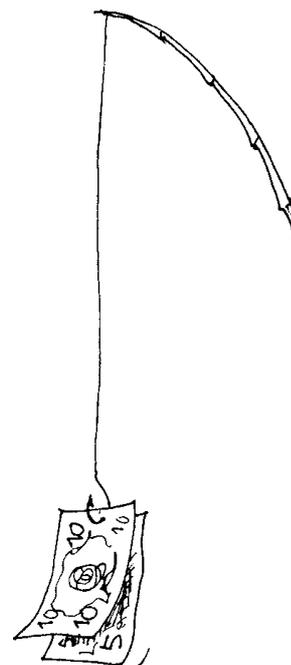
In March, 1993, a three-day training introduced the CALDATA interviewers to the Participant Questionnaires. In addition to scripted practice with their instruments, interviewers practised with protocols for approaching respondents, including a long script prescribed by the California Committee for the Protection of Human Subjects explaining the purposes of the study, its voluntary nature, and the confidentiality with which all information was held. A field procedures manual laid down the steps in contacting and locating respondents, beginning from the principle that CALDATA interviewers were never to explain the research except as a "health study" until they were secure that they were speaking to a selected respondent in private.

Training in field procedures drew upon the 32-person pretest. The field managers conducting the pretest had found their small group of pretest respondents dramatically more difficult to locate than respondents for research on issues like job market behaviour or health care expenditure. Once located, the pretest respondents as a group had been difficult to bring to the point of interview—evasive, suspicious and prone to break appointments. Hence the CALDATA interviewer training prepared the field staff for special difficulty in contacting and locating, suggesting that patience, persistence, and a strong positive attitude from the interviewer would eventually reassure a respondent. Confidentiality protocols and issues were another training emphasis: interviewers' success in gaining the co-operation of CALDATA participants and gathering valid data from them depended above all on giving them confidence that their answers would in truth be held in utmost privacy, used only for research, and published only as summary statistics. To assist the field staff in making such assurances, the

study obtained a Confidentiality Certificate from the U.S. Department of Health and Human Services that shielded the interviewers from legal action that might require them to testify in court about the whereabouts or criminal activity admissions of respondents.

At conclusion of training, each interviewer received an initial assignment of about 30 cases. As expected, a proportion of respondents was located and interviewed fairly quickly, but many others were harder to pin down. To get word to this group, interviewers were encouraged to distribute a distinctive blue business card with the neutral name used in fielding CALDATA and the toll-free phone number of the project's California office in the course of their locating inquiries. Word was circulated among friends and contacts of the respondents that they were sought for a health study, and that a check in payment was due them. The project staff believed that the distinctive card would enhance the visibility of the study in the drug using communities with which respondents had contacts. If it were generally acknowledged in the local drug cultures that the "health study" was legitimate unthreatening research with a payment of \$15, hesitant respondents could be won to call up the office and make appointments for interview. Consequently, about 400 respondents called the toll-free phone number.

In addition to circulating the card with the office phone number, the project instituted locating procedures with local agencies. A regular weekly check of a new-inmates jail list circulated by Los Angeles County (site for one-fourth of the sample) effectively located a number of respondents. The California state prison system endorsed the study and facilitated contacts with respondents in state prisons. Commercial databases giving recent addresses for persons using credit cards were accessed at modest cost. Computerised telephone directories were employed by field managers to track respondents with distinctive names to distant communities or to look for relatives who



might have recent contact. ADP arranged for inquiries about respondents' addresses with the California Department of Motor Vehicles, which maintains a huge database showing the addresses to which drivers' licenses and well as motor vehicle registrations are issued. The California Department of Social Services could not by statute divulge address information but agreed to search its large database of welfare recipients and to circulate a "health study" letter asking for phone contact to any respondents discovered.

The various database searches contributed significantly to the success of the data collection, but CALDATA staff found that the persistent, patient, unthreatening personal inquiries of interviewers were indispensable to the final outcome. Interviewers who could inspire confidence while maintaining patience and masking their eagerness to push the inquiry to a final result made the difficult contacts with homeless and all but nameless respondents. During the records abstraction, staff of facilities treating numbers of homeless people had asserted that CALDATA would never find and interview their discharged participants. But interviewers did find a reasonable number (49

of 121 assigned cases with no address information for the respondent or any relative or associate were successfully interviewed). The interviewers used every avenue open to them and were inventive about developing their own locating procedures, like blending into the background and lingering at centers maintained for the homeless or in drug-dealing areas in metropolitan cities until someone answered a casual question and furnished a clue to a missing respondent.

