INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in "sectioning" the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again — beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from "photographs" if essential to the understanding of the dissertation. Silver prints of "photographs" may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

University Microfilms International
300 North Zeeb Road
Ann Arbor, Michigan 48106 USA
St. John's Road, Tyler's Green
High Wycombe, Bucks, England HP10 8HR

78-8691

NOWAK, Laura Stone, 1947-
AN EVALUATION OF THE FEDERAL-STATE REHABILITATION PROGRAM IN N.J. AS A MEANS OF INCOME REPLACEMENT.

City University of New York, Ph.D., 1978
Economics, general

University Microfilms International, Ann Arbor, Michigan 48106

AN EVALUATION OF THE FEDERAL-STATE REHABILITATION PROGRAM IN N.J. AS A MEANS OF INCOME REPLACEMENT

by

LAURA NOWAK

A dissertation submitted to the Graduate Faculty in Economics in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1978

This manuscript has been read and accepted for the Graduate Faculty in Economics in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

1/31/78
Date

Michael Grossman
Chairman of Examining Committee

1/31/78
Date

Executive Officer

Prof. Michael Grossman

Prof. Elliot Zupnick

Prof. Damodar Gujarati

Supervisory Committee

The City University of New York

Abstract

An Evaluation of the Federal-State
Rehabilitation Program in New Jersey
As a Means of Income Replacement

by

Laura Nowak

Adviser: Professor Micheal Grossman

The income loss associated with disability is measured in the billions of dollars. Vocational Rehabilitation is designed to deal with this income loss by restoring financial independence to disabled adults. In this paper, an evaluation of the efficiency of the Vocational Rehabilitation program using the benefit/cost technique is undertaken. The evaluation is unique in that the benefits of the study group (measured as the increase in earning ability of program participants) are adjusted by a comparison group that was especially selected for this purpose. I designed the methodology, selected a sample, designed the questionnaire form, and supervised the data collection. I tested the comparison group using linear multiple discriminant analysis. Results of the benefit cost analysis are presented from the viewpoints of society, the taxpayers, and the individual client. The results are then adjusted with respect to the comparison group.

Various measures of the impact of rehabilitation services are presented. Ordinary least squares was used to calculate expected earnings, the expected cost of services, and the expected difference in earnings ability between participants and non-participants in

the program. The calculations depend on an array of demographic characteristics and physical limitations.

Estimates of financial efficiency of a service delivery program is an invaluable tool for the decision-maker in determining whether to expand, contract or terminate a program. Of course financial efficiency is not the only criterion used by the government to determine whether to continue a social program or to expand it. Equity considerations as well as political considerations are used as well.

ACKNOWLEDGEMENTS

This study was initiated in 1975 when the author was a Research Associate at the Bureau of Economic Research of Rutgers, the State University of New Jersey. The theoretical concepts and the written report received extensive comments from Professor Michael Grossman of the National Bureau of Economic Research and the City University of New York. I am indebted to him for his efforts and encouragement. The dissertation was supported in part by a grant from the Robert Wood Johnson Foundation.

TABLE OF CONTENTS

List of Tables and Figures

I. Introduction

Evaluations are conducted of social programs to determine how the programs are working. The manner in which an evaluation is conducted depends upon who does the evaluating and upon the purpose of the evaluation.

When program directors evaluate their own programs, they are already familiar with program operation. They may be looking for areas that need improvement, they may be looking to cut costs, or they may be looking to verify and validate the program processes. Outside evaluators may have the same goals as program directors but the outside agency may know little about the workings of the program. When evaluation is policy related, the decision-maker is looking for information that will contribute to the decision making process.

The forms of evaluation reflect the evaluator and the purpose of the evaluation. The forms include case studies, audits, descriptions of the program purposes, goals, techniques, outcomes, as well as attempts to measure aspects of the social program.

In the field of health and rehabilitation, measurement problems abound, program goals are often unclear or multifaceted, and the outcome variables are often difficult to isolate.

This paper attempts to evaluate the Federal State Vocational Rehabilitation Program in N.J. by examining the program's stated goal of restoring financial independence to disabled adults. The outcome variable, movement toward financial independence, will be measured as the increase in earning ability of program participants.

In the first section, the problem of income loss associated with disability is discussed. Some insight into the nature of disability as distinct from functional limitation and disease is presented, and the

magnitude of the problem in terms of dollars is discussed. The second section describes the operation and background of the Federal State Vocational Rehabilitation Program and how the program is designed to deal with income loss associated with disability.

After presenting disability as a social problem and the program designed to deal with the problem, an evaluation of the efficiency of the program follows in section three. Efficiency of the program is evaluated using the benefit cost technique. The technique, its strengths and limitations are described in section three.

The Federal State program had been considered successful by State directors and Federal sponsors but there had been no attempt to compare the outcome of program participants to non-participants or to participants in alternative programs (e.g. private programs). In fact, no data were available for comparison purposes. Under the auspices of Rutgers University's Bureau of Economic Research and the Social and Rehabilitation Services (SRS) within the Department of Health, Education, and Welfare, I undertook to establish a comparison group. I designed the methodology, selected a sample, designed the questionnaire form, and supervised the data collection. A discussion of the sampling methodology and data collection process can be found in Appendix I. A detailed description of the data collected is presented in Appendix II.

In section three, there is a discussion of the appropriateness of the comparison group that I developed.

Section four presents the results of the benefit cost analysis from the viewpoints of the society, the taxpayer, and the individual client. The results are adjusted with respect to the comparison group.

The fifth section presents a prediction model for costs, benefits and the impact of rehabilitation services which would be useful for predicting efficiency when data concerning the expanded clientel is available.

II. The Income Losses Associated with Disability

Definitional confusion exists regarding the terms disability, functional limitation, and mental or physical impairement. A mental or physical impairement may be congenital or caused by injury or by disease. Poor vision, for example, is an impairement that may be congenital, caused by injury to the eye or skull or caused by a disease such as glaucoma. The impairement may lead to a functional limitation such as difficulty in seeing. Other examples of functional limitations are difficulty in hearing, walking, sitting, reaching, and so forth.

Functional limitations may or may not lead to a disability (defined as an inability to perform one's social role).[1] For an adult, an inability to perform one's social role constitutes a limitation of a person's labor force participation and/or a limitation in the capability to function as a homemaker. The limitation in a person's capability to function in the social role depends on the adaptations made by the person to the functional limitation. For example, a person who cannot walk due to an impairement of the legs might have a severe work disability or a mild work disability. The severity of the disability depends on how much the

---

[1] HEW defines disability based on the extent of work limitation (e.g. those unable to work regularly or at all were classified as severely disabled). From Lawrence D. Haber, "Disability, Work and Income Maintenance Prevalence of Disability: 1966," Social Security Bulletin, May 1968.

role functioning has been limited. A person can function as an economist even though walking without assistance is impossible whereas a stevedore is less likely to be able to continue in his former occupation. The capability to adjust to limitations depends on the person's education, geographic location and family circumstances. A more detailed look at how demographic characteristics affect disability in the sample population is presented in Appendix III.

Disability is an important social problem. The number of disabled in the non-institutionalized population aged 18-64 has been estimated by various sources. The estimates range from 11-17.8 million people.[2] See Table 2.1.

The loss to the disabled in real terms is measured in the billions of dollars. The loss includes the foregone earnings suffered by the disabled, the extra medical costs that must be absorbed by the family unit of the disabled person, and the psychic costs due to the discomfort of change in behavior required by the disability.

Luft[3] estimated foregone earnings losses from long term disability to be $22.8 billion in 1966. In terms of 1973 wage levels, comparable losses were approximately $33.2 billion.

Since earnings are the major source of income for almost all families in the U.S., when earnings are disrupted by disability, families face financial hardship. Only three-fifths of the units with severely

---

[2]Berkowitz, Johnson, and Murphy, Public Policy Toward Disability, N.Y.: Praeger, 1976, p. 24.

[3]Luft, H., "Poverty and Health: An Empirical Investigation of the Economic Interactions," Ph.D. Dissertation, Harvard University, 1972, pp. 5-6.

TABLE 2.1
Number of Disabled Persons (millions) and Percentage of Persons in Noninstitutionalized Population

	Severe	Unable to Work: At All	Unable to Work: Regularly	Occupational	Part-Time Only	Full-Time--Cannot Do Same Work	Never Worked	Secondary	Total
SDA 1966, ages 18-64									
Number	6.1	3.7	2.4	5.0	1.0	2.8	1.2	6.6	17.8
Male	2.3	1.6	.7	2.4	-	-	-	3.7	8.4
Female	3.8	2.1	1.7	2.6	-	-	-	2.9	9.3
Percent	5.9	3.6	2.3	4.9	1.0	2.7	1.1	6.4	17.2
Male	4.7	3.3	1.4	4.9	-	-	-	7.6	17.2
Female	7.0	3.9	3.1	4.8	-	-	-	5.4	17.2
Census 1970, ages 18-64									
Number	4.5	-	-	6.5	-	-	-	-	11.0
Male	1.8	-	-	4.0	-	-	-	-	5.8
Female	2.7	-	-	2.5	-	-	-	-	5.2
Percent	4.0	-	-	5.8	-	-	-	-	9.8
Male	3.4	-	-	7.3	-	-	-	-	10.7
Female	4.6	-	-	4.3	-	-	-	-	9.0
NHS 1972, ages 17-64									
Number	-	2.7	-	8.3	-	-	-	4.3	15.3
Male	-	2.1	-	3.6	-	-	-	2.3	8.0
Female	-	0.6	-	4.8	-	-	-	2.0	7.4
Percent	-	2.2	-	6.9	-	-	-	3.6	12.7
Male	-	3.7	-	6.3	-	-	-	4.1	14.1
Female	-	0.9	-	7.7	-	-	-	3.3	11.9

Sources: Derived from SDA Report Nos. 3 and 19; U.S. Census, Persons with Work Disability, 1970, National Center for Health Statistics, November 1974.

disabled members had some income from earnings in 1966. The unit could contain a disabled head of household, spouse, or other adult. This implies that two-fifths of the disability units with severely disabled members had no income from earnings. Those units with partially disabled members received nine-tenths of their income from earnings compared with three-fifths for the severely disabled.[4] See table 2.2.

The family income of the severely disabled has been calculated as equal to about half the median income of the general population.[5] In 1965, the median family income of the general U.S. population under age 65 was $6,817. Families with a severely disabled adult had incomes of only $3,156. See table 2.4.

Some of the lost income is replaced by public income maintenance programs. Over one-half of the severely disabled unmarried men and two-thirds of the severely disabled unmarried women had income from these sources. Two-thirds of the severely disabled married men had income from public programs but these sources provided only three-tenths of total disability income. As a group, the partially disabled received very little from public programs. Only one-fourth of the partially disabled had income from public programs and this accounted for only one-twentieth of their family income. See table 2.3.

Private sources of income (e.g., asset income, employer and union pension, and insurance) provided about 7 percent of income for the total

---

[4]Swisher, Idella, The Social Security Survey of the Disabled: 1966. Family Income of the Disabled, Report No. 13, Division of Disability Studies, Office of Research and Statistics, Social Security Administration, October 1970, p. 15.

[5]Swisher, IBID., p. 2.

TABLE 2.2
Sources of 1965 Income of Disability Units: Percentage Distribution of Disability Units by Severity of Disability, Marital Status, and Sex of Disabled Adults aged 18-64

Source of Income	Total	Severity of Disability		
		Severe	Occupational	Secondary Work Limitations
I. Total Units				
Number (in thousands)	15,401	5,244	4,233	5,924
Total Percent	100.0	100.0	100.0	100.0
No income	3.4	6.2	2.6	1.5
Earnings	79.4	59.1	87.5	91.5
Head	73.9	49.0	84.3	88.4
Spouse	27.2	19.9	31.7	30.5
Children	5.3	5.3	7.0	4.0
Asset income	41.3	32.0	44.1	47.3
Public income maintenance	37.6	57.4	34.0	22.5
Social insurance	30.7	44.2	29.6	19.5
Public assistance	9.3	18.6	5.6	3.6
Private employer/union	3.5	5.7	3.0	1.8
Other private income	6.6	9.9	4.7	5.1
Contributions from relatives	3.9	5.5	3.1	3.0
II. Married Men				
Number (in thousands)	6,290	1,467	1,980	2,843
Total Percent	100.0	100.0	100.0	100.0
No income	.6	.5	.5	.7
Earnings	91.9	75.5	97.6	96.5
Head	83.4	46.8	96.1	93.4
Spouse	46.7	47.5	49.4	44.5
Children	8.5	9.9	11.5	5.7
Asset income	47.6	36.9	50.2	51.2
Public income maintenance	35.8	66.5	36.0	19.7
Social insurance	31.8	55.8	33.8	18.1
Public assistance	5.7	17.4	2.5	1.9
Private employer/union	4.4	9.4	4.0	2.0
Other private income	5.1	11.4	2.9	3.4
Contributions from relatives	2.2	4.8	.8	1.9

Source: Swisher Idella, from the Social Security Survey of the Disabled: 1966, Report No. 13. Family Income of the Disabled, U.S. Department of HEW, Social Security Administration, Office of Research and Statistics, October 1970, p. 15.

TABLE 2.3
Shares of 1965 Income from Specified Sources: Percentage Distribution of Disability Unit Income by Severity of Disability, Marital Status, and Sex of Disabled Adults Aged 18-64

Shares of Income from Specified Sources	Total	Severity of Disability		
		Severe	Occupational	Secondary Work Limitations
I. Total Units				
Number (in thousands)	15,401	5,244	4,233	5,924
Mean income	$4,964	$3,265	$5,486	$6,096
Total Percent	100.0	100.0	100.0	100.0
Earnings	83.8	64.6	86.6	91.1
Head	69.8	50.9	71.6	77.6
Spouse	13.6	12.8	14.8	13.3
Children	*	.8	*	*
Asset income	4.5	6.1	4.2	3.9
Public income maintenance	9.6	24.7	7.4	3.9
Social insurance	7.8	19.0	6.5	3.4
Public assistance	1.8	5.6	.9	.6
Private employer/union	.9	2.4	.7	*
Other private income	1.2	2.3	1.1	.7
Contributions from relatives	.7	.9	.8	*
II. Married Men				
Number (in thousands)	6,290	1,467	1,980	2,843
Mean income	$6,455	$3,992	$6,824	$7,469
Total Percent	100.0	100.0	100.0	100.0
Earnings	85.9	56.1	88.2	92.6
Head	67.5	25.3	70.0	77.4
Spouse	18.1	30.1	17.0	14.9
Children	*	.6	*	*
Asset income	4.5	8.1	3.9	3.9
Public income maintenance	7.8	29.7	6.7	2.5
Social insurance	6.8	24.6	6.2	2.3
Public assistance	1.0	5.1	.5	*
Private employer/union	1.1	3.4	.9	.5
Other private income	.7	2.7	*	*
Contributions from relatives	*	.6	-	*

Source: IBID. p. 19

TABLE 2.4
Median 1965 Income of Disability Units and Families with Severely Disabled Adults by Life Cycle and Sex of Disabled Persons, Size of Family and Proportion in Poverty

Characteristic	Young Dependent Adults	Married Head or Spouse: With Minor Children	Married Head or Spouse: With Adult Children Only	Married Head or Spouse: Without Children	Non-Married Head	Older Dependent Adults
I. Total						
Number (in thousands)	544	1,395	543	1,825	1,218	584
Median unit income	$464	$4,247	$5,122	$3,706	$1,244	$705
Family income	4,210	4,316	7,764	3,538	1,344	3,230
Percent reporting income	71.9	94.4	83.6	95.7	92.7	76.4
Average number of persons in family	3.9	5.4	3.7	2.6	1.9	3.3
Percent in poverty:						
Disability unit	88.9	40.8	15.8	24.3	69.2	78.9
Family	38.0	41.2	13.3	24.1	64.9	41.2
II. Men						
Number (in thousands)	294	537	200	714	339	216
Median unit income	$397	$2,939	$3,890	$3,251	$1,204	$911
Family income	4,384	3,188	5,848	3,201	1,315	1,927
Percent reporting income	66.1	96.0	86.1	98.2	95.7	78.9
Average number of persons in family	4.0	5.7	3.7	2.6	1.6	2.8
Percent in poverty:						
Disability unit	91.2	60.0	20.4	30.0	66.9	72.8
Family	37.6	60.3	19.6	29.4	64.8	53.6
III. Women						
Number (in thousands)	250	858	334	1,111	879	368
Median unit income	$550	$5,348	$5,907	$3,979	$1,266	$533
Family income	3,936	5,631	8,610	3,791	1,355	3,981
Percent reporting income	78.7	93.4	82.1	94.2	91.5	75.0
Average number of persons in family	3.9	5.2	3.7	2.6	2.2	3.8
Percent in poverty:						
Disability unit	86.2	28.8	13.1	20.6	70.1	82.4
Family	36.3	28.9	9.4	20.6	65.0	33.7

Source: IBID. p. 9

disabled population. The severely disabled received about twice as much of their total income from these sources as the total disabled population.

