# MINNESOTA DVR FY 1981 ECONOMIC ANALYSES
## A Modified Cost/Benefit Procedure

DIVISION OF VOCATIONAL REHABILITATION

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## Executive Summary

This study analyzes the economic impact of vocational rehabilitation in Minnesota using a modified cost/benefit procedure developed by the Oregon Vocational Rehabilitation Division. The analysis was based on the fiscal year 1981 Client Service Report data compiled by the Minnesota Division of Vocational Rehabilitation (MDVR).

The costs of rehabilitation are the total costs of the vocational rehabilitation program for the fiscal year 1981 and the actual case service expenditures for the FY 1981 rehabilitants incurred in prior years. Costs excluding case service expenditures and some non-rehabilitation related costs are termed overhead costs. Overhead costs are allocated to all closed cases proportional to the length of time spent from application to closure.

The benefits of rehabilitation are client's earnings gain due to vocational rehabilitation. This earnings gain is the difference between client's referral earnings and earnings at closure. Client's earnings at referral were adjusted for changes in wage rate over the period of time from referral to closure before computing the difference. The difference was then reduced to reflect the effects of (1) uncertainty (by discounting), (2) future unemployment, (3) client mortality, (4) referral earnings underestimation, and (5) gain not attributable to vocational rehabilitation on future earnings. Fringe benefits are then added to the earnings to derive total clients benefits.

The benefits of vocational rehabilitation cover not only the rehabilitants because of their increased earnings resulting from vocational rehabilitation but also "the taxpayers" due to increased taxes paid by the rehabilitants and their decreased use of public assistance.

The study shows that the average additional income earned by each rehabilitated person over his/her remaining working life will be $39,296.94, in 1981 dollars. The rehabilitated clients will increase their earnings by $11.44 for every vocational rehabilitation dollar spent.

The study also shows that tax dollars spent to help disabled persons get jobs are an outstanding investment of public money. In Minnesota, every tax dollar spent by the joint state-federal vocational rehabilitation program is returned to the state and federal government in 2.87 years. The annual rate of return for the investment on vocational rehabilitation program is 34.8 percent. The study estimates that Minnesota DVR will return $3.32 to "the taxpayers" for every vocational rehabilitation dollar it spent.

The cost/benefit model used in this study can report economic costs and benefits for all clients or for any subgroup of DVR clients. This study also reports key findings by client's status on various public assistance or insurance programs such as Supplemental Security Income (SSI), Social Security Disability Insurance (SSDI), and Workers' Compensation (W/C). Also reported in this study are the results of cost/benefit analyses of vocational rehabilitation by referral sources, administrative units of the agency, and client's characteristics including severity of disability, major disability group, and sex.

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## I. Introduction

In 1980, the Minnesota Division of Vocational Rehabilitation (MDVR) developed a method for analyzing the economic impact of vocational rehabilitation. The method computed two cost/benefit ratios, one based on increased income and the other, on increased taxes as the result of vocational rehabilitation. The computation procedures were laborious and complicated.

As the competition for resources from the public sector becomes intensive, the need for a simple and valid cost/benefit procedure is essential. The MDVR has continued its efforts in the improvement of its cost/benefit analysis. The efforts focus on the development of a computerized procedure which will enable the agency to produce cost/benefit data for any client group in a timely fashion. In reviewing the existing cost/benefit models designed especially for the vocational rehabilitation program, it was found that the procedure developed by Ross T. Moran of the Oregon Vocational Rehabilitation Division appeared to best meet the needs of the MDVR. The Oregon model of cost/benefit analysis was adapted for the situation in Minnesota.

## II. The Costs of Rehabilitation

In general, the cost of a program can be categorized into direct and indirect costs. In the vocational rehabilitation (VR) context, direct costs are equivalent to actual case expenditures - money spent to purchase goods or services for clients. Indirect costs are equivalent

to overhead vocational rehabilitation costs which may be defined differently by each individual state VR agency. While actual case expenditures are generally readily retrievable from the Case Service Report (CSR) records kept by the State VR agency, overhead costs for each client need to be estimated. The Oregon model allocates overhead costs to all closed cases in proportion to the length of time between application for services and case closure. Overhead costs are thus assumed to have been incurred after a formal application had been made. The overhead costs used in this analysis are listed in Table A.

The costs of rehabilitation are the total costs of the vocational rehabilitation program for the fiscal year of interest, which is FY 81 for the present study, and the actual case service expenditures for the rehabilitants of that year incurred in prior years. These total costs include: (1) overhead costs and (2) case service expenditures. To determine the overhead cost for each closed case, the average overhead cost per client per month has to be computed. The following formula is used to derive this figure:

$$\overline{OH} = AGOH/APCL$$

where $\overline{OH}$ represents the average overhead cost per client per month,

AGOH is the agency's total overhead cost as defined, and

APCL is the number of months from application to closure.