At close of the nine-month Phase 2 field period, 1821 respondents, 61.4% of the eligible participant sample, had completed the interview. Table 2 summarises the Phase 2 data collection by modality. Seventy-seven participant cases were ineligible, assigned a final Out of Scope status. Fifty-seven of these had died since the treatment episode 8 spoke neither English nor Spanish and could not be interviewed (CALDATA developed a Spanish translation of the Discharged Participant Interview but was not prepared to gather data in other non-English languages). Eight were physically or mentally incapacitated to the point that they could give no interview and four were ineligible for other reasons.

TABLE 2: CALDATA final participant case status counts by modality

Modality type	Original sample	Out of scope	Net sample	Completed	No interview	% complete
1- Social Model Recovery	703	9	694	401	293	57.8%
2- Methadone Detox	474	24	450	294	156	65.3%
3- Nonmethadone Outpatient	641	11	630	382	248	60.6%
4- Residential Treatment	615	15	600	343	257	57.2%
5a- Methadone Maintenance Outpatient	302	13	289	182	107	63.0%
5b- Continuing Methadone Maintenance	310	5	305	219	86	71.8%
TOTALS	3045	77	2968	1821	1147	61.4%

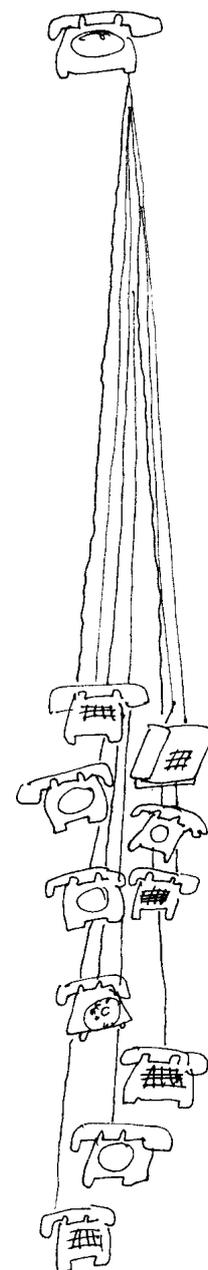
One thousand one hundred forty-seven eligible participants were not interviewed. Two hundred thirty-one of this group, 7.8% of the eligible net sample, were contacted and refused to give an interview. Such a percentage of refusals is well within acceptable range for most surveys. Five hundred ninety-two of the non-interview cases, 19.9% of the net sample, could not be located in the course of the nine month field period. This percentage loss would not be expected in a population under no special stress. Given the population that CALDATA interviewers attempted to contact, and the uneven quality of identifying information, this loss rate is not surprising.

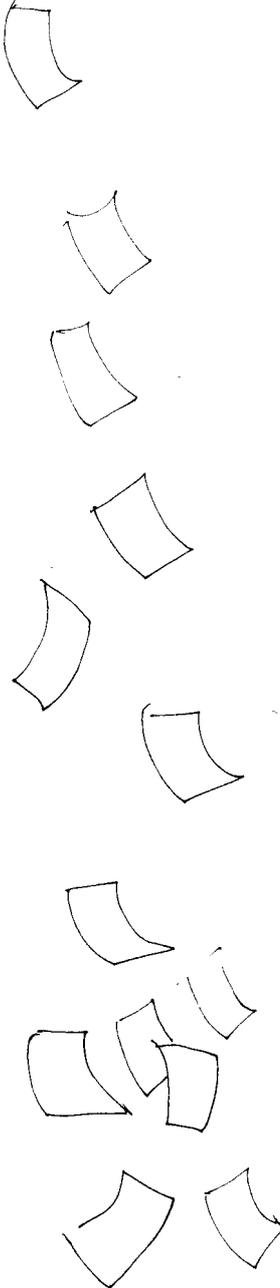
Besides the refusals and unlocatables, the other non-interview cases were participants who had been located, but for one reason or another interviews had not been arranged. Small groups were in jails, prisons, or treatment centers that did not allow interviewer access. Seventy cases had been traced outside the borders of California but could not be reached to arrange a telephone interview (An interview over long distance phone was CALDATA'S standard approach to remotely located respondents. Altogether, 119 interviews were completed by phone.). Fifty-two non-interview cases had been located in California but had broken appointments, often repeatedly. Time ran out on this group. The general CALDATA experience with evasive, slow to convince respondents suggests that many in the broken appointment group would have given an interview had the deadline not halted field work. The final non-interview group represented 185 respondents who were known to be welfare clients in California. Towards the end of the field period the Department of Social Services forwarded letters to them describing the health study and giving the project office phone for contact. Phone calls in response to the mailing were just beginning to come in to the project office as data collection ended. Indeed, the final 33 interview documents reached NORC'S central office too late to be included in data processing and were set