Other household members also help to defray medical costs and to replace foregone earnings of the head of household. Income from earnings represented 84 percent of disability unit income. Of this, the head of household contributed 69 percent, the spouse 13.6 percent and children contributed less than 0.5 percent. For the severely disabled, earnings represented 65 percent of total income. The head of household contributed 51 percent of total earnings, the spouse 13 percent, and children contributed about 1 percent. (See table 2.3.)

Disability not only reduces family income, but also reduces the percentage of income received from earnings. This is due to a decline in labor force participation of disabled people and the lower productivity associated with functional limitation. Disabled people have lower incomes than the population also because disability disproportionately affects people with lower incomes.[6]

III. Vocational Rehabilitation As a Means of Income Replacement

The Federal State Vocational Rehabilitation Program serves those who have a disability that presents a substantial barrier to employment but for whom there exists some vocational potential. The goal of the program is to restore the human capital of those who have lost the ability to function vocationally or to build human capital in those who never had

---

[6] See Berkowitz, Johnson, and Murphy, Public Policy Toward Disability, N.Y.: Praeger, 1976, p. 67 and Luft, Harold S., "Poverty and Health: An Empirical Investigation of the Economic Interactions," Ph.D. dissertation, Harvard University, 1972, p. 110-111

the ability to function vocationally. The program attempts to assist the client in the achievement of her/his vocational goal by changing the clients' physical status, mental status or the environment.

This is accomplished by offering training, medical, surgical, and psychiatric services. Artificial appliances such as limbs, braces, or hearing aids are provided, as well as schooling, on-the-job training, tools, equipment and licenses. The program also provides job counseling and placement for its clients.

The services rendered by the rehabilitation agency are designed to augment the human capital embodied in their clients for the purpose of raising client earnings. The rehabilitation agency's guidance, counseling, and placement services provide information to rehabilitation clients regarding their vocational potential, their vocational opportunities and their eligibility for the various transfer payments available. The information dispensed by the rehabilitation agency tends to increase labor market earnings and to increase the receipt of transfer payments compared with those who did not receive services.

The Federal State Vocational Rehabilitation Program was originally designed to help persons "disabled in industry or otherwise". The original act, passed in 1920, was first known as the Industrial Rehabilitation Act. Its purpose was to aid those who were partially or totally incapacitated due to illness, injury, accident or congenital defect. In the 1930's, the vocational rehabilitation program became a part of the Social Security complex. In 1965, legislation liberalized the federal matching of state funds and encouraged states to serve more severely disabled people. The 1968 amendments opened opportunities to serve the disadvantaged as well as the disabled in terms of providing vocational evaluation

and work adjustment. The 1973 amendments required states to give priority to the severely handicapped.

Since the 1920's the number of cases served by the vocational rehabilitation program, the number of cases rehabilitated[7] and the amount of expenditures has grown steadily.[8] About 500 cases per year were rehabilitated in 1921, about 15,000 cases per year in 1941 and about 320,000 cases per year are rehabilitated at present. Over 1.2 million cases are served at present compared with approximately 78,000 cases in 1941. (See Table 3.1.)

The growth in expenditures has followed the expansion of the program. In 1962, program expenditures passed the $100 million mark and the half-billion dollar mark was passed in 1970. Currently, program expenditures are about $869 million.

Estimates of the Vocational Rehabilitation target population have been calculated to be between 3.5 million to 5.5 million in 1973. Of the potential target population, the program served approximately 20-35 percent during 1973 and rehabilitated only 6-10 percent of the target population.[9]

---

[7] A rehabilitant is defined as a person who is placed in a job (or in the case of a homemaker, is restored to functioning in homemaking activities).

[8] Except FY 1975 when priority was given to the severely handicapped. Rehabilitation dropped in FY 1975 by more than 10 percent.

[9] Bureau of Economic Research. An Evaluation of the Structure and Functions of Disability Programs. Year 1 Summary Report. Rutgers, The State University of New Jersey. June 1975 (unpublished Report) p. 198

TABLE 3.1

Number of Cases Served and Persons Rehabilitated by State Vocational Rehabilitation Agencies, Fiscal Year 1921-75

Fiscal Year	Cases Served (in thousands)	Persons Rehabilitated (in thousands)
1975	1,244,338	324,039
1974	1,201,661	361,138
1973	1,176,445	360,726
1972	1,111,045	326,138
1971	1,001,660	291,272
1970	875,911	266,975
1961	320,963	92,501
1951	231,544	66,193
1941	78,320	14,579
1931	n.a.	5,184
1921	n.a.	523

Note: N.a. = not available.

Source: SRS, Caseload Statistics: State Vocational Rehabilitation Agencies (1973), Table 1, p. 9.

The federal-state support burden has changed over the years with the federal government supporting a third of the expenditures in 1921 and supporting four-fifths of the expenditures at present. See table 3.2. In addition to the federal financing of services offered in the state agencies, the federal government allocates funds for research and development projects and training programs. These additional allocations have approximated $20 million in FY 1975 for research and development projects and $22.2 million for training.

Although manpower training and community action programs are no longer expanding, and those that have survived are not distinguished by cost effectiveness, Vocational Rehabilitation expenditures have been rising. The program has become subject to public scrutiny and evaluation to determine the need to expand the services of the program.

An expansion of services is intended to increase the quality and quantity of services provided to rehabilitation clients and to increase the number of clients accepted for services and the number of clients who are rehabilitated. Expansion of services would hopefully increase the benefits derived from the program. Many considerations are involved in expansion. Financial efficiency of the program and the expected financial efficiency of an expanded program will be considered here.

IV. Benefit/Cost Analysis with a Comparison Group

To determine the financial efficiency of the Vocational Rehabilitation program, estimates must be made of the benefits and costs associated with the program. A program is said to be financially efficient if benefits derived from the program are greater than or equal to the costs of the program. That is, for financial efficiency, expenditures

TABLE 3.2

Expenditures of the Federal-State Program
Fiscal Year 1921-75

Fiscal Year	Total (millions)	Percent Federal
1975	$868,849	80.0*
1974	809,634	80.0*
1973	729,656	80.0*
1972	696,841	79.5*
1971	631,371	79.5
1970	557,706	76.2
1961	88,150	61.1
1951	30,273	69.4
1941	4,711	48.4
1931	2,043	45.7
1921	285	32.8

*Estimate.

Sources: SRS, Statistical History, Federal-State Program of Vocational Rehabilitation 1920-1969 (June 1970), Table 31, p. 67; State Vocational Rehabilitation Agency in Fiscal Year, annual, 1970-73.

should not exceed expected benefits. When $B/C \geq 1$ or $B-C \geq 0$ the expenditure is said to be financially efficient and higher ratios or differences imply greater efficiency. Expected benefits are measured, in the theoretical sense, as the increase in the present discounted value of the human capital embodied in each human being which resulted from the health services provided.

The present discounted value of future yields from human capital would be calculated as:

$$B = \sum_{i=1}^{n} \frac{Y}{(1 + r)^i}$$

Where:

Y = yield from the asset human capital

r = discount rate

n = length of life of the asset

$Y = w_r^1 - w_r^0$

w_r^1 = wage after association with rehabilitation

w_r^0 = wage (earnings) of rehabilitants at entry

Benefits of Vocational Rehabilitation are measured here in terms of increased earnings from before to after the receipt of Vocational Rehabilitation services. Such a measure is consistent with the stated goal of rehabilitation which is to restore the physically disabled, the mentally handicapped as (financially) independent not dependent members of society. This is done through employment.

Other continuous and quantifiable measures of benefits are: change in transfer payments and changes in family earnings. Dichotomous measures

of benefits such as change in employment status (i.e., employed vs. unemployed), change in income source (i.e., welfare recipient vs. non-recipient) are also valuable, but they are not used in this paper to compare benefits with costs.

An increase in earnings after the program may be attributed to the services provided by the program, but they may also be attributed to other unknown variables. Other variables affecting earnings include motivation, labor market opportunities, etc. Therefore, to determine the impact of services on increased earnings, the other variables must be held constant.

Data are collected on clients referred for rehabilitation. Some of the clients are rehabilitated into paid employment or unpaid employment (e.g., homemaker, student). In the latter case, there is not an increase in earnings. Some clients are not rehabilitated. That is, they do not follow a rehabilitation plan drawn up by an agency counselor and/or are not placed in employment as a result of Vocational Rehabilitation services.

We do not know how much of the measured change in income experienced by Vocational Rehabilitation clients is associated with agency contact and how much would have occurred in the absence of agency contact. To determine agency impact, a control group is required.

The control group should ideally be randomly selected from the identical population as the group under study. Identical population implies that from the same group of eligible applicants who are willing to participate in the program, some percentage be systematically but randomly denied services in order to serve as a comparison group. That option was not available. However, those clients who were referred to the Vocational Rehabilitation program or who applied to the program but who did not receive services served as a comparison. The obvious difference

between the two groups is the unwillingness of the comparison group to participate in the program.[10] This is not an insignificant difference, since the unwillingness of some clients to participate in the program could be correlated with the outcome variable (change in earnings). Whenever an omitted variable is correlated with the outcome (dependent) variable, specification bias results. The direction of the bias is unclear in this case. Unwillingness to participate in the program may be a proxy for lack of motivation or laziness, or it may be the result of high motivation and optimism concerning the client's ability to cope without participation in the social program. No adjustment for bias was made since neither the magnitude nor the direction of bias is known.

Another difference that may have been present is the difference in disability mix and possibly the severity of disability. The types of disability are known for the study group since each client underwent a physical examination. Comparable data were not available for the comparison group. It is possible then that the comparison differs with respect to severity and/or disability type.

To test if the group fared any better than the group without services, the experimental design requires a comparison of change in earnings between the study group and the comparison group.

$$B_s = \sum_{i=16}^{n} [e_r^1 - e_r^0 - (e_c^1 - e_c^0)]/(1 + r)^{n-i}$$

---

[10] A frequency distribution of the reasons clients were unwilling to participate in the program is presented in Appendix II, p. 84

where: B_s = benefit to society

n = 65 years of age

i = present age

e_r^1 = mean earnings of the rehabilitated client after rehabilitation

e_r^0 = mean earnings of the rehabilitated client at entry

e_c^1 = mean earnings of control group members after rehabilitation

e_c^0 = mean earnings of control group member at entry

r = discount rate, alternatively 5%, 7%, 10%

The charge in earnings associated with Division of Vocational Rehabilitation clients could be attributed to the impact of guidance, counseling, and placement services provided by the agency or to chance, to variabilities in the demand for labor, to geographic location of clients or to the demographic characteristics of the clients (e.g., age, race, sex, education, marital status, and number of dependents). To control for the variables above, the comparison group members were selected from those who had been exposed to the same variabilities as the study group. They were randomly selected from the same counties in the State of New Jersey to avoid geographic location bias; they were subjected to the same variabilities in the demand for labor; the chance component was reduced by selecting a large enough sample (approximately 600 cases) to approximate the normal distribution, and the demographic characteristics of the two groups were similar.

Multiple discriminant analysis was used to test the similarity or difference between groups. The technique is primarily used as a

classifying or predicting method in problems where the dependent variable is qualitative such as program participant/non-program participant.

Discriminant analysis is used to statistically distinguish between two or more groups. To distinguish between the groups, a collection of discriminating variables are selected on which the groups are expected to differ. The mathematical objective of the analysis is to weight and linearly combine the variables in some way so that the groups are forced to be as statistically distinct as possible. The technique has the advantage of considering an entire profile of characteristics common to the groups under study as well as the interaction of these properties. The discriminant function of the form

$$D_i = d_{i1}Z_1 + d_{i2}Z_2 + \ldots + d_{ip}Z_p$$

transforms individual variable values into a single discriminant score which is then used to classify the case,

where: d_{ip} = weighting discriminant coefficients

z_p = standardized value of the p discriminating variables used in the analysis.

Ideally, the discriminant scores (D's) for the cases within a particular group will be similar. This would imply that the group members are similar and the within group variance is minimized. The function is also formed in such a way as to maximize the separation of the groups, that is, between group variance is maximized.

Statistical tests are performed to measure the success with which the discriminating variables can distinguish between groups when the

variables are combined into the discriminant function. The weighting coefficients can be interpreted as in multiple regression analysis, that is, they identify the variables which contribute to the discriminating capabilities of the function.

As a check on the adequacy of the function, the original set of cases can be reclassified to see how many cases would be correctly classified using the discriminant function.

The reclassification is performed by the use of a separate linear combination of the discriminating variables for each group. These produce the probability of membership in the respective group and the case is assigned to the group with the highest probability.

The eigenvalues and their associated canonical correlations denote the ability of the function to separate groups. The group centroids and a plot of the cases present more evidence of within and between group similarities and/or differences.

Results show a relatively low eigenvalue and a low canonical correlation indicating little intercorrelation between the two sets of variables and little ability of the function to separate groups. (See Figure 4.1.)

Discriminant analysis shows the relative geometric position of the group centroids. The group centroid is the mean discriminating score using the discriminating function. Results show a small difference between the two group centroids. (See Figure 4.2.) The degree of variation within groups would be graphically represented as a scatter of overlapping discriminant scores, one score for each case.

If the function can discriminate between the two groups, then the function can be used to predict group membership. Results show a poor predictive capability of the discriminating function for the data.

Figure 4.1.