Let the symbol i represent the client. The rehabilitation cost for client i is:

$$COST\ i = CASEEXP\ i + \overline{OH} \times APCL\ i$$

Table A: MDVR OVERHEAD COSTS (F.Y. 1981)

ADMINISTRATIVE COSTS

DVR Administrative staff salaries and fringe benefits
Contracts and agreements
Less prorated administrative support services to Disability Determination Services (DDS)

FIELD SERVICES

Field staff salaries
Consultant contracts (i.e. medical contracts; CETA contracts)
Services* and supplies

OTHER

CETA Contract funds
Long-Term Sheltered Employment Program

FACILITIES

DVR Facilities Administrative staff salaries, services* and supplies

*Services include such items as rent, heat, lights, telephone, travel expenses and office equipment.

where COST i is the rehabilitation cost for client i,

CASEEXP i is the actual case expenditure for client i,

$\overline{OH}$ is the average overhead cost per client per month, and

APCL i is the number of months from application to closure for client i.

The summation of each individual client's rehabilitation cost is equal to the agency's total rehabilitation cost. To derive the agency's total rehabilitation cost, the following equation is used:

$$TCOST = \sum_{i=1}^{N} COST\ i$$

where TCOST is the agency's total rehabilitation cost and

COST i is the rehabilitation cost for client i.

The agency's total rehabilitation costs are attributed only to the clients whose cases are closed in the fiscal year of interest. Since the actual case expenditures may be incurred during years prior to the year of interest, if the vocational rehabilitation program is expanding or shrinking drastically, the agency's total annual rehabilitation cost, thus computed, may not equal the agency's actual expenditures during that fiscal year of interest. Further, inflation may also have some effect on the actual case expenditures. Because the State/Federal Vocational Rehabilitation program has been quite stable during the past years, any deviation from the actual expenditures is, thus, assumed to be insignificant.

The average rehabilitation cost per client is computed by dividing the agency's total rehabilitation cost by the total number of clients who were successfully rehabilitated during the fiscal year of interest.

This average cost per rehabilitation is obtained using:

$\overline{COST}$ = TCOST/ST26

where $\overline{COST}$ is the average cost per rehabilitation,
TCOST is the agency's total rehabilitation cost, and
ST26 is the total number of successful rehabilitations during the fiscal year of interest.

## III. The Benefits of Rehabilitation

The Oregon model considers only economic gains which are attributable to vocational rehabilitation services. The measure of the economic gains in the vocational rehabilitation context is the client's increased earnings as a result of vocational rehabilitation. The earnings gain, thus computed, is the difference between client's earnings at referral and earnings at closure. In computing the benefits of rehabilitation, the estimated average annual earnings gain has to be determined first.

Let the symbol i represent client i; EARRE i, the weekly earnings at referral for client i; EARNRi, the weekly earnings at referral adjusted for change in the general level of wage over the referral to closure time span; then EARNRi is obtained:

EARNRi = EARREi x Adjustment Factor for Wage Change

The estimated average annual earnings gain is computed by taking the sum of the difference between weekly earnings at referral and weekly earnings at closure, correcting for changes in the wage rate over the

period from referral to closure. This sum of earnings difference is then multiplied by 52 and divided by the number of successful rehabilitations to obtain the estimated average annual earnings gain.

The formula used to derive the estimated average annual earnings gain is:

$$\overline{GAIN} = \frac{\sum_{i=1}^{N} (EARCLi - EARNRi) \times 52}{N}$$

where $\overline{GAIN}$ is the average annual earnings gain,
EARCLi is the weekly earnings at closure for client i,
EARNRi is the weekly earnings at referral adjusted for changes in wage level for client i, and
N is the number of successful rehabilitations.

The estimated average annual earnings gain is then used as a base for estimating future earnings gain.

Future earnings are estimated by adjusting for uncertainty by discounting and by adjusting for a number of factors such as age of retirement, possible short-term unemployment, client mortality, underestimation of referral earnings capability, gain not attributable to VR services, and fringe benefits. The adjusting procedure is demonstrated by equations listed below:

Let the symbol $\overline{EGAIN}$ represent the adjusted estimate of the average annual earnings gain, then

$$\overline{EGAIN} = \overline{GAIN} \times BAF \times FRNBEN$$

where BAF is the adjustment index taking into consideration the adjustment factors including unemployment, mortality, underestimation of referral earnings and gain not attributable to VR services, and

FRNBEN is the fringe benefit rate.

The adjustment index, BAF, is derived by:

$$BAF = (1\text{-}UNEMP)\ (1\text{-}MORTA)\ (1\text{-}UNDER)\ (1\text{-}GAINNOT)$$

where UNEMP is the unemployment rate,

MORTA is the mortality rate,

UNDER is the underestimation of referral earnings, and

GAINNOT is the gain not attributable to vocational rehabilitation services.

Then, the adjusted estimate of the average annual earnings gain is projected over the average remaining working lifetime of rehabilitated clients to derive the average estimate of total client benefits. This estimate is obtained:

$$\overline{TCB} = \overline{EGAIN}\ (ADF)$$

where ADF is the annuity discount factor derived by:

$$ADF = \frac{1 - \left(\frac{1}{1 + r}\right)^{N}}{r}$$

where r is the discount rate, and

N is the retirement age minus the average age at closure.