aside from the analysis. Had the field period been longer a number of the 185 welfare cases would have completed interviews.

A final component of CALDATA Phase 2 data collection was the Validation Reinterview, organised to confirm the circumstances that interviewers reported when they submitted completed questionnaires. Such validation is routinely built into data collection plans employing in-person interviews with dispersed samples. Survey research interviewers seeking to conduct interviews at the convenience of randomly selected, scattered respondents necessarily work very independently. For CALDATA NORC, field managers took weekly phone reports of case status and field costs from interviewers and transmitted the results to central office. Completed questionnaires received a quality control edit at the project's California office and their receipt was then communicated to central office. Objective verification of at least ten percent of each interviewer's completed cases with a brief telephone Validation Reinterview was required. The reinterview instrument confirmed that the interview took place with the sampled respondent when and where reported, checked the time elapsed, and verified content by re-asking a few innocuous data items. The validation process turned up one suspect interviewer when a sample respondent denied answering the questionnaire, asserting that he had refused to make an appointment when requested. The validation staff undertook a systematic review of the suspect interviewer's entire completed caseload, and eventually determined to replace every interview. When validation of all interviewers' work was completed, 346 cases had responded to validation reinterview, a validation rate of 19% of the completed caseload of 1821, systematically distributed in early, middle, and late field period.

When Phase 2 data collection ceased on December 1, 1993, the large task of data preparation began. This meant cleaning and





data entering the information from Provider Questionnaires, Participant Abstraction Records, Discharged Participant Questionnaires, and Continuing Methadone Maintenance Questionnaires. As part of on-going quality control during the field period, the project office in California had given preliminary edits to the PQs, the PARs, and the Discharged Participant Questionnaires. On receipt at NORC's central office the instruments received a full edit, with coding of selected items in the Participant Questionnaire, before entry at computer terminals using a Computer Assisted Data Entry Program with Autoquest software. Range and consistency checks for individual items were programmed into the software. Additional consistency or logic checks were added to the program by project staff. Quality control of data entry included a random re-keying of 10% of each operator's work by a second operator. After data entry, hard copy case materials were filed by case ID in the library maintained by NORC's data preparation facility. The final data files were delivered on diskette to the project team responsible for the analysis. Dean Gerstein, Robert A. Johnson, and Natalie Suter of NORC worked with Henrick J. Harwood and Douglas Fountain of Lewin-VHI, Inc., subcontractor for the cost/benefit analysis, to complete the report to ADP.

How were the data analysed?

The analytical team first inquired into the strengths and limits of the data. In Phase 1, the field staff had successfully completed work at 87 of 106 eligible modalities for an 82% modality completion rate. In Phase 2, the field had interviewed 60.9% of 3,045 sampled participants in time to meet the data preparation deadline. Were the resulting data sufficient to represent the whole population of participants discharged from publicly supported treatment in the sample year in California, plus the population in continuing methadone maintenance? The partici-

part completion rate was the product of the rate for participants represented in the Phase 1 abstraction times the rate for the participants data-entered from Phase 2, 60.9% of 76.5%, or 46.5%. Could the analysis proceed to discuss the effects and costs of drug treatment in California, looking at information that represented less than half of the participant sample? Answering this question meant separate consideration of sample bias due to provider non-response and participant non-response.