Results of Discriminant Analysis On the Two Groups (Participants and Non-participants in the Vocational Rehabilitation Program)

Discriminant Function

Eigenvalue	0.02082
Canonical Correlation	0.143
Wilks' Lamda	.9796
Chi Square	15.416
D.F.	6
Significance	.017

Standardized Discriminant Function Coefficients

Male	0.32407
Age	.01434
JDPC	.53622
Education	-0.85151
White	-0.35411
Marry	0.47921

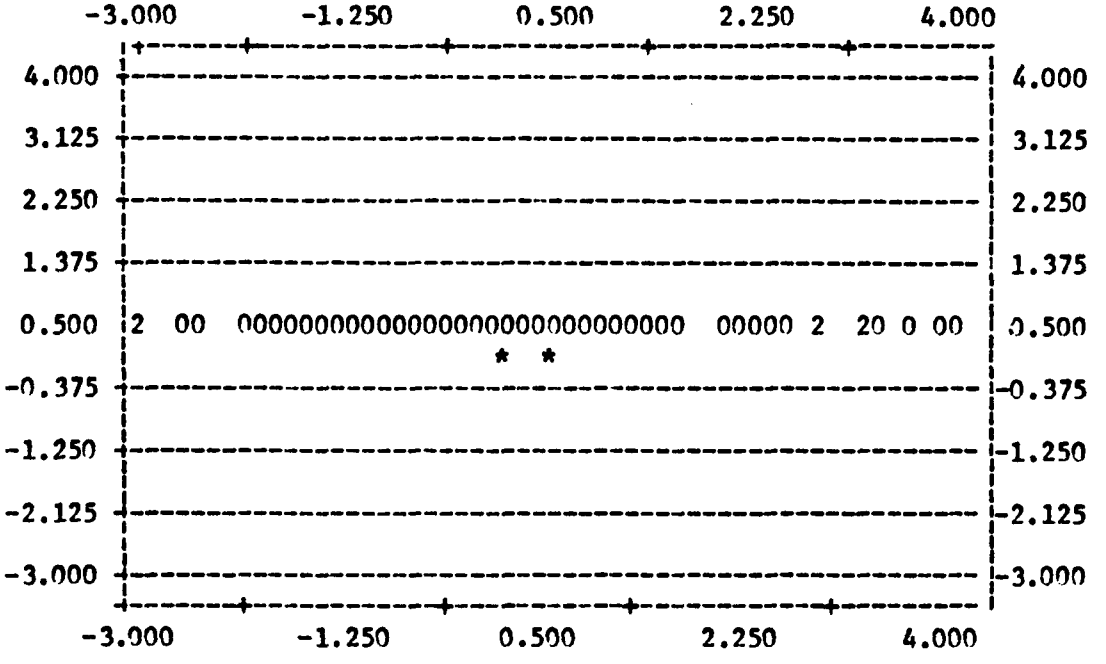
Centroids of Groups in Reduced Space

Group 0 = 0.13982 Group 2 = -0.14552

Figure 4.2.

Results of Discriminant Analysis - Location of Group Centroids

Plot of Discriminant Score 1 (Horizontal) vs. Discriminant Score 2 (Vertical). * Indicates a Group Centroid



Theoretically, each case can be assigned to either group 0 or group 2. The random probability of successful prediction is 50%. For these data, the average success rate for correctly predicting group membership was 53.9%. See Table 4.3. We can conclude that the discriminant function was not able to predict group membership much more accurately than a random assignment. This implies that the two groups are not significantly different with respect to the demographic characteristics that were tested.

Since the two groups are similar aside from the participation in the Vocational Rehabilitation Program and aside from a possible difference in severity and/or disability mix, the comparison group is especially well suited for use as an adjustment factor in calculating benefits accruing to Vocational Rehabilitation clients.

Figure 4.3

Results of Discriminant Analysis

Prediction Results

Actual Group	No. of Cases	Predicted Group Membership Group 0	Group 2
Group 0	384	201 52.3%	183 47.7%
Group 2	369	164 44.4%	205 55.6%

Percent of "grouped" cases correctly classified: 53.92%

V. Results of Benefit/Cost Analysis

Benefits from rehabilitation services can be defined for society, for the taxpayer, and for the individual client.

From society's point of view, an increase in net earnings represents an increase in productivity (if earnings are based on the productive contribution of the worker to overall production). The increase in productivity is quantified as the change in earnings from before to after program participation (adjusted by the control group's change in earnings).

$$B_S = \sum_{i=16}^{n} \{ e_r^1 - e_r^0 - (e_c^1 - e_c^0) \}/(i + r)^{n-i}$$

where: B_S = benefit to society

n = 65 years of age

i = present age

e_r^1 = mean earnings of the rehabilitated clients after rehabilitation

e_r^0 = mean earnings of the rehabilitated clients at entry

e_c^1 = mean earnings of control group members at their follow-up interview

e_c^0 = mean earnings of control group members at entry

r = discount rate, alternatively 5%, 7%, and 10%

The net change in earnings was computed from the time of referral to the rehabilitation agency until after rehabilitation.

Results show the present discounted value of net change in earnings and transfer payments to range from about $24 thousand to about $40 thousand over the working life of the client using a 10% and 5% discount rate respectively. See table 5.1. These estimates are conservative

Table 5.1

Benefit/Cost Analysis Results - Society's View

	At Discount Rate =5%	At Discount Rate =7%	At Discount Rate=10%	B/C 5 %	B/C 7 %	B/C 10%
Society's Benefit from Rehabilitation Services = Present Discounted Value of Net Change in Earnings						
All Cost=$554	$39,581	$31,379	$23,562	71.45	56.64	42.53
Male Cost=$552	48,796	38,639	28,973	88.40	70.00	52.49
Female Cost=$555	27,896	22,173	16,701	50.26	39.95	30.09
Society's Benefit from Control Group						
All	$13,145	$10,472	$ 7,881	-	-	-
Male	15,005	11,993	9,051	-	-	-
Female	10,662	8,410	6,294	-	-	-
Society's Benefit from Rehabilitation Services Adjusted for the Control Group						
All	$26,436	$20,907	$15,681	47.72	37.74	28.31
Male	33,791	26,646	19,922	61.22	48.27	36.09
Female	17,274	13,763	10,407	31.12	24.80	18.75

since no increase in productivity is assumed to occur over time. Individual benefits to males were considerably higher than for females. The range of benefits for men was about $29 thousand to $49 thousand, whereas the range for women was much lower, $17 thousand to $28 thousand.

For the control group, the net change in earnings is computed from the time of referral to the rehabilitation service to the time of the follow up interview in 1976. For the control group as a whole, the net present value ranged from about $8 thousand to $13 thousand using a 10% and 5% discount rate respectively. The benefits were higher on average for the men in the control group compared with the women. The average benefit for women in the group was about $6 thousand assuming a 10% discount rate, $8 thousand assuming a 7% discount rate, and $11 thousand assuming a 5% discount rate. For the men however, the average benefit was $9 thousand assuming a 10% discount rate, $12 thousand assuming a 7% discount rate and $15 thousand assuming a 5% discount rate.

The average benefits accruing to the control group members are substracted from the average benefits accruing to the group of people who received rehabilitation services to achieve a more accurate estimate of benefits derived from rehabilitation services. Results show that the average rehabilitated group member's benefit adjusted for the control group ranged from about $16 thousand to $26 thousand. Again, the benefits to males were greater than to females.

From the taxpayer's point of view, an increase in earnings generally increases tax revenues and a decrease in transfer payments implies a decrease in government direct expenditures.

$$B_T = \sum_{i=16}^{n} \{TR \ \{(e_r^1 - e_r^0) - (e_c^1 - e_c^0)\} + (t_r^0 - t_r^1) - (t_c^0 - t_c^1) \ \} / (1+r)^{n-i}$$

where: B_T = benefit to the taxpayer

n = 65 years of age

i = present age

e_r^1 = mean earnings of the rehabilitated clients after rehabilitation

t_r^1 = mean transfer payments received by rehabilitated clients after rehabilitation

e_r^0 = mean earnings of the rehabilitated clients at entry

t_r^0 = mean transfer payments received by rehabilitated clients at entry

e_c^1 = mean earnings of control group members after rehabilitation

t_c^1 = mean transfer payments received by control group members after rehabilitation

e_c^0 = mean earnings of control group members at entry

t_c^0 = mean transfer payments received by control group members at entry

TR = marginal tax rate, alternatively 10%, 15% and 20%

r = discount rate, alternatively 5%, 7% and 10%

(Government transfers are the bulk of the transfers represented in the sample.)

The marginal tax rate on the client's increased earnings was calculated at 10%, 15% and at 20% of the change in earnings. While average earnings increased, average transfer payments also increased for rehabilitated clients, the latter is a negative benefit from the taxpayer's point of view, it is subtracted from the increased tax revenues generated from increased earnings. Assuming a marginal tax rate of 10%, benefits to the taxpayer ranged from $2,252 at a 10% discount rate to $3,798 at a 5% discount rate for people who received rehabilitation services. At a marginal tax rate of 15%, benefits to the taxpayer ranged from $3,431 at a 10% discount rate to $5,778 at a 5% discount rate. At a marginal tax rate of 20%, benefits to the taxpayer ranged from $4,609 at a 10% discount rate to $7,757 at 5%. Benefits to the taxpayer from the investment in males were higher on average than for females. (See tables 5.20-5.22.)

Earnings and tax revenues rose for the control group members also but average transfer payments for the group fell over the period. The decrease in transfer payments is interpreted as a benefit to the taxpayer. The control group contributed more benefit to the taxpayer than did the group who received rehabilitation services. Although members of the control group had a lower increase in earnings and therefore had a lower increase in tax revenues than the group who received rehabilitation services, their average transfer payment decreased whereas the service group had a slight increase in transfer payments over the period. This could be attributed to eligibility information dispensed by the V.R. Program. The net result was a higher benefit generated from the control group than from the group which received services.

Table 5.20

Benefit/Cost Analysis - Taxpayer's View

Assume a Marginal Tax Rate of 10%

	At Discount Rate= 5%	At Discount Rate=7%	At Discount Rate=10%	B/C 5 %	B/C 7 %	B/C 10%
Taxpayer's Benefit from Rehabilitation Services = Present Discounted Value of Increased Tax Revenues & Decreased Transfers						
All	$3,798	$3,006	$2,252	6.84	5.42	4.06
Male	4,867	3,854	2,890	8.82	6.98	5.24
Female	2,444	1,931	1,444	4.40	3.48	2.60
Taxpayer's Benefit from the Control Group						
All	$5,630	$4,522	$3,447	-	-	-
Male	5,534	4,480	3,426	-	-	-
Female	5,692	4,567	3,474	-	-	-
Taxpayer's Benefit from Rehabilitation Services Adjusted for the Control Group						
All	-1,832	-1,516	-1,195	-3.30	-2.73	-2.15
Male	- 717	- 635	- 536	-1.29	-1.15	- .97
Female	-3,248	-2,636	-2,030	-5.85	-4.75	-3.65

Table 5.21

Benefit/Cost Analysis - Taxpayer's View

Assume a Marginal Tax Rate of 15%

	At Discount Rate=5%	At Discount Rate=7%	At Discount Rate=10%	B/C 5 %	B/C 7%	B/C 10%
Taxpayer's Benefit From Rehabilitation Services = Present Discounted Value of Increased Tax Revenues and Decreased Transfers						
All	$5,778	$4,575	$3,431	10.41	8.24	6.18
Male	7,307	5,786	4,338	13.24	10.48	7.86
Female	3,839	3,040	2,279	6.92	5.48	4.11
Taxpayer's Benefit From the Control Group						
All	$6,287	$5,046	$3,841	-	-	-
Male	6,334	5,089	3,879	-	-	-
Female	6,223	4,988	3,789	-	-	-
Taxpayer's Benefit From Rehabilitation Services Adjusted for the Control Group						
All	$ -509	$ -471	$ -410	-.92	-.85	-.74
Male	973	697	459	1.76	1.26	.83
Female	-2,384	1,948	1,510	-4.29	3.51	2.72

Table 5.22

Benefit/Cost Analysis - Taxpayer's View

Assume a Marginal Tax Rate of 20%

	At Discount Rate=5%	At Discount Rate=7%	At Discount Rate=10%	B/C 5%	B/C 7%	B/C 10%
Taxpayer's Benefit From Rehabilitation Services = Present Discounted Value of Increased Tax Revenues and Decreased Transfers						
All	$7,757	$6,144	$4,609	13.98	11.07	8.30
Male	9,746	7,718	5,787	17.66	13.98	10.48
Female	5,233	4,148	3,114	9.43	7.47	5.61
Taxpayer's Benefit From the Control Group						
All	$6,944	$5,569	$4,235	-	-	-
Male	7,084	5,688	4,331	-	-	-
Female	6,755	5,408	4,104	-	-	-
Taxpayer's Benefit From Rehabilitation Services Adjusted for the Control Group						
All	$ 813	$ 575	$ 374	1.47	1.04	.67
Male	2,662	2,030	1,456	4.82	3.82	2.64
Female	-1,522	-1,260	-990	-2.74	-2.27	-1.78

When the average benefit generated from people who received rehabilitation services is adjusted for the control group, the results indicate negative benefits (except where a 20% marginal tax rate was assumed). Assuming a marginal tax rate of 10%, adjusted benefits to the taxpayer ranged from $-1,832 to $-1,195. With a marginal tax rate of 15%, the benefit ranged from $-410 to $-509. There were benefits generated from the male subgroup ranging from $459 at a 10% discount rate to $973 at a 5% discount rate. The benefits generated from the female subgroup were strongly negative. At a marginal tax rate of 20%, adjusted average benefits for the group were positive, with negative benefits generated only from the female subgroup.

For the individual client, the benefit is represented by the present discounted value of the net change in earnings plus the present discounted value of the net change in transfer payments.

$$B_I = \sum_{i=16}^{n} \{(e_r^1 - e_r^0 - e_c^1 + e_c^0)(1 - TR)\} + \{t_r^1 - t_r^0 - t_c^1 + t_c^0\} / (1 + r)^{n-i}$$

where: B_I = benefit to the individual rehabilitation client

n = 65 years of age

i = present age

e_r^1 = mean earnings of the rehabilitated clients after rehabilitation

t_r^1 = mean transfer payments received by rehabilitated clients after rehabilitation

e_r^0 = mean earnings of the rehabilitated clients at entry

t_r^0 = mean transfer payments received by rehabilitated clients at entry

e_c^1 = mean earnings of control group members after rehabilitation

t_c^1 = mean transfer payments received by control group members after rehabilitation

e_c^0 = mean earnings of control group members at entry

t_c^0 = mean transfer payments received by control group members at entry

TR = marginal tax rate, alternatively 10%, 15%, 20%

r = discount rate, alternatively 5%, 7%, 10%

The net change in earnings and transfer payments was computed from the time of referral to the rehabilitation agency until after rehabilitation.

Results show the present discounted value of net change in earnings[11] and transfer payments to range from about $21 thousand to about $35 thousand over the working life of the client using a 10% and 5% discount rate respectively. Individual benefits to males were considerably higher than for females.

For the control group, the net change in earnings and transfer payments is computed from the time of referral to the rehabilitation service to the time of the follow up interview in 1976. For the control group as a whole, the change in earnings was positive and the change in transfer payments was negative. The net change in income was positive for the group and ranged from about $4-8 thousand using a 10% and 5% discount rate respectively.