## IV. Benefit Adjustment Assumptions

The adjustment categories used in computing the benefits of vocational rehabilitation are described below:

### (1) Discount Rate

Because future dollars are worth less than present dollars, any future earnings of rehabilitated clients need to be discounted in order to reflect the true benefit. To do this, the discount rate was used in this analysis to estimate the value of future earnings by VR clients in terms of the present dollar's worth. Since vocational rehabilitation is competing for funds in the public sector of the economy, the use of the interest rate on government bonds as the discount rate would appear to be appropriate. Currently, the bond interest rates fluctuate between nine and eleven percent. A rate of 10 percent was assumed by this analysis.

Since each rehabilitant will continue to have earnings until retirement or death, his/her remaining working duration will be most likely to be more than just one year. To derive an appropriate discount rate over this number of years, an annuity discount factor (ADF) needs to be generated. This factor will estimate the present dollar value of future earnings assuming that rehabilitants will earn an equal amount for each of the remaining working years. The ADF is derived by the formula shown in the previous section.

The number of years over which present earnings are discounted is the difference between a client group's average age at closure and the average retirement age in Minnesota. Once the number of years over which present earnings are discounted is determined, the annuity discount factor (ADF) can be derived. A discount rate of 10 percent was assumed by this analysis, although the computer program for this analysis permits the use of other discount rates. The average annual earnings gain is then multiplied by this derived factor to bring future earnings to the present dollar value.

(2) Retirement Age

According to Cynthia Koeck, the author of the report entitled, Minnesota's Elderly in the 1990's[1], 70 percent of Minnesotans retire before they reach 65 years of age. She also found that the average retirement age for Minnesotans is 63. Therefore, 63 was used in this analysis as the average retirement age for computing the annuity discount factor (ADF) in projecting the increased earnings.

[1] Cynthia Koeck, Minnesota's Elderly in the 1990's (St. Paul, Minnesota: Minnesota State Planning Agency, February 1981).

(3) Unemployment Rate

The average unemployment rate of the last three years for Minnesota was used for this analysis. Data on the Minnesota unemployment rates were obtained from the report, Review of Labor and Economic Conditions[1] published by the Minnesota Department of Economic Security. The average unemployment rate for the fiscal years 1978-80 is 4.53 percent.

In addition to those who may become unemployed before they reach age 63, some rehabilitated clients may not be able to retain vocational rehabilitation benefits until retirement. This will result in a reduction of vocational benefits. However, some clients may subsequently have earnings gain attributable to the employment foundation laid by vocational rehabilitation services. This will result in an increase in the benefits. It is assumed that these two opposing factors counterbalance one another; therefore, no adjustments are made for either of these effects.

[1] Minnesota Department of Economic Security, Review of Labor and Economic Conditions (St. Paul, Minnesota: Minnesota Department of Economic Security), issues of February 1979, 1980, and 1981.

(4) Mortality

Mortality needs to be considered in computing vocational rehabilitation benefits because not all rehabilitated clients will survive until their retirement age. The Oregon model computes two annuity discount factors to derive a percentage of benefit reduction. One is the weighted mean annuity discount factor, using a 10 percent discount rate weighted according to the expected age of death/retirement. The other is the factor assuming that all clients would survive to the retirement age, which is 63 for Minnesota. The percentage of benefit reduction is then derived by taking the difference between these two factors and dividing it by the "all to the retirement age" discount factor. The derived percentage is 3.5 percent. Since the Oregon model used national data on mortality which were further adjusted to reflect the vocational rehabilitation client/gender mix, this percentage is assumed to be appropriate for Minnesota to use as the default mortality factor by which vocational rehabilitation benefits are reduced.

(5) Referral Earnings Underestimate

Reported client's earnings at referral tend to be too low because a recent onset of unemployment may initiate the referral. This indicates that client's earnings at referral underestimate his/her pre-service earnings capability. Data on client's earnings analyzed by the Oregon DVR using a statistical correction for earnings prior to the onset of disability indicate that client's earnings at referral constitute only 29.4

percent of their earnings for the calendar year prior to the year of the onset of disability. In order to estimate vocational rehabilitation benefits more accurately, an adjustment for clients' earnings at referral is needed. The Oregon model's derived reduction rate of 39 percent was utilized in this analysis.

The Oregon model estimates client's pre-service earnings capacity using a statistical correction for earnings prior to the onset of the disability. The derived estimate is then adjusted for changes in wage rate and the fact that rehabilitants had average weekly earnings at referral which were 25.9 percent higher than those of clients as a whole to derive x wage rated-adjusted referral earnings of rehabilitants. Using this adjusted referral earnings to compute earnings gain results in a substantially smaller amount compared to using the unadjusted referral earnings for earnings gain computation. The reduction rate thus derived by the Oregon model is 39 percent.

The earnings gain due to VR is thus reduced by an additional 39 percent to adjust for the underestimate of earning capability obtained by using the unadjusted earnings at referral.