Bias due to provider non-response was not equally distributed among modalities. Taking into consideration the number of discharged participants represented by successful abstractions, the Phase 1 completion rate was greater than 90% for the Residential and Social Model modalities, greater than 75% for the Outpatient Non-Methadone modality, and less than 75% for the Methadone Detox and Methadone Maintenance modalities (See Table 1, page 42). The lower cooperation rate from methadone programs stemmed from refusals of owners of two large chains of methadone facilities operating for profit. To get some idea of the bias created by the relatively light sample of methadone providers, the analysts looked outside their CALDATA files. In the fiscal year before the CALDATA sample was drawn, California had reported on a number of participant and provider characteristics to the National Drug and Alcoholism Treatment Unit Survey (NDATUS), conducted by the National Institute on Drug Abuse. A comparison between CALDATA and NDATUS was run for participant age, sex, and ethnicity, and for the weekly work hours of several kinds of professional staff at facilities. Both for residential and methadone providers, the CALDATA and NDATUS participant data were broadly similar. The data about professional staff levels in the two sorts of programs were likewise similar. The comparison with NDATUS suggested that bias in CALDATA results due to provider non-cooperation might not be severe.

To study the characteristics of participants whose data were missing because they had been sought but had not been interviewed during Phase 2 of data collection, the analysts had another resource—the data abstracted in Phase 1 from provider records into the Participant Abstraction Record. For most measures there was no difference between sampled respondents and sampled non-respondents. Where differences were statistically significant, a lack of data at the PAR item often seemed responsible. For example, participants described as Hispanic—Mexican Americans or other Americans reporting ethnic derivation from Spanish America—represented 37% of CALDATA respondents and 30% of non-respondents. But the Hispanic variable was missing in more than 20% of PARs for both respondents and non-respondents. This suggested data distortion from item non-response rather than a systematic difference between respondents and non-respondents. The overall conclusion from the comparison of PAR data was that the Phase 2 respondents could reasonably be taken as representative of the whole population of sampled discharged participants in CALDATA's sample year. It appeared that Phase 2 participant non-response depended primarily on poor quality address and other locating information obtained from provider records, and the quality of locating information in the provider record seemed largely independent of the characteristics and treatment outcomes of discharged participants.

The CALDATA analysts also considered the strengths and the possible limits of the design implicit in the Discharged Participant Questionnaire. The questionnaire asked about repeated categories of experience in three time segments—the 12 months before treatment, time during sampled treatment, and time since treatment. The data items permitted measurement and comparison of the behaviour of the same individual before and after treatment, or *pre/post comparison*. Pre/post comparison allows the analyst to use sampled participants as their

own controls. Participant characteristics which tend to have a permanent influence on behaviour, like gender, ethnicity, personal appearance, early experience and upbringing, and other aspects of character and personality, are held constant in comparisons of experiences pre- and post treatment. If there appear to be treatment effects, such background characteristics can be ruled out as causes. To get comparable controls for the sampled group using another sort of research design, it would be necessary to match each participant with a drug user not in treatment who had the same background characteristics—a sampling exercise of impossible complexity. The CALDATA design had another advantage for analysis. When statistical measures indicated pre/post treatment changes in the sample, the analysis could identify individuals who had changed and seek to describe the ways in which certain sub-groups who changed behaviour differed from each other and from other sorts of participants whose behaviour did not change.

In designing CALDATA to allow pre/post comparison, the analytical team relied on respondents' ability to recall and report details of their behaviour over several years with reasonable accuracy. The sample year began with discharges on October 1, 1991, while the last Phase 2 interviews were conducted in November, 1993. The maximum retrospective recall for 12 months pre-treatment extended over something more than three years. Given the familiar experience, that some people cannot routinely recall events a week in the past, was the research team justified in expecting high quality retrospective recall from its participant sample? The pretest of the Discharged Participant Questionnaire conducted by field managers in January/February 1993 had sought to test sampled participants' ability to recall and to discriminate between past events in the three time frames. The results from that small sample indicated that administration of the questionnaire was indeed feasible. But as responsible students of behavioural change over time, the CALDATA analytical team felt



obliged to address questions about the kind and degree of measurement error involved in retrospective recall when they examined their final data. They considered five possible sources of error:

Recall delay - People have progressively greater difficulty remembering events, the more remote they are in time. CALDATA sought to minimise this source of inaccuracy by limiting recall to recent time. Questions focused on behaviour of high personal interest, more likely to be recalled than monotonous routines. The study's best safeguard against recall delay came from the fact that recall delay would minimise reporting that suggested beneficial treatment effects.