The adjusted benefits range from $17-28 thousand using a 10% and 5% discount rate respectively. Males generated more benefits than females from the individual's view as well.

---

[11] Earnings are net of taxes. These figures assume a 10% marginal tax rate. Present discounted values are also computed for marginal tax rates of 15% and 20%. See pages 35-7

Table 5.30

Benefit/Cost Analysis Results

Individual View

Assume a Marginal Tax Rate of 10%

	At Discount Rate= 5%	At Discount Rate= 7%	At Discount Rate 10%	B/C 5 %	B/C 7 %	B/C 10%
Rehabilitated Individuals Benefits = Present Discounted Value of (Change in net earnings plus change in transfers)						
All Cost=$554	35,783	28,373	21,310	64.47	51.12	38.40
Male Cost=$552	43,929	34,785	26,083	79.58	63.02	47.25
Female Cost=$555	26,529	20,242	15,257	47.80	36.47	27.49
Control Group Benefits						
All	7,515	5,950	4,434	-	-	-
Male	9,421	7,504	5,625	-	-	-
Female	4,930	3,843	2,820	-	-	-
Rehabilitated Individual's Benefits Adjusted for the Control Group						
All	28,268	22,423	16,876	50.93	40.40	30.41
Male	34,508	27,281	20,458	62.51	49.42	37.06
Female	21,599	16,399	12,437	38.92	29.55	22.41

Table 5.31

Benefit/Cost Analysis Results

Individual View

Assume a Marginal Tax Rate of 15%

	At Discount Rate= 5%	At Discount Rate= 7%	At Discount Rate=10%	B/C 5 %	B/C 7 %	B/C 10%
Rehabilitated Individual's Benefits = Present Discounted Value of (Change in net earnings plus change in transfers)						
All	33,803	26,804	20,031	60.91	48.30	36.09
Male	41,489	32,853	24,635	75.16	59.52	44.63
Female	25,134	19,133	14,422	45.29	34.47	25.99
Control Group Benefits						
All	6,858	5,426	4,040	-	-	-
Male	8,671	6,904	5,172	-	-	-
Female	4,389	3,422	2,505	-	-	-
Rehabilitated Individuals Benefits Adjusted for the Control Group						
All	26,945	21,378	15,991	48.55	38.52	28.81
Male	32,818	25,949	19,463	59.45	47.01	35.26
Female	20,745	15,711	11,917	37.38	28.31	21.47

Table 5.32

Benefit/Cost Analysis Results

Individual View

Assume a Marginal Tax Rate of 20%

	At Discount Rate= 5%	At Discount Rate= 7%	At Discount Rate=10%	B/C 5 %	B/C 7 %	B/C 10%
Rehabilitated Individual's Benefits = Present Discounted Value of (Change in net earnings plus change in transfer)						
All	31,824	25,235	18,953	57.34	45.47	34.15
Male	39,050	30,921	23,186	70.74	56.02	42.00
Female	23,740	18,025	13,587	42.77	32.48	24.48
Control Group Benefits						
All	6,201	4,903	3,646	-	-	-
Male	7,921	6,305	4,720	-	-	-
Female	3,867	3,002	2,190	-	-	-
Rehabilitated Individual's Benefits Adjusted for the Control Group						
All	25,623	20,332	15,307	46.17	36.63	27.58
Male	31,129	24,616	18,466	56.39	44.59	33.45
Female	19,873	15,023	11,397	35.81	27.07	20.54

To test for financial efficiency, the benefits are compared with the costs. The cost of providing rehabilitation services to each participant includes direct and indirect expenditures incurred by the individual and by the agency for medical services, training, and placement services. Foregone earnings, if any, transportation costs, and psychic costs, as well as the fixed costs of buildings, office equipment, advertising, research and personnel should be considered.

Data are available on the direct expenditures made on behalf of the individual clients by the rehabilitation agency but fixed costs are not included. The data are expected to represent an estimate of marginal cost and not average fixed cost. Psychic costs, transportation cost and foregone earnings are not available and were not included in the estimate of the mean marginal cost of rehabilitation services. The non-participants (the comparison group) are assumed to have entailed no cost.

Benefit costs ratios for the program participants are calculated as the ratio of the mean benefits and mean marginal costs for the study group.

$$\left\{\frac{B}{C}\right\}_{\text{unadjusted}} = \frac{\bar{B}}{\bar{C}} = \sum_{i=1}^{n} B_i \Big/ \sum_{i=1}^{n} C_i = \sum_{i=1}^{n} \left\{\frac{B_i}{C_i}\right\} \frac{C_i}{\sum_{i=1}^{n} C_i}$$

where: $\bar{B}$ = mean present discounted value of benefits from rehabilitation clients

$\bar{C}$ = mean of the marginal costs incurred by the rehabilitation clients

n = number of rehabilitants

This is a weighted average of the benefit cost ratios. It is weighted by the proportion of costs incurred by each participant. See tables.

No ratios can be computed for the control group since they are assumed to have entailed no cost.

To calculate the adjusted benefit cost ratios, the mean benefit accruing to the control group was subtracted from the mean benefit received from rehabilitation services. The benefit adjusted in this way was divided by the mean marginal cost. The adjusted benefit cost ratio is computed therefore as the ratio of the adjusted mean benefit and the mean marginal cost. The ratio of the means can be expressed as follows:

$$\left\{ \frac{B}{C} \right\}_{\text{adjusted}} = \frac{\bar{B} - \bar{B}_c}{\bar{C}}$$

where: $\bar{B}$ = mean present discounted value of benefits from rehabilitation clients

$\bar{C}$ = mean of the marginal costs incurred by the rehabilitation clients

$\bar{B}_c$ = mean present discounted value of benefits from the control group.

The benefit cost ratios for the study group adjusted by the comparison group indicate high efficiency of investment in Vocational Rehabilitation services whether viewed from society's or from the individual's point of view. From the taxpayer's point of view, the investment is shown to be financially efficient only at a marginal tax rate of 20%. (Financial efficiency is acheived for the male subgroup when the marginal tax rate is assumed to be 15%.)

Of course, financial efficiency is not the only criterion used by the government to determine whether to continue a social service program or to expand it. Equity considerations as well as political considerations are used by decision makers as well.

VI. Predicting Program Performance

Program performance is measured by the number or percentage of successfully rehabilitated clients in the program as well as by the magnitude of the change in earnings that occurs as a result of rehabilitation services. In the previous chapter, the magnitude of the change in earnings that occurred as a result of rehabilitation services was shown. The results pertain only to the sample studied and to the time period studied. If the clientele changes over time, the number of successful participants as well as the magnitude of the benefits and costs of rehabilitation services could be expected to change also.

The probability of successful rehabilitation is estimated using ordinary least squares. The estimate is based on the demographic and other characteristics that are known to the agency prior to client participation. An estimate of an individual client's probability of successful completion of the program has been calculated as an example. The dependent variable (success = 1, non-success = 0) as well as all the independent variables are dichotomous.[12]

---

[12]The ordinary least squares application yields results that may be interpreted as the conditional probability of an event, given the set of independent variables. The regression coefficients estimated are unbiased. The error variance however, varies with the independent variables. Heteroskedasticity is present. The estimates derived will be inefficient. The standard tests of significance do not apply.

The following demographic variables, physical limitations, non-market sources of income, and the existence of a secondary disability are expected to affect the client's probability of success. See table 6.1.

The probability of successful completion of the program is conditional and additive (i.e., we can forecast the probability of success by summing the probabilities of each factor associated with successful completion of the program). For example, the probability of success for a white male applicant who is 36 years old, has finished 12 years of school, is receiving social security disability insurance, has a mental disorder and is married with two dependent children is about 71%. In comparison, a non-white male who is 25 years old with an eighth grade education, not married, no dependent children and also categorized as having a mental disorder has a probability of success equal to about 46%. (See Table 6.2)

A comparison of success rates for each type of client can be made over time to estimate program performance. The percentage of successfully rehabilitated clients in the program will be equal to the average of the probabilities of success for the group. The expected number of successfully rehabilitated clients will be equal the sum of the probabilities of success for the group.

Clients who are termed "successful" complete the program and are placed in jobs. Ideally, earnings after rehabilitation services are greater than before contact with the program.

To measure the magnitude of the impact of Vocational Rehabilitation services, the following equations are used:

Table 6.1

List of Independent Variables Associated with a Client's Marginal Cost and Wage

SSDI	Social security disability insurance recipient
JDPC	number of dependent children = 1-3
JDPC4	number of dependent children = greater than 4
Age 25	if 25-34
Age 35	if 35-44
Age 45	if 45-54
Age 55	if 55-64
JED 8	last grade completed was 8th
JED 9	last grade completed was 9-11
JED 12	last grade completed was 12th
JED 13	last grade completed was 13+
SPEHE	disability condition = speech or hearing
ORTHO	= orthopedic
AMPUT	= amputation
MENTD	= mental disorder
MENTR	= mental retardation
BCRES	= blood, circulatory,& respiratory
NEOPL	= neoplasms
DIGES	= digestive
GENUR	= genito-urinary
DISD	= miscellaneous
JMDIS	secondary disability
YPAC	public assistance recipient
MALE	
WHITE	
MARRY	married with spouse present
CONS	constant term

Table 6.2

Probability of Successful Rehabilitation
Ordinary Least Squares Regression

Dependent Variable = Successful Completion of Rehabilitation Program Given Acceptance into the Program

Independent Variables	Regression Coefficient	T
SSDI	-0.0437	-2.1364
JDPC	0.0593	5.6112
JDPC4	0.0329	1.7743
Age 25	-0.0148	-1.2292
Age 35	0.0262	1.6946
Age 45	0.0145	0.9433
Age 55	0.0368	2.0435
JED 8	-0.0190	-0.9487
JED 9	-0.0078	-0.4880
JED 12	0.0571	3.6400
JED 13	0.0997	5.3469
SPEHE	0.1003	4.4008
ORTHO	-0.0147	-0.8685
AMPUT	0.0993	3.2680
MENTD	-0.1125	-7.3376
MENTR	0.0812	3.6762
BCRES	-0.0133	-0.5946
NEOPL	0.1026	1.1468
DIGES	0.1550	8.4883
GENUR	0.0642	0.9825
DISDI	0.0313	0.6034
JMDIS	-0.0109	-1.1292
YPAC	-0.0872	-5.2381
MALE	-0.1097	-11.2464
WHITE	0.0869	8.7336
MARRY	0.0246	2.1197
CONSTANT	0.7224	34.2603

R^2 = 0.1051 F=37.2873
SE = .4050 N= 8033

(1) $\text{Earndiff} = a + b_1R + b_2x_i + b_3x_iR$

where:

- Earndiff = difference in earnings from the time period before Vocational Rehabilitation services to the time period after services
- R = Recipient of Vocational Rehabilitation services
- x_i = demographic variables that are expected to be associated with change in earnings
- x_iR = interaction variables between Vocational Rehabilitation services and the demographic variables
- a = constant
- b_i = regression coefficients

(2) $\text{Earndiff} = a + b_1x_i$

where:

- Earndiff = difference in earnings
- x_i = demographic variables
- a = constant
- b_1 = regression coefficient

The coefficients of R and x_iR in equation (1) represent the magnitude and direction of the impact of rehabilitation on change in earnings of clients of the Vocational Rehabilitation program. The significance of the contribution of the set of variables R and x_iR was tested by using the F test. The F test measures the significance of the contribution of the set of variables R and x_1R on the R^2 of the two equations. (See table 6.30 and 6.31.)

$$F = \frac{SS_2 - SS_1 \ / \ \text{number of additional variables}}{SS_{u2} \ / \ \text{d.f. in the residual}}$$

- SS_1 = sum of squares of the regression equation
- SS_2 = sum of squares of the expanded regression equation expanded by the added variables

Table 6.30

Earnings Differential Between
Participants and Non-participants

Equation (1)

Independent Variables	Regression Coefficients	F
ED	0.4337	0.109
Males	3.7606	0.241
Age 1	- 2.9184	0.084
Age 2	-30.0237	6.152*
Race 0	- 5.2177	0.060
Race 2	-11.6437	1.953
Marry 1	27.6805	6.081*
Marry 2	12.6916	1.311
JDPC	1.5980	0.390
REHED †	3.6451	3.320*
REHMALE †	16.7258	2.239
REAGE 1 †	- 7.4362	0.270
REAGE 2 †	0.1434	0.000
REHRACE 0 †	21.7707	0.633
REHRACE 2 †	17.7292	2.202
REHMAR 1 †	-22.1228	1.989
REHMAR 2 †	0.3007	0.000
REHJDPC †	- 3.5349	0.878
REHABS ††	- 5.2878	0.042
CONS	9.0134	0.042

R^2 = .1206 F = 4.8944
SE = 68.9049 N = 698

† = Interaction Terms

†† = Vocational Rehabilitation Services Recipient

Table 6.31

Earnings Differential Between
Participants and Non-Participants

Equation (2)

Independent Variables	Regression Coefficients	F
ED # of yrs. of schooling	3.0355	9.081*
Males Client is male	12.4290	4.674*
Age 1 Age 26-43	-9.7677	1.793
Age 2 Age 43-64	-28.8465	11.374*
Race 0 Black	11.4683	0.699
Race 2 Other	- 4.6878	0.589
Marry 1 Married w/ spouse	16.5149	4.197*
Marry 2 Married w/o spouse	11.3771	1.829
JDPC # of dependent children	- 0.2364	0.015
CONS	- .0349	

R^2 = .0439 F = 3.5133

SE = 71.3221 N = 698

SS_{u2} = sum of squares of the residual in the expanded equation

d.f. = degrees of freedom

The F-statistic was calculated to be 5.91 which is significant at the 1% level.

$$F = \frac{280679.6/10}{3219062.4/678} = 5.91$$

According to the data, rehabilitation services increased earnings by $36/wk. when all other variables are held constant. (See table 6.32.)

Rehabilitation services were most effective with male clients and with those more educated clients. Rehabilitation services were least effective with older clients (aged 45-65). Race, marital status, and number of dependents were not significantly associated with the effect of rehabilitation services on earnings. (See table 6.32 and 6.33.)

Another way of estimating the impact of rehabilitation services on the sample group is to compute the rehabilitation effect at the sample mean for each variable.

$$\text{Earndiff} = a + bR + \sum_{i=1}^{n} c_i x_i + \sum_{i=1}^{n} d_i x_i R$$

$$\frac{\delta \text{Earndiff}}{\delta r} = b + \sum_{i=1}^{n} d_i x_i$$

$$\frac{\delta \text{Earndiff}}{\delta r} = b + d_i \bar{x}_i$$

Table 6.32

Earnings Differential Between
Participants and Non-participants

SET III

Independent Variables	Regression Coefficients	F
ED	2.1264	4.652*
Males	10.9108	3.826*
Age 1	- 6.1302	0.747
Age 2	-28.2438	11.600*
Race 0	4.2230	0.100
Race 2	- 4.7680	0.648
Marry 1	15.2634	3.813*
Marry 2	11.3800	1.946
JDPC	0.1451	0.006
REHABS	35.7399	45.010
CONS	- 8.1948	

R^2 = .1027 F = 7.865

SE = 69.1448 N = 698

Table 6.33

Earnings Differential Between
Participants and Non-participants

SET IV

Independent Variables	Regression Coefficients	F
REHED	3.9567	6.795*
REHMALE	20.3775	6.162*
REAGE 1	-10.4838	1.055
REAGE 2	-30.0251	6.843*
REHRACE 0	16.1887	0.862
REHRACE 2	5.9961	0.485
REHMAR 1	5.3089	0.232
REHMAR 2	12.7945	1.113
REHJDPC	- 1.8890	0.456
REHABS	-11.1103	0.292
CONS	16.4706	

R^2 = .0960 F = 7.2922

SE = 69.4050 N = 698

where: Earndiff = difference in earnings

R = recipient of Vocational Rehabilitation services

x_i = demographic variables

$x_i R$ = interaction variables

a = constant term

b,c,d = regression coefficients (see table 6.30.)