(6) Gains not Attributable to Vocational Rehabilitation

In the course of rehabilitation, it is possible that clients may rehabilitate themselves in the absence of vocational rehabilitation services. Therefore, a portion of client's

earnings gain may be attributable to self-rehabilitation and the earnings gain needs to be further reduced. The Rehabilitation Service Administration (RSA) assumes a 20 percent rate for earnings gain reduction due to gains not attributable to vocational rehabilitation[1]. This analysis adopts the same reduction rate.

(7) Fringe Benefits

Fringe benefits are considered parts of earnings gain and, thus, must be adjusted in the computation of a cost/benefit ratio. The Oregon model assumed an increase in earnings gain of 13 percent for fringe benefits, which are considered too low.

According to the Bureau of Labor Statistics, 23.3 percent of the total compensation in 1977 for employers in private non-farm industries were spent for items other than time worked [2]. These items include pay for vacations, holidays and other time away from work; bonuses and severance pay; and expenditures for a variety of insurance, retirement, unemployment benefits, and

[1] F.C. Collignor et. al. Benefit/Cost analysis of Vocational Rehabilitation Services Provided by the California Department of Rehabilitation (Berkeley, California: Berkeley Planning Associates, 1977), p.p. IV - 9.

[2] Bureau of Labor Statistics, U.S. Department of Labor, Employee Compensation in the Private Nonfarm Economy, 1977 (April, 1980), Summary 80-5.

savings programs. Therefore, it would be appropriate to use 23.3 percent rate to adjust for earnings gains covered by fringe benefits. However, based on the recommendation of the agency's accounting unit, the rate of 20 percent of the total monetary earnings was adopted to adjust for fringe benefits.

(8) Tax Rate

In addition to increased earnings, increased taxes are also considered benefits of rehabilitation. To estimate increased taxes, a combined tax rate for single and married persons needs to be derived. The tax rate is the percentage of gross income that a client is expected to pay in federal and Minnesota state income taxes and Social Security withholding. The rate of 20 percent[1] recommended and used by the West Virginia Rehabilitation Research and Training Center's in its cost/benefit formula was utilized in this analysis.

[1] R.K. Majunder, et. al. Benefit/Cost Analyses in Vocational Rehabilitation: A Simplified Approach (Dunbar, West Virginia: West Virginia Rehabilitation Research and Training Center, 1978), p.5.

## V. Assumptions Used

The assumptions used in determining the default benefit adjustments in this cost/benefit analysis are summarized as follows:

1. The discount rate of 10 percent was used to derive an annuity discount factor for estimating the present value of future earnings. Since the vocational rehabilitation program has been funded by governments, the use of the interest rate on government bonds is deemed appropriate.
2. The unemployment rate is assumed to be 4.53 percent, which is the average of the unemployment rates in Minnesota for the fiscal years 1978-80.
3. The mortality factor is assumed to be 3.5 percent, adopted from the Oregon model.
4. The underestimate of earnings capacity at referral is assumed to be 39 percent, adopted from the Oregon model.
5. Gain not attributable to vocational rehabilitation is assumed to be 20 percent, recommended by RSA[1].
6. Fringe benefits are assumed to be 20 percent of the total monetary earnings suggested by the agency's accounting unit, which is more conservative than the rate of 23.3 percent reported by the U.S. Department of Labor[2].

[1] F.C. Collignor et. al. op. cit. pp. IV - 9.
[2] Bureau of Labor Statistics, op. cit. pp. IV - 9.

7. The tax rate is assumed to be 20 percent, as recommended by the West Virginia Rehabilitation Research and Training Center[1].
8. Homemakers and unpaid family workers are assumed to have zero earnings.
9. Gains obtained by those who received vocational rehabiliation services but were not successfully rehabilitated are not considered in the computation of program benefits.
10. All non-monetary benefits of vocational rehabilitation programs are not assessed by this model because of lack of data.
11. Costs incurred by clients who went through the vocational rehabilitation process more than once are not separately considered.
12. Clients are assumed to have foregone no earnings in obtaining vocational rehabilitation services.

[1] R.K. Majunder, et. al. op. cit., p. 5.

## VI. Glossary and Results

This model computes economic indices including: (1) the average cost per rehabilitation, (2) the client's income cost/benefit ratio, (3) the taxpayer's payback cost/benefit ratio, (4) the taxpayer's net profit per rehabilitation, (5) the number of years required to repay cost, and (6) the annual rate of return. The following descriptions of the indices include the computed data for Minnesota DVR in FY 81 obtained from the analysis by the model.

The client's income cost/benefit ratio is the ratio of discounted average future income gain to the average cost of rehabilitation. It is obtained by dividing the average discounted expected earnings gain by the average cost per rehabilitation. Based on Minnesota DVR FY 81 cost/benefit analysis, this ratio is 11.44, implying that clients will increase their earnings by $11.44 for every vocational rehabilitation dollar spent.

The average total client benefit is the average expected earnings gain discounted over the remaining working lifetime of the rehabilitated persons. On the average, each Minnesota rehabilitant of FY 81 is expected to have additional earnings of $38,296.94, resulting from vocational rehabilitation, in his/her remaining working lifetime.