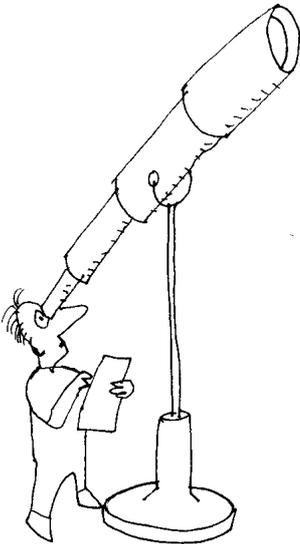
Telescoping - This measurement error derives from people's tendency to assign events to an earlier or later time period than the one in which they occurred. CALDATA sought to minimise telescoping by repeatedly focusing respondents' attention on the reference period of each question and by associating the beginning and end of each period with memorable events like admission to and discharge from treatment. To the extent that evidence of treatment effectiveness appeared in the data, it could be considered stronger for having risen above any error created by telescoping.

Under reporting of sensitive behaviours - It is common wisdom that people are more likely to suppress responses that implicate them in criminal behaviour or otherwise tend to cast shame on them, such as having sex for money or drugs, armed robbery, diagnosis as HIV-positive, or use of drugs and alcohol. But participants discharged from drug treatment do not react to such questioning with the spontaneous alarm that might be expected of the general population. The research team knew that if CALDATA respondents could be reassured that they would incur

no damage in answering they would report illegal and illicit behaviour. Earlier drug research studies had run comparisons between self-reported illicit drug use and drug test results that showed respondent reporting was valid. In interviewer training CALDATA emphasised non-judgemental management of the interview, unbiased probing techniques, and confidentiality guidelines. Also, because the analysts knew of research showing that Under reporting is most common for sensitive events in the present or the near past, they did not rely on respondent reports of current illicit behaviour only, but based analyses on periods of 12 months or longer.

Reversion to more typical behaviour - Earlier studies of drug treatment had shown that participants use more drugs and alcohol and commit more crimes, often related to the need to support a drug habit, in the time period just before admission to treatment. Indeed the high levels of substance abuse and related deviant behaviour are factors that induce participants to seek treatment. Thus CALDATA's analysis needed to be careful that it did not describe as a treatment effect changes caused by reversion to more typical behaviour. The year-long recall periods built into its data tended to smooth out pre-admission jumps in deviant behaviour. The analytical team agreed that small changes revealed by pre/post comparisons should be set aside as possibly influenced by reversion to more typical behaviour, but that reversion was a negligible issue when changes were large.

Differential non-response - A final bias in the data might arise because more participants whose treatment was beneficial co-operated with CALDATA than participants whose treatment was not. The analysts studied their PAR data and Non-Interview Reports on refusal cases and found little evidence of bias from this source. Those who rejected the study tended to come from more se-



cure backgrounds, to have more financial and social resources, and to live in more comfortable circumstances post-treatment than those who co-operated.

Having reviewed potential sources of data distortion and satisfied themselves that the study design compensated appropriately for them, the analysts proceeded to run pre/post comparisons of data for reported respondent behaviour in the areas covered by the repeated sections of the Discharged Participant Questionnaire, testing changes for statistical significance using standard methods.

Analysing the cost and benefits of treatment called for use of measures derived from thirty years of research into the economics of drug treatment. Economic impacts of participant behaviour were calculated by measuring its negative drain on the overall economy, offset by values contributed by participant employment. When post-treatment economic impacts were less than the cost of treatment itself, a benefit was judged to exist, and when they exceeded the cost of treatment, a loss was declared. This cost/benefit analysis distinguished costs to society as a whole from costs to taxpaying citizens. *Costs to Society* include losses of society's net productivity or losses in society's net wealth. Thus, participants who do not earn up to their potential because of drug and/or alcohol abuse represent negative economic impacts, as do the costs of health services, police forces, and corrections facilities deployed because of participants' drug use and related crimes. However, the values of goods or cash stolen by participants, and of welfare and disability payments they receive, do not count as costs but as transfer payments, in which money simply moves from one pocket to another within the society as a whole. *Costs to Taxpaying Citizens* include only those losses to individuals in society who do not engage in any substance abusing behaviour. For these people, the loss of earnings from drug- or alcohol-dependent participants who are not living up to their potential is of little concern, while the value

of goods and cash stolen by substance abusers is a serious cost, as is money expended on welfare and disability payments made to drug and alcohol abusers.

What did they find out?