These results also show the impact of rehabilitation to be approximately a $36 increase in earnings compared to the non-participants during the time period. (See tables 6.30 and 6.4.)

The impact of rehabilitation can be predicted for future time periods as well when data regarding the new clientele's demographic characteristics become available. The regression coefficients from the previous time period can be used along with the new demographic data. When after-rehabilitation earnings data become available, the regression coefficients can be revised for more accurate predictive capability.

The impact of rehabilitation can be predicted using the same technique for an individual as well as for the group. The predicted change in earnings would be projected into the future and discounted back to the present. The present discounted value of the stream of benefits divided by the predicted cost of rehabilitation services is an estimate of the financial efficiency of investment for the individual. The benefits accruing from the group are calculated as the sum of all the individual clients' benefits.

The estimate of a client's wage after rehabilitation could be calculated as follows:

Table 6.4

The Impact of Rehabilitation Services
Measured at the Sample Mean of Each Variable

Variable	Mean	Coefficient of Interaction Dummy	Impact of Each Variable
Ed	10.6980	3.6451	38.9953
Males	.5881	16.7258	9.8364
Age 1	.4051	- 7.4362	- 3.0124
Age 2	.2751	0.1434	.0394
Race 0	.0434	21.7707	.9448
Race 2	.3130	17.7297	5.5494
Marry 1	.3306	-22.1228	-7.3138
Marry 2	.2222	0.3007	.0668
JDPC	1.1975	-3.5349	-4.2330
	Coefficient of the Rehabilitation Variable		-5.2878
	Total Impact of Rehabilitation Services		35.5851

$$W = a + b_1x_1 + b_2x_2 + ... + b_nx_n$$

where: W = wage after rehabilitation

a = constant

x_i = independent variables (see list Table 6.1)

b_i = regression coefficients

The estimated wage after rehabilitation for the first man in the previous example, a white male applicant who is 36 years old, has finished 12 years of school, is receiving social security disability insurance, has a mental disorder and is married with two dependent children is about $71/wk. In comparison, a non-white male who is 25 years old with an eighth grade education, not married, no dependent children and also categorized as having a mental disorder is expected to earn a wage of about $52/wk. (See Table 6.5)

The estimated marginal cost of a client who successfully completes the program is dependent on the demographic characteristics of the client (such as age, sex, education, etc.) and on other characteristics (such as physical handicap, income source, etc.). Costs vary across individual clients. Certain clients require more costly rehabilitation either in terms of type of services required (e.g., psychiatric treatment, vocational training, job counseling) or the amount of services required (e.g., number of visits to a psychiatrist, number of weeks of training). Costs for a particular individual are predicted using ordinary least squares. The dependent variable (cost) is continuous, and the independent variables are dichotomous. (See Table 6.1 for the list of independent variables.)

Table 6.5

Predicted Wage of Successful Clients
After Rehabilitation

Independent Variables	Regression Coefficient	T
SSDI	-25.6368	- 8.1544
JDPC	15.6560	9.640
JDPC4	25.3735	8.903
Age 25	5.2093	2.810
Age 35	7.7260	3.253
Age 45	1.8448	0.780
Age 55	- 8.3532	- 3.022
JED 8	1.0333	0.335
JED 9	8.9878	3.682
JED 12	23.9887	9.945
JED 13	43.5554	15.197
SPEHE	15.6787	4.474
ORTHO	- 5.4829	- 2.106
AMPUT	7.5861	1.625
MENTD	0.1120	0.048
MENTR	- 5.4474	- 1.605
BCRES	1.6783	0.488
NEOPL	8.3667	0.609
DIGES	21.5786	7.680
GENUR	1.0728	0.107
DISDI	3.7149	0.466
JMDIS	- 5.1535	- 3.486
YPAC	-15.3493	- 5.990
MALE	15.4926	10.330
WHITE	5.2473	3.428
MARRY	- 0.9588	- 0.536
CONS	29.9888	9.252

R^2 = 0.1227 F = 44.14

SE = 62.2259 N = 8024

The cost equation indicates which characteristics are costly to rehabilitate.

$$C = a + b_1x_1 + b_2x_2 + \ldots + b_nx_n$$

where: C = cost

a = constant

x_1 = independent variables (See table 6.1.)

b_1 = regression coefficients

The regression coefficients represent the magnitude and the direction of the association of a particular variable with the estimate of marginal cost. The estimated cost of rehabilitation services for a particular client is calculated as the sum of the constant term and the respective regression coefficients multiplied by the independent variables that apply to a particular client. (See cost equation above.) An estimate of the cost of rehabilitating the first man in the previous example would be equal to $597 compared with $407 for the second man. (See table 6.6.)

The sum of the present discounted value of the benefits of the expanded clientele would then be compared with the sum of the marginal costs. The comparison is the benefit cost ratio test for program efficiency in the expanded program. If the benefits are greater or equal to the costs, the program is shown to be a sound financial investment.

Table 6.6

Predicted Marginal Cost of Rehabilitation Services

Independent Variables	Regression Coefficient	T
SSDI	161.1681	3.080
JDPC	-65.0778	-2.444
JDPC4	-78.4740	-1.656
Age 25	30.9549	0.985
Age 35	67.6628	1.730
Age 45	3.4090	0.088
Age 55	-16.2178	-0.368
JED 8	-58.2583	-1.115
JED 9	-84.2215	-2.026
JED 12	-73.7905	-1.826
JED 13	20.4115	0.431
SPEHE	21.6734	0.398
ORTHO	224.1792	5.254
AMPUT	419.2109	5.765
MENTD	-17.0711	-0.431
MENTR	422.4311	7.572
BCRES	14.4067	0.254
NEOPL	106.4148	0.510
DIGES	- 1.6272	-0.037
GENUR	314.4531	1.969
DISDI	-50.0336	-0.389
JMDIS	16.5515	0.674
YPAC	- 8.1297	-0.179
MALE	-13.8296	-0.567
WHITE	115.2450	4.455
MARRY	-43.6605	-1.517
CONS	465.3811	8.576

R^2 = 0.0402 F = 10.8128
SE = 896.9089 N = 6092

SUMMARY

In sum, the Federal-State Vocational Rehabilitation Program in New Jersey has been shown to be a financially efficient program in dealing with income replacement for the disabled from the individual's and from society's points of view. From the taxpayer's point of view, the program is financially efficient only when it can be assumed that the client's marginal tax rates are 20% and above. (For the male subgroup alone, financial efficiency from the taxpayer's point of view was achieved at a marginal tax rate of 15%.) These results obtain when the study group is compared with a comparison group. Without a comparison group, the benefits outweigh the costs under any of the assumptions of tax and discount rates.

The financial efficiency of the program is only one of the many criteria used by decision-makers to expand, contract, or discontinue a social program. Having met the criteria during the study period, there is no assurance of continued financial efficiency since the clientele and staff will change over time.

In order to get a crude estimate of the financial efficiency in future periods, the probabilities of success as well as the marginal costs and the benefits from rehabilitation services could be calculated. They are calculated from the demographic and physical characteristics that become available to the program staff at referral to the program. The estimate can then be compared with a comparison group to test for financial efficiency. Ideally, the prediction model should be updated (the regression coefficients reestimated) to maintain the precision of the predictions. The new data would confirm

or deny financial efficiency and draw attention to areas where financial efficiency criteria are not being met.

Appendix I. Data Collection and Sampling Methodology

A representative sample of about 600 clients of the Vocational Rehabilitation Program who did not participate in Vocational Rehabilitation services was selected to be interviewed with a comprehensive schedule. The information attained duplicates the data available for clients who did complete the program. In addition, information was collected on functional limitation, labor market status, financial status, transportation problems and the reason services were not rendered to the client as seen by the client.

A personal interview was required to minimize non-answered questions on the questionnaire form (see attached) and also to probe in depth to ascertain changes in income, work adjustments, functional limitations, and perceptions of program decisions. The personal interview approach, which is more costly to administer, necessarily limited the feasible sample size. The sample size was chosen to be 3% of the 19,302 people in fiscal year 1975 who were Vocational Rehabilitation clients but who did not participate in the program. The sample size was exactly 589. A proportionate number of cases was selected from each county.

$$\frac{x_i}{589} = \frac{\text{\# of cases in county } i}{\text{\# of cases in the state}}$$

where: x_i = the number of cases selected in county i i.e., the number of client cases who did not participate in the rehabilitation program.

Table 1 presents the determination of county representation in

RUTGERS UNIVERSITY—Bureau of Economic Research

SECTION I—SURVEY OF HEALTH AND WORK ADJUSTMENTS (1976)

Name:

Address (on file):

New Address (if different from above)

Phone Number:	New Phone Number:	SS#:
Date of Referral:	Date of Closure:	Closure #:
County Code:		

RECORD OF CALLS

TYPE	DATE	TIME	COMMENTS
PHONE		A.M.	
IN PERSON		P.M.	
PHONE		A.M.	
IN PERSON		P.M.	
PHONE		A.M.	
IN PERSON		P.M.	
PHONE		A.M.	
IN PERSON		P.M.	

METHODS OF LOCATING RESPONDENT WHO HAS MOVED

SUCCESSFUL	UNSUCCESSFUL	
☐	☐	NEW OCCUPANTS
☐	☐	NEIGHBORS
☐	☐	APARTMENT HOUSE MANAGER
☐	☐	POST OFFICE
☐	☐	"INFORMATION" AT TELEPHONE COMPANY
☐	☐	OTHER — SPECIFY

RECORD OF INTERVIEW

INTERVIEW TIME BEGAN	INTERVIEW TIME ENDED	DATE COMPLETED	INTERVIEWED BY
A.M. P.M.	A.M. P.M.		

NONINTERVIEW REASON

001
1 ☐ UNABLE TO CONTACT RESPONDENT — SPECIFY _____
2 ☐ TEMPORARILY ABSENT — GIVE RETURN DATE _____
3 ☐ REFUSED
4 ☐ INSTITUTIONALIZED
5 ☐ DECEASED — DATE OF DEATH _____
6 ☐ OTHER — SPECIFY _____

Notes

If respondent is the disabled person, use the term "your." If respondent is not the disabled person, read the disabled person's name.

SECTION II—DEMOGRAPHICS

Interviewer, please fill in the following 3 questions yourself.

I What is the relationship of the respondent to the disabled?

a. self _____ c. dependent child _____ e. mother _____
b. spouse _____ d. father _____ f. other _____

II. What is the sex of the disabled person?

Male _____ Female _____

III. What is the race of the respondent? _____

1—Negro 2—Caucasian 3—other

1. How old is (read name) _____ ?

(age in years)

2. What was the last grade completed by (read name) _____

_____
(actual grade)

3 What is the marital status of (read name) _____ at present

a. married _____ d. separated _____
b. widowed _____ e. never married _____
c. divorced _____ f. unknown _____

4. Is (read name) _____ head of household? Yes _____ No _____

If no, relationship to head of household: _____

5. How many people are there in (read name) _____'s family? _____

6. How many dependents does (read name) have? _____

SECTION III—WORK

1. Does your health . . . keep you from working ALTOGETHER? Yes . . . No . .

   if YES, skip to question #2

   if NO: does it limit the KIND of work you can do? Yes . . No . . .

   does it limit the AMOUNT of work you can do? Yes . . No . .

   (WOMEN ONLY) does it limit the amount or kind of HOUSEWORK you can do? Yes . . No . .

   if NO to all the above, skip to Section IV

2. When did you first notice the condition or illness? _____ (date)

3. Were you working then? Yes_____ No_____

   if NO, skip to #10

   if YES, what kind of work were you doing at that time?

   a. occupation _____(e.g. driver, teacher)

   b. for whom _____

   c. Is that government employment? _____ or private employment? _____

   d. Code*: _____

   Interviewer code the occupation according to these types

   1. competitive labor market _____
   2. sheltered workshop _____
   3. self-employed _____
   4. state agency — Managed Business Enterprises (BEP) _____
   5. homemaker _____
   6. unpaid family worker _____
   7. student _____
   8. other _____
   9. trainee or worker (non competitive labor market) _____
   10. N.D. _____

4. How much did you work before your disability? Hours per week? _____

5. How many weeks per year did you work? _____

6. Did you stop working because of the disability? Yes _____ No _____

   if NO, skip to question #8

   if YES,
   were you ever able to go back to work again? Yes _____ No _____

7. If you stopped working due to disability (i.e., answered YES to #6), did you stop working for any of the following reasons:

   a. no job of that type. c. not enough opportunity at the job.
   b. not enough money earned at the job. d. other.

   if YES, which reasons? _____ No _____ N.A. _____

8. Did you change your type of work after onset and because of your disability?

   Yes _____ Did not change type of work . . . _____

   if NO or did not change type of work, skip to question #10

9. If you changed type of work, were there any other factors besides your disability that caused you to change your type of work? Yes _____ No _____

   if YES, was it because of:

   a. no jobs of that type _____ c. not enough opportunity _____
   b. not enough money _____ d. other _____

10. Did anyone in your family *start* working because of your disability?

    Yes _____ No _____ N.A. _____

    if NO, skip to number 12.

    if YES, who? _____
    (relationship)

    how many hours per week? _____ earnings per week _____

    weeks per year _____

11. Did above work more than he/she used to? (This does not refer to the disabled person but to the additional worker) Yes _____ No _____ How much?_____

    did above work at a different job because of disability? Yes _____ No _____

    Explain: _____

12. How much were *YOUR* weekly earnings at onset, that is, directly before the disability? $_____ Gross (earnings of the disabled person)

    Not Working _____

13. How much were *FAMILY* earnings at onset of disability? $_____ Gross (includes earnings of other family members but not transfer payments)

    Not Working _____

SECTION IV—FUNCTIONAL LIMITATION

1. Do you have a car to use to drive to work? Yes___ No___ Don't Know___

2. Does your health or disability prevent you from driving to work? (Assuming you had a car to use.) Yes _____ No _____ Don't Know _____

3. Do you have access to public transportation to get to work? Yes _____

   No _____ Don't Know _____

4. Does your health or disability prevent you from using public transportation?

   (Assume you had access.) Yes _____ No _____ Don't Know _____

5. What is your disability or health condition? _____

   _____

6. Do you *EVER* have difficulty performing any of the activities on this card? *(SHOW CARD)*

	Difficult*	Can not do at all
1) WALKING		
2) USING STAIRS OR INCLINES		
3) STANDING FOR LONG PERIODS		
4) SITTING FOR LONG PERIODS		
5) STOOPING, CROUCHING OR KNEELING		
6) LIFTING OR CARRYING WEIGHTS UP TO 10 POUNDS		
7) LIFTING OR CARRYING HEAVY WEIGHTS		
8) REACHING RIGHT HAND / LEFT HAND		
9) HANDLING AND FINGERING RIGHT HAND / LEFT HAND		
10) SEEING (EVEN WITH GLASSES)		
11) HEARING		
12) KEEPING UP WITH WORK SCHEDULE		
13) WORKING UNDER PRESSURE		
14) WRITING		
15) OTHER		

   If none of the above are difficult or impossible, skip to Section V.