The taxpayer's payback cost/benefit ratio is the ratio of the discounted average increase in taxes paid and reduction in public assistance benefits to the average cost per rehabilitation. The tax rate used to calculate tax receipts is 20 percent of gross earnings for state and federal income taxes and social security withholding. Based

on FY 81 economic analysis, Minnesota DVR will return $3.32 to "the taxpayers" for every vocational rehabilitation dollar it spent.

The taxpayer's net profit per rehabilitation is that amount of money over the costs of rehabilitation which will accrue to the public through increased tax receipts and reduced public assistance payments over the remaining working lifetime of those rehabilitated. The average estimated net profit for Minnesota taxpayers due to vocational rehabilitation in FY 81 is $7,758.25 per rehabilitation.

The number of years required to repay cost is obtained by dividing the annual total cost of rehabilitation by the annual total taxpayer's benefit, which is the combination of the annual increase in taxes and the annual reduction in public assistance. The FY 81 economic analysis indicates that it would take 2.87 years to repay the total rehabilitation costs spent by Minnesota DVR in the fiscal year 1981.

The annual rate of return is a percentage rate of return which is computed by taking 1 to be divided by the number of years required to repay cost. The annual rate of return based on the FY 81 economic analysis is 34.8 percent.

## VII. Application of the Cost/Benefit Analysis

This cost/benefit model computes rehabilitation costs and benefits on individual client level. This feature makes it possible for the model to analyze cost/benefit data for any specific client populations. The data base compiled specifically for this cost/benefit analysis enables

the supporting computer program to conduct economic analyses by the following variables:

1. Client's Supplemental Security Income (SSI) status
2. Client's Social Security Disability Insurance (SSDI) status
3. Client's Workers' Compensation status
4. Referral sources
5. Administrative Area of Minnesota DVR
6. Client's severity of disability
7. Disability group
8. Sex

Although assumptions used in this model for the agency as a whole are valid, they may become less appropriate when used with specific sub-populations of clients. Readers are urged to be cautious when interpreting the results of cost/benefit analysis for various sub-groups. Factors to be taken into consideration include: (1) the length of time from application to closure, (2) the amount of case expenditures, (3) the proportion of clients rehabilitated, (4) clients' earnings at referral and at closure, (5) the reduction in the amount of public assistance, and (6) the average age of rehabilitants at closure.

Listed below are a series of statistical tables containing various economic indices analyzed by various client sub-populations. Table 1 is used as an example to demonstrate how the indices should be interpreted. Also included is a graphic comparision of rate of return on investments for vocational rehabiltation and private industries.

Data presented in Table 1 are economic indices for Supplemental Security Income (SSI) recipient clients, non-SSI clients, and general clients of the agency (both SSI and non-SSI combined). The average cost per rehabilitation for SSI clients is $4,227.59 compared to $3,307.22 for non-SSI clients. For general clients, the average cost per rehabilitation is $3,348.07. SSI clients cost $920.37 or 27.8 percent more than non-SSI clients to achieve successful rehabilitation status.

Earnings gain due to vocational rehabilitation is higher for non-SSI clients than for SSI clients. For every dollar that DVR spent on rehabiliation, the average SSI client will have increased earnings of $4.02 and the average non-SSI client will have $11.88. The increased earnings per rehabilitation dollar spent for the agency's general clients is $11.44.

Similarly, taxpayers' payback cost/benefit ratio for non-SSI clients is higher than that for SSI clients. For every dollar spent in rehabilitating SSI, non-SSI and general clients, taxpayers will recover $1.47, $3.43, and $3.32 respectively. The profits to taxpayers which will accrue over the remaining working life of the rehabilitants for non-SSI clients are much higher than that for SSI clients, $8,025.75 compared to $1,999.06. Taxpayers profits for general clients are $7,758.25.

The combined dollar amount of rehabilitants' increased tax payments and decreased use of public assistance will repay the yearly costs of the Minnesota DVR program in 2.87 years. However, it would take much

longer to repay the cost of rehabilitating SSI clients than to repay the cost of rehabilitating non-SSI clients. The number of years required to repay the rehabilitation costs for SSI clients is 6.47 and that for non-SSI clients is 2.78.

Table 1: Minnesota DVR FY 81 Economic Analysis by Client's SSI Status

| SSI Status | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| SSI Client | $4,227.59 | 4.02 | $16,990.14 | 1.47 | $1,999.06 | 6.47 | 15.5 |
| Non-SSI Client | 3,307.22 | 11.88 | 39,286.59 | 3.43 | 8,025.75 | 2.78 | 36.0 |
| All Agency | 3,348.07 | 11.44 | 38,296.94 | 3.32 | 7,758.25 | 2.87 | 34.8 |

** Supplemental Security Income (SSI) payment recipients.

Table 2: Minnesota DVR FY 81 Economic Analysis by Client's SSDI Status

| SSDI Status | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| SSDI Client | $3,415.31 | 6.84 | $23,343.95 | 2.30 | $4,429.25 | 4.15 | 24.1 |
| Non-SSDI Client | 3,344.46 | 11.69 | 39,101.76 | 3.37 | 7,937.42 | 2.82 | 35.5 |
| All Agency | 3,348.07 | 11.44 | 38,296.94 | 3.32 | 7,758.25 | 2.87 | 34.8 |

*Client and taxpayer monetary benefit, resulting from Vocational Rehabilitation over the remaining working life of the rehabilitated person, have been documented to estimate the present value of those future benefits.