CALDATA analysts calculated the costs related to participants' criminal behaviour and health care utilisation and the value of their labour force productivity by assigning average values to each criminal act, arrest, incarceration, health care utilisation, earnings, and welfare/disability reported by participants, factoring in data from current statistical compilations such as the *Sourcebook of Criminal Justice Statistics* and *Hospital Statistics*. Cost of participants' sampled drug treatments was based on data from CALDATA's Provider Questionnaire augmented by CADDs data. The State of California spent \$209 million in treating the 146,609 participants represented by CALDATA's discharged and continuing methadone samples. The average treatment for the 136,867 discharged participants lasted 95 days and cost \$1,361. Residential treatment was substantially higher in cost than outpatient treatment—\$61.47 per day, \$4,405 per episode for the Residential modality, vs \$7.47 per day, \$990 per episode for the Nonmethadone outpatient modality.

The analysis found that benefits to tax-paying citizens during the time participants were in treatment and in their first year post-treatment represented approximately 1.5 billion in savings, due mostly to reductions in crime. Each day of treatment paid for itself—the benefits to taxpaying citizens equaled or exceeded costs—on the day it was received. Table 3 summarises the pre/post comparison of costs both to taxpaying citizens and to society (Earnings totals are bracketed as productive inputs counting against the other negative impacts).

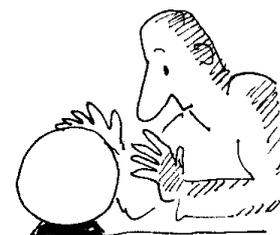


TABLE 3: CALDATA costs

Pre/Post Treatment	Total Dollar Costs		Dollar Costs Per Person	
	Year Before	Year After	Year Before	Year After
Criminal Justice System	\$1,086,043,000	\$841,800,000	\$7,935	\$ 6,151
Victim Losses	524,727,000	310,387,000	3,834	2,268
Theft Losses	815,738,000	253,297,000	5,960	1,851
Health Care Costs	441,698,000	337,923,000	3,227	2,469
[Earnings]	[1,378,105,000]	[1,101,356,000]	[10,069]	[8,047]
Lost Earnings	2,343,151,000	2,619,912,000	17,140	19,164
Income Transfers	250,466,000	275,563,000	1,830	2,013
Costs to Taxpayers	\$3,118,672,000	\$2,018,971,000	\$22,786	\$14,751
Costs to Society	\$4,395,447,000	\$4,109,605,000	\$32,151	\$27,035

The benefits of alcohol and other drug treatment outweighed the costs of treatment by ratios from 4:1 to greater than 12:1 depending on the type of treatment. For the whole society, the cost-benefit ratios ranged from 2:1 to more than 4:1 for all modalities except for methadone maintenance outpatient.

The analysis supported the hypothesis that treatment was effective in changing participant behaviour. The level of criminal activity declined by two-thirds from before treatment to after treatment. Declines of approximately two-fifths occurred in the use of alcohol and other drugs from before treatment to after treatment. About one-third reductions in hospitalisations were reported from before treatment to after treatment, with corresponding significant improvements in other health indicators. Treatment for problems with the major stimulant drugs was as effective as

treatment for alcohol problems and somewhat more effective than treatment for heroin problems. For each type of treatment studied, there were slight or no differences in effectiveness between men and women, younger and older participants, or among African-Americans, Hispanics, and Whites. Overall, treatment did not have a positive effect on the employment of participants. The most common source of income for participants before and after treatment was full-time employment. Welfare, illegal activities, and disability payments were the next most common income sources. Rates of employment and income from employment were both generally lower post-treatment than pre-treatment. Overall employment earnings declined by 29%. This finding is consistent with the depressed economic trend in California 1991-1993. In every type of treatment, more participants enrolled in disability programs