7. Are you currently working? Yes _____ No _____

   If no, skip to Section V.

   If yes, are any of these activities which you find difficult or cannot do at all necessary on your current job? Yes ___ No ___ Which _____
   (list by number)

SECTION V—VOCATIONAL REHABILITATION

Now I'd like to ask you some questions about the State Vocational Rehabilitation Program.

1 Did you ever hear of the State Vocational Rehabilitation Program?
Yes _____ No _____ Don't know _____

Interviewer: Explain the V.R. Program and ask again.
Yes _____ No _____ Don't know _____

2 How did you hear of it?
_____
_____
_____

3. Did you ever have any contact with the program?
Yes _____ No _____ Don't know _____

4. Did you apply for help from the State Vocational Rehabilitation Program? (i.e. did you write a letter or visit the office on _____ St.)
Local Office Address
Yes _____ No _____ Don't know _____

5. As a result of your condition, did you receive any of the following from any source at all?
a) medical examination
b) medical, surgical or psychiatric treatment
c) special devices, brace, hearing aid, etc.
d) physical therapy
e) schooling to prepare for a vocation, or on-the-job training
f) tools, equipment, licenses
*g) guidance and counseling (by a Voc. Rehab. counselor not a doctor)
h) living expenses or other support
i) other _____
_____
No _____ Yes _____ If YES, which? _____ Don't know _____
If No, or Don't know skip to #12

6. Where did you get these services? (mark all that apply)
if a.: Vocational Rehabilitation Agency, skip to #7
other responses: skip to #9
a. Vocational rehabilitation agency _____
b. Public welfare _____
c. Veterans' Administration _____
d. School _____
e. Own doctor _____
f. Hospital _____
g. Other private person _____
h. Employer for the job: _____
i. Private agency _____
j. Other public agency _____
k. Don't know _____

7. How were you referred to the V.R. office? (See codes attached — allow only one answer)
a. educational institutions: code: _____
b. hospital: code: _____
c. health organizations and agencies: code: _____
d. public organizations and agencies (not specifically education, health, or welfare): code: _____
e private organizations and agencies (not specifically education, health, education, or welfare): code: _____
f. individuals: code: _____ (including self-referral)
g. don't know

8. Were you referred elsewhere by Voc. Rehab.? Yes___ No ___ Don't know___
if NO or Don't know, skip to #9
if YES: where?
a. educational institutions: code: _____
b. hospital: code: _____
c. health organizations and agencies: code: _____
d. welfare agencies: code: _____
e. public organizations and agencies (not specifically education, health, or welfare): code: _____
f. private organizations and agencies (not specifically educational, health, or welfare): code: _____
g. individuals: code: _____
Now skip to #12.

9. How did you know about this service, i.e., the service that you received? (who arranged it or referred you to it?) _____

10 Who paid for it? (the service you received)
a health insurance (private) _____ (e.g., Blue Cross)
b self _____ f. medicaid _____
c. relative or friend _____ g no charge _____
d other (specify) _____ h. medicare _____
e unpaid _____ i. don't know _____
If b is one of the answers to ques #10, ask #11; otherwise skip to #12.

11 Are you paying?
a less than half of the expenses? _____ c. more than half _____
b. about half _____ d none

12 Did you want or need any (or additional) services from an agency?
Yes _____ No _____
if Yes, skip to #14
if No, ask:

13 If you did not want or need services from the agency, was it because of any of the following:
a. inconvenient to receive services too far from residence _____ e did not think it would be useful _____
b. no transportation to services _____ f. had to work _____
c. had responsibilities at home _____ g. no disability _____
d too sick or disabled to go _____ h. other _____

14. Why do you think you did not get services (or further services) from the State Voc. Rehab.?
_____ N.A. _____

15. Interviewer: a) try to find the closest code to the above answer: code: _____
b) what was the actual reason for closure? code: _____

Codes

0	Client was accepted either for extended evaluation or V.R. services.	6	Transferred to another agency
1	Unable to locate, client changed residence, changed phone #.	7	Failure to cooperate
2	Handicap too severe	8	No disability condition
3	Refused services — Did not want or need services	9	No vocational handicap
4	Death	10	Did not contact me, or change of address or phone number.
5	Client institutionalized	11	Do not know
		12	Other _____

16. Were you working when either you were first referred to VR or at _____ date (see referral date from page 1
a. full-time _____ part-time _____ No _____
b. how many hours per week? _____ N.A. _____
c. how many weeks per year? _____ N.A. _____

17. What type of work were you doing when you were referred to V.R. or a _____ (referral date
a. Occupation _____ (e.g. driver, teacher
b. for whom _____ (e.g. Ace Trucking, Lodi P.S.
c. is that government employment? _____ or private employment? _____
d. Interviewer, please code the occupation: _____

1) competitive labor market _____
2) sheltered workshop _____
3) self-employed _____
4) state agency — Managed Business Enterprises (BEP) _____
5) homemaker _____
6) unpaid family worker _____
7) student _____
8) other _____
9) trainee or worker (noncompetitive labor market) _____
&) N. D. _____

18. What were your weekly earnings at _____ or referral (referral date)
$_____ Don't Know _____

19. What were the monthly family earnings at _____ or referral (referral date)
$_____ Don't Know _____

2C When you first applied to V.R. or at _____ (fill in referral date) did you, spouse or children under 18 receive any other income such as

(Please read *EACH ITEM* on the list.)

	Which family member(s) received this income?				What was the late amount received	Are you (spouse or child) NOW receiving income from this source		Total Amount
	Respondent	Spouse	Parents who live with disabled person	OWN children under 18		YES	NO	
Government employee pensions or disability benefits					$			$
Private employer or union pensions or disability benefits					$			$
State cash sickness (temporary disability) benefits (T.D.I.)					$			$
Workmen's compensation					$			$
Unemployment compensation					$			$
Private insurance or annuities					$			$
Any other kinds of income? Specify					$			$
Social Security — Old Age Survivors Benefits					$			$
Disability					$			$
Childhood Disability					$			$
Veteran's Payments					$			$
Aid to the blind or aid to the permanently and totally disabled? (SSI)					$			$
Aid to families with dependent children (welfare)					$			$
Any other type of public welfare or public assistance Specify _____					$			$
				GRAND TOTAL:	$	GRAND TOTAL		$

SECTION VI—AT PRESENT

1. Are you working at present? Yes_____ No_____

   if NO, when did you last work? _____ (date) Never _____

   If disabled person is not working at present, skip to #7.

2. If YES, how did you get your present job?

   a. private employment agency _____ d. newspaper _____

   b. state employment agency _____ e. other _____

   c. referral of friend or relative _____

3. When did you get your present job? _____ (date)

4. What type of work do you do now?

   a. occupation _____

   b. for whom _____

   c. is this government employment? _____ or private employment? _____

   d. code: _____

Codes:

1) competitive labor market _____
2) sheltered workshop _____
3) self-employed _____
4) state agency — Manage Business Enterprises (BEP) _____
5) homemaker _____
6) unpaid family worker _____
7) student _____
8) other _____
9) trainee or worker (noncompetitive labor market) _____
&) N. D. _____

5. How much are your earnings per week? $_____ N.A._____

6. How many hours per week do you work now? _____ N.A._____

7. How many weeks per year? _____ N.A._____

8. What are family earnings per month $_____ N.A._____

9. Is your present income in dollars (including spouse and children's) more, less, or about the same as it as before you became limited in your ability to work?

   More _____ Less _____ Same _____

   Not applicable _____

Thank you for your cooperation. We will send a check to you as soon as possible.

Table 1

Determination of County Representation in Statewide Sample of Rehabilitation Clients Who Did Not Receive Services From The Federal-State Vocational Rehabilitation Program

Col. (1)	Col. (2)	Col. (3)	Col. (4)
County Name	Number of Cases Reported by County	Percentage of Statewide Cases Reported by County	County Representation in Sample
Atlantic	1069	5.53	33
Bergen	1005	5.20	31
Burlington	741	3.83	22
Camden	2789	14.44	86
Cape May	120	0.62	3
Cumberland	261	1.35	8
Essex	3148	16.30	97
Gloucester	688	3.56	21
Hudson	2377	12.31	73
Hunterdon	88	0.45	2
Mercer	873	4.52	27
Middlesex	789	4.08	24
Monmouth	673	3.48	20
Morris	493	2.55	15
Ocean	489	2.53	15
Passaic	1187	6.14	36
Salem	59	0.30	2
Somerset	321	1.66	9
Sussex	157	0.81	4
Union	1853	9.60	57
Warren	122	0.63	4
	19,302	100.00	589

Total Sample Size in State = 589
Total Number of Non-Participating Clients in State = 19,302 FY'75
Total All Cases = 30,764 FY'75

the total sample of 589 of those sample members who did not receive services from the State Division of Vocational Rehabilitation Services in fiscal year 1975. Column 2 lists the number of cases reported by the county office who were either referred or had applied to the program but who did not receive services. Column 3 gives the percentage of the state total represented in each county. The design of the sample was such that the requisite number of cases from each county had the same weight in the sample as it had in the statewide statistics. Therefore, for example, if Atlantic County reported 1069 client cases who did not receive services in fiscal 1975 and if 1069/19302=.0553, then Atlantic County would have the same weight in the sample survey, namely .0553 x 600 = 33 cases.

Stratified random sampling was used to select cases for the sample. A process of random number selection was employed to chose the cases from the files in each of the twenty local offices.

The interviewers who were chosen were counselors employed by the State Division of Vocational Rehabilitation who had field experience in the rehabilitation process. The interviewers were familiar with the terminology of rehabilitation, the use of forms and the necessity for a comparable data set for the comparison group.

Approximately 30 interviewers were chosen from the various local offices to locate the clients whose cases had been randomly chosen and to carry out the interviews. They were expected to use telephone, mailing, and/or home visits to locate the clients. Interviewers were then expected to make an appointment and to interview the client with a prepared questionnaire (see attached). They were paid $20 per completed interview. Travel, telephone, and mailing expenses were not

reimbursed. An incentive fee of $5 was offered to each client contacted to minimze the possibility of refusal.

Interviewers were instruced to keep a record of their attempts to locate a client. Number of phone calls, number of in-person calls, time of each call, and date of each call were recorded. Efforts to locate telephone numbers, if such were not readily available, were recorded, as well as other efforts to locate clients (e.g., home visits, inquiries of neighbors, follow-up of forwarding address, inquiries of other agencies).

As each questionnaire was returned to us, our staff checked and validated the information in it by telephone or by mail. Questions unanswered on the form were asked again at this point to obtain more complete information from each sample client. Also, random questions were reasked of the client by our staff to check the accuracy of the completed questionnaire.

The following were considered to be non-responses:

1. unable to contact respondent
2. temporarily absent
3. refused
4. institutionalized
5. deceased
6. miscellaneous other reasons

When all surveys were collected from the interviewers, the non-responses were reissued for another attempt at locating the client and obtaining an interview. The non-response rate was 33%.

The information contained in the survey questionnaire form was coded after verification and punched onto cards for computer analysis. (The coding maual is available.) Non-responses were also coded since records were kept on attempts to locate clients. Demographic characteristics of the non-respondents were collected by the interviewers (coun-

selors) from the Division of Vocational Rehabilitation files, and were given to us for further analysis.

Appendix II. Description of Data Collected

Data are available on the demographic characteristics of clients who actually participated in the Vocational Rehabilitation Program, on the marginal costs of their rehabilitation, and on their outcome. There were not however, comparable data regarding non-participants and potential participants for Vocational Rehabilitation services. There had been no follow-up survey which adequately indicated the outcome of non-participating clients in terms of subsequent employment history. There also were little data regarding clients securing rehabilitation services outside the State Vocational Rehabilitation Program.

A small scale survey was undertaken to study the characteristics of non-accepted referrals and to follow up on their labor market and financial status. The selected group consisted of people who either applied for or were referred to the State Division of Vocational Rehabilitation Services but who did not receive services. This group was followed to see how they adjusted to their health or disability in terms of labor force participation, earnings, and transfer payments. We were also interested in their perception of Vocational Rehabilitation services (i.e., do they know about the program, did they want further services, why did they refuse services or fail to cooperate, etc.), and the severity of their functional limitation (see attached questionnaire). The following section describes the demographic characterisitics of the survey participants (the non-participants in the Vocational Rehabilitation Program) and the demographic characteristics of the Vocational Rehabilitation clients.

The demographic characteristics (age, race, sex, eduction, marital status, and number of dependents) of the non-participants are presented in the following tables. It can be seen that these demographic characteristics are similar to the participants'. It has been shown (see body of text) that there is not statistically significant difference between the two groups. Linear discriminant analysis was used to differentiate sample cases. The discriminant function was not capable of differentiating the two groups with greater accuracy than a random assignment. This implies no significant difference between the two groups.

Most of the people in the groups studied were relatively young, (55% were below age 34) predominantly White with slightly more males than females. The groups were on average fairly well educated. Only about 20% had less than a 9th grade education. About 43% of the groups were never married and 33% were married. Almost half of the groups had no dependents.