** Social Security Disability Insurance (SSDI) payment recipients.

Table 3: Minnesota DVR FY 81 Economic Analysis by Workers' Compensation Status

| Workers' Comp. Status | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| Workers' Comp. Client | $2,576.01 | 19.33 | $49,803.06 | 5.03 | $10,393.58 | 1.89 | 52.9 |
| Non-Workers' Comp. Client | 3,508.18 | 10.22 | 35,862.98 | 3.06 | 7,215.71 | 3.12 | 32.1 |
| All** Agency | 3,346.43 | 11.44 | 38,281.79 | 3.32 | 7,767.13 | 2.87 | 34.8 |

**Figures for all agency differ slightly from those shown in other tables because 18 cases did no have information on their Workers' Compensation Status.

Table 4: Minnesota DVR FY 81 Economic Analysis by Referral Sources

| Referral Source | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| Education Institutions | $4,825.57 | 7.89 | $38,059.34 | 1.60 | $ 2,914.56 | 5.94 | 16.8 |
| Hospital | 2,623.58 | 14.59 | 38,274.03 | 3.44 | 6,389.28 | 2.77 | 36.1 |
| Health Organization | 3,195.96 | 10.51 | 33,586.46 | 4.24 | 10,346.48 | 2.25 | 44.4 |
| Welfare | 3,369.57 | 8.32 | 28,021.56 | 6.58 | 18,804.75 | 1.45 | 69.0 |
| Public Organization | 2,859.01 | 14.54 | 41,576.98 | 4.14 | 8,981.37 | 2.30 | 43.5 |
| Private Organization | 2,727.06 | 14.15 | 38,584.72 | 3.98 | 8,117.68 | 2.40 | 41.7 |
| Individual | 2,874.30 | 13.61 | 39,108.65 | 3.94 | 8,460.91 | 2.42 | 41.3 |
| All Agency | 3,348.07 | 11.44 | 38,296.94 | 3.32 | 7,758.25 | 2.87 | 34.8 |

*Client and taxpayer monetary benefit, resulting from Vocational Rehabilitation over the remaining working life of the rehabilitated person, have been documented to estimate the present value of those future benefits.

Table 5: Minnesota DVR FY 81 Economic Analysis by Administrative Area

| Admin. Area | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| East Metro | $3,519.45 | 12.05 | $42,420.37 | 3.38 | $ 8,372.11 | 2.82 | 35.5 |
| West Metro | 3,323.22 | 11.46 | 38,073.87 | 3.85 | 9,458.42 | 2.48 | 40.3 |
| Central | 3,230.14 | 13.71 | 44,269.36 | 3.44 | 7,869.23 | 2.77 | 36.1 |
| Northwest | 3,320.95 | 10.76 | 35,732.04 | 2.61 | 5,344.23 | 3.65 | 27.4 |
| Northeast | 3,460.13 | 11.79 | 40,794.17 | 4.06 | 10,590.92 | 2.35 | 42.6 |
| Southwest | 3,167.41 | 10.08 | 31,925.69 | 3.05 | 6,489.28 | 3.12 | 32.1 |
| Southeast | 3,336.23 | 9.68 | 32,289.83 | 2.35 | 4,502.65 | 4.25 | 24.7 |
| All Agency | 3,348.07 | 11.44 | 38,296.94 | 3.32 | 7,758.25 | 2.87 | 34.8 |

Table 6: Minnesota DVR FY 81 Economic Analysis by Client's Severity of Disability

| Severity Dis. | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| Severely Disabled | $3,579.20 | 9.26 | $33,154.81 | 2.94 | $6,944.70 | 3.24 | 30.9 |
| Non-Severely Disabled | 3,069.18 | 14.50 | 44,501.54 | 3.85 | 8,739.88 | 2.48 | 40.3 |
| All Agency | 3,348.07 | 11.44 | 38,296.94 | 3.32 | 7,758.25 | 2.87 | 34.8 |

*Client and taxpayer monetary benefit, resulting from Vocational Rehabilitation over the remaining working life of the rehabilitated person, have been documented to estimate the present value of those future benefits.