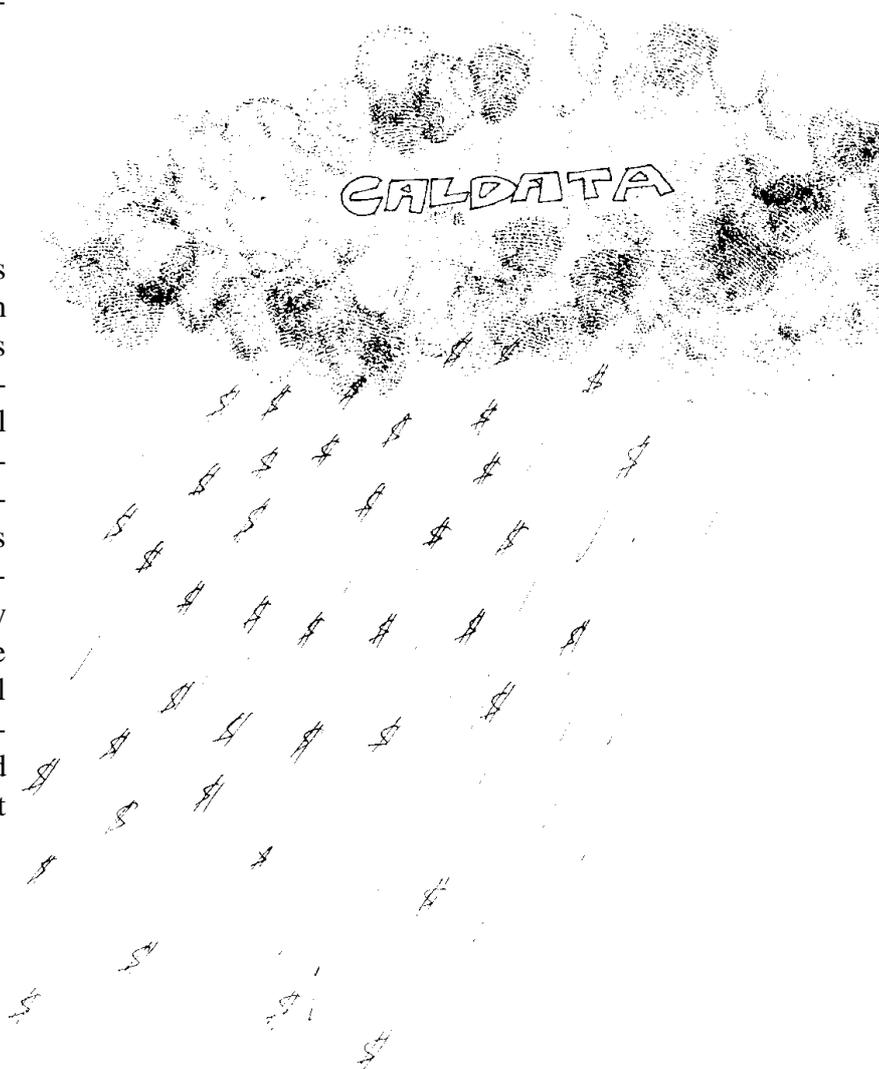
and participants received more money in disability payments after treatment, increases ranging from one-sixth to one-half. The analysis indicated that treatment increased eligibility for disability payments even though it led to overall improvements in health status.

The cost-benefit analysis concluded that participants in the California treatment system reduced their criminal activity and health care utilisation during and in the year following treatment by amounts worth well over \$1.4 billion, for an overall ratio of benefits to costs of 7 to 1. Savings included reduced criminal justice expenses (police protection, adjudication, and corrections), reductions in victim losses (stolen and damaged property, injuries, and lost work), and lower levels of health care utilisation (hospitalisations, emergency room use, outpatient care.) Savings were offset by modest increases in welfare and disability dependence.

How were the results used?

Dr. Mecca released CALDATA's findings at two back-to-back press conferences in September 1994 in San Francisco and Los Angeles. The report received extensive national press coverage and was influential in altering U.S. perceptions of the effectiveness and social value of drug and alcohol treatment. The fact that the study was brought to fruition so quickly while pertinent national studies were not yet ready for release was to its advantage. The White House Office of National Drug Control Policy and other federal agencies have referenced the study and it is routinely cited in academic research into drug treatment and mental health evaluation.

CALDATA continues to yield results. Further analysis of the data has been supported by the Office of the Secretary of the U.S. Department of Health and Human Services and by the Robert Wood Johnson Foundation, one of the largest health-oriented philanthropies in the U.S. The March 1996 A Treatment Protocol Effectiveness Study issued by General Barry R. McCaffrey, Director of the White House Drug Office, cited CALDATA as a major source of evidence for its White Paper on treatment effectiveness. Federal spending on drug treatment increased by over 17 percent between fiscal year 1994 and fiscal year 1996; the increase was over 25 percent when one compares 1994 with the federal budget request for the fiscal year 1998.





It's your turn

What are the strengths and the weaknesses of the presented case example? List three positive aspect and three negative aspects:

Strengths of the case study

1 _____

2 _____

3 _____

Weaknesses of the case study

1 _____

2 _____

3 _____

References for CALDATA case example

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