Work Disability

Work disability refers to the inability to perform one's social role (i.e., the work role) which occurs as a result of a functional limitation. Clients were asked if their health keeps them from working altogether. This question is identical to the one asked on the Social Security Survey of Disabled Adults.[1] These results correspond with the results of the Social Security Survey of 1966. In the 1966 Social

---

[1]United States Department of Health, Education and Welfare, Social Security Administration, Office of Research and Statistics, "From the Social Security Survey of the Disabled, 1966, Work and Earnings of the Disabled, Report #17, November 1971

Table 1.0

Comparison of Demographic Characteristics
of the Vocational Rehabilitation
Population Sample and the Control Group

Age

Control Group

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Ages 14-24	107	27.9	28.3	28.3
Ages 25-34	101	26.3	26.7	55.0
Ages 35-44	68	17.7	18.0	73.0
Ages 45-54	63	16.4	16.7	89.7
Ages 55-64	39	10.2	10.3	100.0
No Data	6	1.6	Missing	100.0
Total	384	100.0	100.0	

Sample of
Vocational Rehabilitation Population

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Ages 14-24	1845	30.3	30.4	30.4
Ages 25-34	1543	25.3	25.4	55.9
Ages 35-44	895	14.7	14.8	70.6
Ages 45-54	936	15.4	15.4	86.1
Ages 55-64	650	10.7	10.7	96.8
Ages 65+	195	3.2	3.2	100.0
No Data Or Less Than 14	28	0.5	Missing	100.0
Total	6092	100.0	100.0	

Table 1.1

Comparison of Demographic Characteristics
of the Vocational Rehabilitation
Population Sample and the Control Group

Race

Control Group

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Negro	127	33.1	33.1	33.1
Caucasion	245	63.8	63.8	96.9
Other	12	3.1	3.1	100.0
Total	384	100.0	100.0	

Sample of
Vocational Rehabilitation Population

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
White	3838	63.0	63.9	63.9
Negro	1839	30.2	30.6	94.6
Indian	2	0.0	0.0	94.6
Other	324	5.3	5.4	100.0
No Data	89	1.5	Missing	100.0
Total	6092	100.0	100.0	

Table 1.2

Comparison of Demographic Characteristics
of the Vocational Rehabilitation
Population Sample and the Control Group

Sex

Control Group

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Male	221	57.6	57.6	57.6
Female	163	42.4	42.4	100.0
Total	384	100.0	100.0	

Sample of
Vocational Rehabilitation Population

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Male	3406	55.9	55.9	55.9
Female	2686	44.1	44.1	100.0
Total	6092	100.0	100.0	

Table 1.3

Comparison of Demographic Characteristics
of the Vocational Rehabilitation
Population Sample and the Control Group

Education

Control Group

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
0-7th Grade	50	13.0	13.0	13.0
8th Grade	34	8.9	8.9	21.9
9-11th Grade	123	32.0	32.0	53.9
12th Grade	113	29.4	29.4	83.3
13+ Grade	49	12.8	12.8	96.1
Special Ed	15	3.9	3.9	100.0
Total	384	100.0	100.0	

Sample of
Vocational Rehabilitation Population

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
0-7th Grade	487	8.0	8.4	8.4
8th Grade	524	8.6	9.1	17.5
9-11th Grade	1602	26.3	27.9	45.4
12th Grade	2205	36.2	38.4	83.8
13+ Grade	926	15.2		100.0
No Data or Special Ed	348	5.7	Missing	100.0
Total	6092	100.0	100.0	

Table 1.4

Comparison of Demographic Characteristics
of the Vocational Rehabilitation
Population Sample and the Control Group

Marital Status

Control Group

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Married	126	32.8	32.8	32.8
Widowed	11	2.9	2.9	35.7
Divorced	33	8.6	8.6	44.3
Separated	51	13.3	13.3	57.6
Never Married	162	42.2	42.2	99.7
Other	1	0.3	0.3	100.0
Total	384	100.0	100.0	

Sample of
Vocational Rehabilitation Population

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Married	2041	33.5	33.8	33.8
Widowed	285	4.7	4.7	38.5
Divorced	454	7.5	7.5	46.1
Separated	597	9.8	9.9	55.9
Never Married	2659	43.6	44.1	100.0
No Data	56	0.9	Missing	100.0
Total	6092	100.0	100.0	

Table 1.5

Comparison of Demographic Characteristics
of the Vocational Rehabilitation
Population Sample and the Control Group

Number of Dependents

Control Group

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
None	182	47.4	47.4	47.4
1-3	155	40.4	40.4	87.8
4 or More	47	12.2	12.2	100.0
Total	384	100.0	100.0	

Sample of
Vocational Rehabilitation Population

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
None	3244	53.3	53.3	53.3
1-3	2308	37.9	37.9	91.1
4 or More	540	8.9	8.9	100.0
Total	6092	100.0	100.0	

Security Survey of Disabled Adults, 34.1%[2] were categorized as severely disabled.[3] A comparable 33% of the cases in this study answered that their health kept them from working altogether. In the Social Security Survey of 1966, 37% had secondary work limitations compared with 41% in this sample.

Disruption of Work Activity

The question of whether the person was working prior to onset of disability, and if so, at what type of work was asked. This question adds a dimension to understanding whether the disability disrupted the vocational functioning of an individual. To get a more accurate picture of the disruption of work activity, the change in clients' labor force participation (hours per week and weeks worked per year) is sought. We also ask if the client stopped working due to disability or changed his type of work due to disability. These sets of questions shed some light on the disruption of work activity caused by the onset of disability.

Results indicate that 40% of clients were working at onset of disability. Some clients' disabilities began in childhood or from birth. Of those who were working, 90% stopped working because of disability, but some (29%) were able to resume work. Approximately 15%

---

[2]IBID. Table 4, p.27

[3]The severely disabled were unable to work at all or unable to work regularly. Those with secondary work limitations were able to work full time, regularly, at the same work, but with limitations in the kind or amount of work they could perform.

of those who never stopped working or who resumed work changed their type of work due to disability. The average reduction in hours worked per week and weeks worked per year of those who continued to work was slight.

Transportation

Questions regarding the availability of private and public transportation facilities were asked. About 88% of the respondents answered that they had access to public or private transportation. However, almost 29% of the respondents who had access to public transportation answered that they were unable to use it because of poor health or disability. About 25% responded that even if they had access to a car, they would be unable to drive due to poor health or disability.

Some inference as to the severity of disability can be gained from a client's perception of functional limitation as far a transportation is concerned. Those respondents who cannot use public and/or private transportation due to disability can be considered to have a severe work disability since their handicap limits their pursuance of labor force participation and limits their functioning as a homemaker.

Functional limiation

We further inquire which activities in particular are difficult or impossible for the sample respondent to perform. (See following page.) The distribution of functional limitations associated with respondents who are working at present and the distribution associated with respondents who are not working at present are quite different. As would be expected, the respondents who are not working at present have more difficulty performing everyday activities compared with those

Chart 1

Do you ever have difficulty performing any of the activities on this card?

	Difficult	Cannot do at all
1) Walking		
2) Using Stairs or Inclines		
3) Standing for Long Periods		
4) Sitting for Long Periods		
5) Stooping, Crouching, or Kneeling		
6) Lifting or Carrying Weights up to 10 Pounds		
7) Lifting or Carrying Heavy Weights		
8) Reaching	Right Hand_____ Left Hand_____	
9) Handling and Fingering	Right Hand_____ Left Hand_____	
10) Seeing (Even with Glasses)		
11) Hearing		
12) Keeping up with Work Schedule		
13) Working Under Pressure		
14) Writing		
15) Other		

who are working. (See tables 3 and 4.)

Client's Familiarity with Vocational Rehabilitation

We know that all the sample respondents had at least been referred to Vocational Rehabilitation. We expect, however, that some were not aware of the Vocational Rehabilitation Program, and that some cannot identify which agencies served them. We would like to know with which other agencies they remember being in contact and what services they received elsewhere.

The first question in this section asks, "Did you ever hear of the State Vocational Rehabilitation Program?" About 75% of the sample respondents answered yes, they had heard of the program. About 10% of the respondents who said they never heard of Vocational Rehabilitation recalled their Vocational Rehabilitation experience after it was explained to them. That is, they were familiar with the program but did not recognize the name.

In order to better serve the eligible disabled population, it is imperative that the Vocational Rehabilitation Program be publicized and known among the non-disabled as well as the disabled population.

Receipt of Other Services

Unfortunately, little data were available regarding services received elsewhere (that is, beside the State Vocational Rehabilitation Program), what type of services, and at whose expense. It is known that many of the clients were referred from other social service agencies. However, the respondents often neglected to mention what other agencies were giving them service. Either the respondents have forgotten their experience in other agencies, or they do not consider

Table 3

Everyday Activities Which Are
Difficult or Impossible For Respondents
Who Were Working At The Time of Interview

Activity	Difficult		Impossible	
	# of Obser.	% of People Answering	# of Obser.	% of People Answering
Walking	22	0.231	0	0.000
Using Stairs or Inclines	20	0.210	0	0.000
Standing For Long Periods	34	0.357	0	0.000
Sitting For Long Periods	17	0.178	0	0.000
Stoop Crouch or Kneeling	23	0.242	0	0.000
Lifting/Carrying 1-10 Lbs.	11	0.115	2	0.021
Lifting/Carrying Heavy Wts.	29	0.305	2	0.021
Reaching Left A/O Right Arm	9	0.094	2	0.021
Handling Left A/O Right Hand	5	0.052	2	0.021
Seeing W/O Glasses	6	0.063	0	0.000
Hearing	6	0.063	0	0.000
Working With Pressure A/O Schedules	27	0.284	3	0.031
Writing	5	0.052	0	0.000
Other	8	0.084	1	0.010
Totals	222		12	

Grand Total of People Who Answered The Question = 95

Table 4

Everyday Activities Which Are
Difficult or Impossible For Respondents
Who Were 'Not' Working At The Time of Interview

Activity	Difficult		Impossible	
	# of Obser.	% of People Answering	# of Obser.	% of People Answering
Walking	105	0.369	8	0.028
Using Stairs or Inclines	110	0.387	15	0.052
Standing For Long Periods	111	0.390	22	0.077
Sitting For Long Periods	74	0.260	12	0.042
Stoop Crouch or Kneeling	98	0.345	23	0.080
Lifting/Carrying 1-10 Lbs.	86	0.302	20	0.070
Lifting/Carrying Heavy Wts.	99	0.348	65	0.228
Reaching Left A/O Right Arm	68	0.239	14	0.049
Handling Left A/O Right Hand	70	0.246	12	0.042
Seeing W/WO Glasses	50	0.176	2	0.007
Hearing	29	0.102	1	0.003
Working With Pressure A/O Schedules	149	0.524	95	0.334
Writing	46	0.161	12	0.042
Other	26	0.091	3	0.010
Totals	1121		304	

Grand Total of People Who Answered The Question = 284

their contact elsewhere as services received, or they are not receiving services elsewhere, or a combination of the above.

Of the total respondents, 72% said they had received other services elsewhere. Other services include medical, hospital and employer services as well as services from public and private agencies. (See table below.)

TABLE 5

Sources of Services Received by Clients

Place	Number of Observations	% of Total Places	% of Total Places Applicable
Voc. Rehab.	78	0.24	0.21
Public Welfare	24	0.07	0.07
Veteran Admin.	8	0.02	0.02
School	11	0.03	0.03
Own Doctor	63	0.19	0.17
Hospital	62	0.19	0.17
Other Private Person	13	0.04	0.04
Empl. for Job	15	0.05	0.04
Private Agency	8	0.02	0.02
Other Pub. Agency	39	0.12	0.11
Don't Know	7	0.02	0.02
Total	328	.99	.90

For 384 records read, 368 had clients that received other services.

The referral sources reported by clients who recalled receiving Vocational Rehabilitation services are presented below. Non-accepted clients remembered referrals by individuals and referrals by public organizations and agencies more than any other type of referral.

Reason for Closure

About 55% (for FY '75) of the clients who were referred or who applied to the Vocational Rehabilitation Program did not receive pro-

Table 6

Referral Sources - Reported by Clients

Category	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Individual	34	8.9	18.9	18.9
Don't Know	15	3.9	8.3	27.2
Educational Inst.	16	4.2	8.9	36.1
Hospital	20	5.2	11.1	47.2
Health Org. And Agency	27	7.0	15.0	62.2
SS	7	1.8	3.9	66.1
Workmens Comp.	1	0.3	0.6	66.7
State Employment	3	0.8	1.7	68.3
Correctional Inst.	2	0.5	1.1	69.4
Welfare Agency	7	1.8	3.9	73.3
Other	4	1.0	2.2	75.6
Employer	1	0.3	0.6	76.1
Public Org. or Agency	32	8.3	17.8	93.9
Self-Referred	2	0.5	1.1	95.0
Physician	4	1.0	2.2	97.2
Priv. Org. or Agency	5	1.3	2.8	100.0
No Data	204	53.1	Missing	100.0
Total	384	100.0	100.0	

Valid Cases 180 Missing Cases 204

gram services for a variety of reasons which are listed below.

1. Can't locate, moved
2. Handicap too severe
3. Refused servicies
4. Death
5. Institutionalized
6. Transfer to other agency
7. Failure to cooperate
8. No disability
9. No vocational handicap
Y. Other

A frequency distribution is presented below which reveals the number of cases in the sample of each category and the percentage of total cases covered by each category in New Jersey in fiscal year 1975.

TABLE 7

Closure Reasons
As Reported by the Vocational Rehabilitation Agency

Category	Absolute Frequency	Relative Frequency
Unable to locate	34%	8.9%
Handicap too severe	50	13.0
Refused services	91	23.7
Death	2	0.5
Client Institutionalized	6	1.6
Transferred to other agency	8	2.1
Failure to cooperate	112	29.2
No disability	15	3.9
No vocational handicap	11	2.9
Do not know	5	1.3
Other	44	11.5
No data	6	1.6
Total	384	100.0

The most common reasons for closure in the sample surveyed are failure to cooperate (29.2%) and refused services (23.7%). These two reasons for case closure describe a similar situation. That is, clients who for whatever reason do not want to participate in the Vocational Rehabilitation Program also fail to answer contact letters from the Vocational Rehabilitation office or fail to keep scheduled appointments. Therefore, those who refuse services also often fail to cooperate as well.

We are interested to discover why over half (29.2% + 23.7% = 52.9%) of the non-participating Vocational Rehabilitation referrals refused servcies or failed to cooperate with the agency. First we asked the clients if they wanted or needed additional services. Those who answered "no" are considered refusals. The number of clients who refused servcies or failed to cooperate according to agency records corresponds to the number in the sample who refused services or failed to cooperate. About 58.6% of the surveyed clients answered that they wanted or needed no more service--which corresponds to the 53% reported by the Vocational Rehabilitation agency.

Of the group of clients who refused services or failed to cooperate, we asked why they refused services or failed to cooperate. Clients could give more than one reason for refusal and 29% of the clients felt they were too sick or disabled to receive services. About 26% of the clients felt servcies would not be useful and 26% had other reasons for refusal. Vocational Rehabilitation counselors felt that only 13.2% of the sample clients had handicaps too severe to participate in the program, but about 30% of the clients who said they had refused services felt that their handicaps were too severe to participate in the program (92 records had reasons why clients refused services and 28 records showed "too sick or disabled to receive services" as a reason for refusal of services). See table 8.

When asked why <u>they think</u> they did not receive further services from the Vocational Rehabilitation agency, only 31% of the clients answered that they either refused services or failed to cooperate. About 16.6% answered that they were not accepted for services because their handicap was too severe. Another 18.3% answered that they did

Table 8

Reasons For Non-acceptance
of Vocational Rehabilitation Services As
Reported By Vocational Rehabilitation Clients

Reason	Services Refused For Reason	% of Total Reasons	% of Total Cases Applicable
Inconvenient to receive	12	0.05	0.05
No transportation	13	0.05	0.06
Home responsibilities	9	0.04	0.04
Too sick	65	0.28	0.29
Felt not useful	58	0.23	0.26
Had to work	15	0.06	0.07
No disability	17	0.07	0.08
Other	59	0.24	0.26

248 reasons 223 cases had reasons

Table 9

-Closure Reason-
As Reported by Vocational Rehabilitation Clients

Reason	Absolute Frequency	Relative Frequency (Percent)	Adjusted Frequency (Percent)	Cumulative Adj.Freq. (Percent)
Unable to locate	10	2.6	2.9	2.9
Handicap too severe	56	15.1	16.6	19.5
Refused services	79	20.6	22.6	42.1
Death	2	0.5	0.6	42.7
Institutionalized	6	1.6	1.7	44.4
Transferred	7	1.8	2.0	46.4
Failure to cooperate	29	7.6	8.3	54.7
No disability	12	3.1	3.4	58.2
No vocational handicap	11	2.9	3.2	61.3
Did not contact me	24	6.3	6.9	68.2
Do not know	64	16.7	18.3	86.5
Other	47	12.2	13.5	100.0
No data	35	9.1	Missing	100.0
Total	384	100.0	100.0	

not know why there were not accepted for services and 13.5% thought there were other reasons why they were not accepted for services (other than the multiple choice of reasons offered in the questionnaire. See frequency distribution in table 9.