Table 7: Minnesota DVR FY 81 Economic Analysis by Disability Group

| Disability Group | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| Visual | $2,151.05 | 15.26 | $32,828.32 | 2.54 | $ 3,320.38 | 3.75 | 26.7 |
| Hearing | 3,855.89 | 9.20 | 35,469.92 | 2.09 | 4,217.91 | 3.68 | 27.2 |
| Orthopedic | 3,251.73 | 13.40 | 43,585.49 | 3.67 | 8,695.32 | 2.59 | 38.6 |
| Amputation | 3,316.19 | 10.97 | 36,381.51 | 3.77 | 9,183.08 | 2.53 | 39.5 |
| Personality** Disorder | 2,733.43 | 14.27 | 39,004.79 | 4.99 | 10,893.14 | 1.91 | 52.4 |
| Mentally** Retarded | 3,913.80 | 5.48 | 21,440.19 | 1.37 | 1,437.90 | 6.97 | 14.3 |
| Neoplasm | 3,201.19 | 15.71 | 50,279.10 | 6.06 | 16,191.15 | 1.57 | 63.7 |
| Allergic | 4,674.48 | 10.41 | 48,673.26 | 2.13 | 5,295.51 | 4.47 | 22.4 |
| Blood Disease | 3,674.42 | 12.45 | 45,734.31 | 3.01 | 7,377.46 | 3.17 | 31.5 |
| Nervous System Disorder | 3,596.16 | 9.21 | 33,118.70 | 2.75 | 6,304.78 | 3.46 | 28.9 |
| Cardiac Condition | 3,135.96 | 13.68 | 42,886.68 | 4.67 | 11,505.74 | 2.04 | 49.0 |
| Respiratory Disease | 3,608.95 | 13.37 | 48,236.06 | 3.20 | 7,936.10 | 2.98 | 33.6 |
| Digestive Disease | 3,173.33 | 10.85 | 34,441.97 | 4.43 | 10,891.52 | 2.15 | 46.5 |
| Genito-Urinary Conditions | 5,061.85 | 9.08 | 45,972.56 | 1.58 | 2,934.72 | 6.03 | 16.6 |
| Speech Impairment | 3,910.20 | 7.90 | 30,871.18 | 2.48 | 5,784.80 | 3.84 | 26.0 |
| Other Disease | 3,440.57 | 10.79 | 37,138.95 | 3.12 | 7,289.92 | 3.05 | 32.8 |
| All Agency | 3,348.07 | 11.44 | 38,296.94 | 3.32 | 7,758.25 | 2.87 | 34.8 |

**See Tables 8 for expanded data on these Disability Groups.

*Client and taxpayer monetary benefit, resulting from Vocational Rehabilitation over the remaining working life of the rehabilitated person, have been documented to estimate the present value of those future benefits.

Table 8: Minnesota DVR FY 81 Economic Analysis by Mental, Psychoneurotic, and Personality Disorders

| Type of Disorder | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| Psychotic Disorder | $2,947.59 | 9.85 | $29,029.53 | 3.72 | $8,005.10 | 2.56 | 39.1 |
| Psycho-neurotic Disorder | 2,973.79 | 12.16 | 36,156.18 | 5.78 | 14,213.26 | 1.64 | 61.0 |
| Other Mental Disorders | | | | | | | |
| Alcoholism | 2,053.89 | 20.81 | 42,737.03 | 6.51 | 11,310.27 | 1.46 | 68.5 |
| Drug Addiction | 2,845.99 | 18.03 | 51,304.20 | 5.34 | 12,346.84 | 1.78 | 56.2 |
| Other Behavior Disorders | 3,378.00 | 12.25 | 41,391.73 | 3.95 | 9,952.50 | 2.41 | 41.5 |
| Mental Retardation | | | | | | | |
| Mild Mentally Retarded | 3,627.89 | 7.18 | 26,037.16 | 2.07 | 3,877.22 | 4.60 | 21.7 |
| Moderate Mentally Retarded | 4,120.94 | 4.42 | 18,197.80 | .86 | (- 562.07) | 11.03 | 9.1 |
| Severe Mentally Retarded | 4,665.68 | 1.94 | 9,033.52 | .11 | (-3,160.09) | 84.58 | 1.2 |

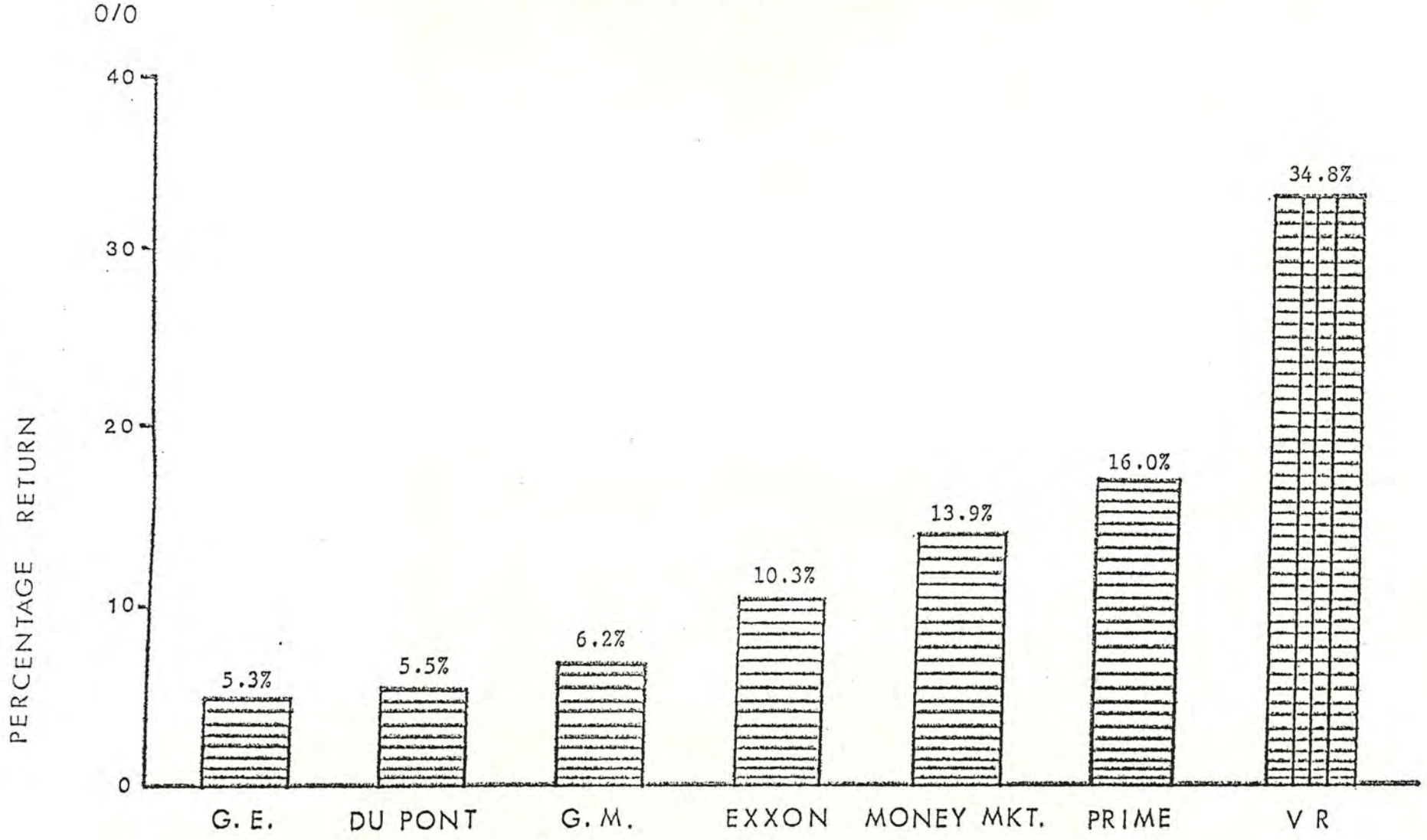
*Client and taxpayer monetary benefit, resulting from Vocational Rehabilitation over the remaining working life of the rehabilitated person, have been documented to estimate the present value of those future benefits.

Table 9: Minnesota DVR FY 81 Economic Analysis by Sex

| Sex | Average Cost Per Rehab. | Clients' Income Cost/Benefit Ratio | Average Total Client Benefit* | Taxpayers' Payback Cost/Benefit Ratio | Taxpayers' Net Profit* Per Rehabilitation | No. of Years Required to Repay Cost | Annual Rate of Return (%) |
|---|---|---|---|---|---|---|---|
| Male | $3,268.59 | 12.95 | $42,343.67 | 3.41 | $7,896.15 | 2.79 | 35.8 |
| Female | 3,474.02 | 9.18 | 31,884.50 | 3.17 | 7,539.74 | 3.00 | 33.3 |
| All Agency | 3,348.07 | 11.44 | 38,296.94 | 3.32 | 7,758.25 | 2.87 | 34.8 |

* Client and taxpayer monetary benefit, resulting from Vocational Rehabilitation over the remaining working life of the rehabilitated person, have been documented to estimate the present value of those future benefits.

CURRENT RATES OF RETURN ON SELECTED INVESTMENTS
as of March 10 , 1982



## VIII. Implications

The Minnesota Division of Vocational Rehabilitation (MDVR) adopted, with modifications, a conservative cost/benefit procedure developed by the Oregon Vocational Rehabilitation Division to analyze the economic impact of vocational rehabilitation. Interpretation of the results of this economic analysis must take into account the assumptions Minnesota DVR used in creating this modified model. The advantages of utilizing this procedure are:

(1) The procedure is a conservative cost/benefit model. It utilizes a series of adjustment factors to reduce gross earnings gain due to vocational rehabilitation. These factors include client's possible unemployment in future, client's mortality prior to retirement, underestimation of client's earning at referral, and earnings gain not attributable to vocational rehabilitation services.

(2) Rehabilitation benefits and costs in this model are computed on the individual client level. This feature enables program managers to analyze cost/benefit data for any specific grouping of disabled clients so long as the grouping criterion is made available. The results can, then, be used to modify programs in order to increase efficiency.

(3) The model is a computerized procedure which provides data consistency and manpower saving in conducting the cost/benefit analysis. Because of its simplicity, program managers can conduct timely cost/benefit analyses to suit program needs.

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