The counselors and the respondents therefore had differing perceptions of the respondent's vocational potential. This could be explained in a few ways. Counselors may close a case "handicap too severe" because of the client's low potential for finding employment. That is, if a client has a severe handicap but has little or no vocational potential, the client's case may be closed "handicap too severe" whether the client was willing to participate in the program or not. Also, survey respondents may attribute their non-working status to their functional limitation and not to their demographic characteristics which also hamper their likelihood of obtaining employment.

According to the data available on the frequency distribution of reasons for non-acceptance as reported by the Vocational Rehabilitation counselors, it would be reasonable to infer that clients, in many cases, refused services or failed to cooperate because they felt that their health kept them from working. This corresponds with the reasons given by clients for refusing services where 29% of the clients who said that they refused services, answered that they were too sick or disabled to receive them. This figure (29%) is greater than the 13% that the Vocational Rehabilitation counselors felt had handicaps too severe to be accepted into the Vocational Rehabilitation Program.

It is also known that clients have misconceptions regarding the services available from Vocational Rehabilitation. Many clients apply for services in order to receive a specific service and would accept

no other rehabilitation plan. For example, common requests from clients are college sponsorship, psychiatric treatment, and dental work. Often, clients are interested in these services and no others. Although the New Jersey Vocational Rehabilitation Program offers or has in the past offered these services, clients may be ineligible to receive the particular service or may be denied the particular service for other reasons. In these cases, clients who do not follow through in the program are to be found among our larger group of non-accepted clients.

Present Employment and Financial Status

Of the sample clients, 26% were working at the time of their follow-up interview. A larger proportion (55%) of the clients who were working at referral were also working at their follow-up interview. Many went back to work at their previous occupation if not their previous job.

Of our sample of non-accepted clients, 18% were working at referral; 26% of our sample were working at the time of their follow-up interview. There were only 27 cases where the respondent was working both at referral and at the time of the follow-up interview. (This constitutes 7% of the sample respondents.) The average weekly wages of the two groups can be compared, if it is kept in mind that the comparison is not an average change in earnings for people who were working both at referral and at their follow-up interview. The average change in earnings for the group who was both working at referral and at the time of the follow-up interview does not apply to a large enough percentage (only 7%) of the survey population to be meaningful. Therefore, the average earnings for the group at

referral is compared with the average earnings of the group at the time of their follow-up interview. (This constitutes 100% of the sample respondents.)

Financial Status

The financial status of the non-accepted group is non-homogeneous. The earnings component of income reveals a high concentration of cases with very low earnings or very high earnings. Of 76% of the client families who had earned income at the time of their follow-up interview, 46% were earning less than $100 per month and 36% were earning more than $500 per month. (See table 10.)

When total income is considered (earnings plus transfer payments), the distribution evens out with a few cases reporting very low incomes and more cases reporting higher incomes. (See table 11.)

Table 10

Reported Family Earnings
of Non-accepted Clients to the
New Jersey Vocational Rehabilitation Program

FY'75

Earnings/Month	Absolute Number	Relative Frequency
$0-99	133	45.5%
100-199	9	3.1%
200-299	10	3.4%
300-399	19	6.5%
400-499	17	5.8%
500+	104	35.6%
Total	292	100.0%

Table 11

Reported Family Incomes
of Non-accepted Clients to the
New Jersey Vocational Rehabilitation Program

FY'75

Income/Month	Absolute Number	Relative Frequency
$0-99	7	3.6%
100-199	21	10.8%
200-299	24	12.4%
300-399	34	17.5%
400-499	28	14.4%
500+	80	41.2%
Total	194	100.0%

Appendix III. Disability and Labor Force Participation

An individual's demographic characteristics in conjunction with the individual's functional limitation determine disability (the ability to perform one's social role). The demographic characteristics serve as a proxy for a measure of adaptability possessed by the individual. Where labor force participation is the social role, the more educated individual would be expected to adapt better to a functional limitation, the younger person, the person with work experience, and the person who is financially dependent on the market place (i.e., those who have no other income aside from the earnings gained in the market place) would be more likely to participate in the labor market than others.

To test this hypothesis, let the probability of participation in the labor market equal a function of the following independent variables: age, race, sex, education, marital status, number of dependents, number of difficult activities, income from sources other than earnings, and previous work experience.

$$LFP = a + b_i x_i$$

where: LFP = labor force participant

a = constant

x_i = vector of independent variables (See table 1.)

b_i = regression coefficients

Each of the above variables affect labor force participation as follows:

According to labor theory,[1] participation in the labor force follows an inverted U shape with relation to age. That is, at younger ages participation is lower, participation increases in middle years and then declines due to ill health, disability, age discrimination, and finally retirement or death. Race is also associated with labor force participation. Empirically, blacks experience higher unemployment rates than white workers regardless of age, sex or education. Sex of the worker affects participation in the labor market. A large percentage of males (over 90%) participate in the labor market whereas the percentage of labor force participants who are female is much lower. As far as education is concerned, education and labor force participation vary directly. The more educated usually obtain either higher wages or better working conditions than their less educated counterparts. Empirically, the substitution effect outweighs the income effect for males, so that labor force participation increases as education increases. It is known that married men have higher participation rates than unmarried men and that married women have lower participation rates than unmarried women. Also, labor force participation varies directly with number of dependents for men and varies indirectly for women. The severity of functional limitation serves as a limitation to labor force participation. Income from other sources (such as unemployment insurance, welfare payments, disability insurance payments, etc) serves as disincentive to labor force participation especially when earned income

---

[1]See Bowen, W. G. and Finegan, T. A., The Economics of Labor Force Participation (Princeton, N.J.: Princeton University Press, 1969)

of a specified amount disqualifies the respondent from receipt of the "other sources of income". There is a problem of reverse causality with the variable "income from other sources". Results are also shown without "income from other sources" to avoid the problem of reverse causality. Previous work experience affects labor force participation positively. That is, we would expect that those with previous work experience would be more likely to participate in the labor force.

The variables which significantly affect the outcome of labor force participation in the study group and the extent of their effect are shown in tables 1 and 2. The data confirm the hypotheses presented above.

Labor force participation depends upon the decisions regarding the allocation of time of family members among market work, household work, and leisure. These decisions are made within the family unit where a division of labor according to socially acceptable roles is accomplished. When a family member becomes disabled (cannot perform the socially acceptable role) adjustments must be made. The allocation of time within the family can be adjusted, the utility of the family can decrease, non-family assistance can be obtained, or a combination of the above.

To ascertain the effects of disability on the allocation of time within the family unit, the study group was asked if anyone else in the family started working because of the client's disability. That is, the other family member was not working prior to disability but started to work after onset of disability. In few cases was the answer positive (less than 1%).

Table 1

Probability of Labor Force Participation

Set I of Independent Variables	Regression Coefficient	F
JDPC (# of dependents)	2.402	2.801
Females (client is female)	-30.821	0.005
Marry 1 (married w/spouse)	-1.108	0.029
Marry 2 (widowed, divorced, separated)	-0.027	1.979
Race 0 (Black)	-3.878	0.080
Race 1 (other)	-8.941	3.497
Age 1 (25-44)	44.888	.000
*Age 2 (45-64)	-0.132	3.507
Tran 1 (Transfer payment $1-199)	4.039	0.118
Tran 2 ($200-399)	-1.518	0.013
Tran 3 ($400 +)	0.157	1.409
Activ 2 (1-2 difficult activities)	4.571	0.461
Activ 4 (3-4 difficult activities)	-7.978	1.148
Activ 6 (5-6 difficult activities)	-8.489	1.075
*Activ 7 (7 + difficult activities)	-0.194	9.834
*WEXPYES (Work experience)	0.263	15.151
ED (education)	1.299	2.885
Constant	-0.321	-----

R^2 = .21409

SE = .39210

F = 5.44

Table 2

Probability of Labor Force Participation

Set II of Independent Variables	Regression Coefficient	F
JDPC	2.466	2.925
Females	-1.392	0.099
Marry 1	1.180	0.033
Marry 2	-0.101	2.457
Race 0	-0.110	0.783
*Race 1	-8.587	3.184
Age 1	-2.436	0.179
*Age 2	-0.150	4.465
Activ 2	3.187	0.220
Activ 4	-0.107	2.039
Activ 6	-0.106	1.676
*Activ 7	-0.234	14.342
*WEXPYES	0.262	14.680
*ED	1.639	4.607
Constant	2.979	------

R^2 = .187
SE = .397
F = 5.639

The substitution of a spouse into the labor force is not found to be empirically common. In few cases does the spouse (who was not working previously) enter the labor force.[2] This result was confirmed in the sample of non-accepted clients to the New Jersey Vocational Rehabilitation Program.

---

[2]See Johnson, William G. and Murphy, Edward H. Jr., "The Response of Low-Income Households to Income Losses from Disability", Industrial & Labor Relations Review, Vol. 29, No. 1, October 1975, pp. 85-96.

BIBLIOGRAPHY

Altman, Edward. "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy." The Journal of Finance, (September 1968).

Arneson, Kathleen C. "Legislative Perspective." Rehabilitation Record, (May/June 1970) pp. 27-31.

Begin, Nancy. Vocational Rehabilitation, A Follow-up Evaluation. New Jersey: State of New Jersey Department of Labor and Industry, Division of Planning and Research, (September) 1974.

Bellante, Donald M. "A Multivariate Analysis of a Vocational Rehabilitation Program." The Journal of Human Resources, Volume 7, No. 2 (Spring 1972).

Berkowitz, Monroe and Anderson, Merilee. An Evaluation of an Experimental Rehabilitation Project. Bureau of Economic Research, Rutgers, The State University of New Jersey, (June) 1974.

Berkowitz, Monroe and Englander, Valerie and Rubin, Jeffrey and Worrall, John D. An Evaluation of Policy-Related Rehabilitation Research. New York: Praeger, 1975.

Berkowitz, Monroe and Johnson, William G. "Health and Labor Force Participation." The Journal of Human Resources, Volume 9, No.1 (Winter 1974), pp. 117-128.

_____. "Towards an Economics of Disability: The Magnitude and Structure of Transfer and Medical Costs." The Journal of Human Resources, Volume 5, No. 3 (1970).

Berkowitz, Monroe and Johnson, William G. and Murphy, Edward H. Public Policy Toward Disability. New York: Praeger, 1976.

Conley, Ronald W. "A Benefit Cost Analysis of the Vocational Rehabilitation Program." The Journal of Human Resources, Volume 4, (Spring 1969), pp. 226-252.

_____. The Economics of Vocational Rehabilitation. Baltimore, Md.: The Johns Hopkins Press, 1965.

Derthick, Martha. Uncontrollable Spending for Social Services Grants. Wash., D.C.: Brookings Institution, 1975.

Flaim, Paul O. "Discouraged Workers and Changes in Unemployment." Monthly Labor Review (March 1973), pp. 8-16.

Fuller, Wayne A. "Regression Analysis for Sample Surveys." A report prepared for the United States Bureau of the Census on work conducted under the Joint Statistical Agreement, mimeographed paper (July 1974).

Grossman, Michael. "The Correlation Between Health and Schooling." Household Production and Consumption, edited by Nestor E. Terleckyj. New York: Columbia University Press for NBER, 1975.

_____. "A Survey of Recent Research in Health Economics." The American Economist (forthcoming).

Grossman, Michael and Benham, Lee. "Health, Hours, and Wages." The Economics of Health and Medical Care, edited by Mark Perlman. London: Macmillan, 1974.

Hoel, Paul G. Introduction to Mathematical Statistics. New York: John Wiley and Sons, Inc., 1971.

Johnson, William G. and Murphy, Edward H., Jr. "The Response of Low-Income Households to Income Losses From Disability." Industrial and Labor Relations Review, Volume 29, No. 1 (October 1975).

Koos, Earl Lomon. The Health of Regionville; What the People Thought and Did About It. New York: Columbia University Press, 1954 (Introduction, Table 6, Chapter 10).

Lando, Mordechai E. "The Interaction Between Health and Education." Social Security Bulletin. Department of Health, Education and Welfare, Social Security Administration, Volume 38, No. 12 (December 1975).

Luft, Harold S. "The Impact of Poor Health on Earnings." The Review of Economics and Statistics, , pp. 43-57.

_____. "Poverty and Health: An Empirical Investigation of the Economic Interactions." Ph.D. Dissertation, Harvard University, 1972.

Manheim, Larry M. "Health and Education." Mathematica. Presented at the CUNY seminar in applied economic analysis, Februrary 18, 1976.

McCleary, Elliot H. "Restoring Disabled Patients Can Pay Big Dividends." Prism (November 1975).

Mushkin, Selma J. "Health as an Investment." Journal of Political Economy, Volume 70 (October 1962), Supplement pp. 129-157.

New Jersey Department of Education. "Special Education Children Census, 1973-74." New Jersey State publication, 1974.

Nil, Norman H., et. al. Statistical Package for the Social Sciences. New York: McGraw-Hill, Inc., 1970, 1975.

O'Connor, James. "Seasonal Unemployment and Unemployment Insurance." The American Economic Review, Volume 52, No. 3 (June 1962), pp. 460-469.

Pechman, Joseph A. and Timpane, P. Michael. Work Incentives and Income Guarantees. The New Jersey Negative Income Tax Experiment. Wash., D.C.: Brookings Institution, 1975.

Rosenblum, Marc. "Discouraged Workers and Unemployment." Monthly Labor Review (September 1974),

_____. "The Last Push: From Discouraged Worker to Involuntary Retirement." Industrial Gerontology (Winter 1975).

Samuelson, Paul A. "The Pure Theory of Public Expenditure." The Review of Economics and Statistics, Volume 36, No. 4 (November 1954), pp. 387-89.

Schreiber, Gatons, and Clemmer. Economics of Urban Problems. Boston: Houghton Mifflin Company, 1971, Chapter II, pp. 15-39.

Spratt, John S., Jr. "The Relation of 'Human Capital' Preservation to Health Costs." American Journal of Economics and Sociology, Volume 34 (July 1975).

Swisher, Idella. "Family Income of the Disabled, Report #13." The Social Security Survey of the Disabled: 1966. United States Department of Health, Education and Welfare, Social Security Administration Office of Research and Statistics (October 1970).

_____. "Work Earnings of the Disabled, Report #17." The Social Security Survey of the Disabled: 1966. United States Department of Health, Education and Welfare, Social Security Administration Office of Research and Statistics (November 1971).

Waitzkin, Howard and Waterman, Barbara. The Exploitation of Illness in Capitalist Society. Ind. & NY: Bobbs-Merrill Co., 1974.

Warren, Ronald S. Jr., and Gilroy, Curtis L. "Labor Force Participation: A Neoclassical Approach." Office of Current Employment Analysis. Wash., D.C.: Bureau of Labor Statistics, U.S. Department of Labor, preliminary draft, (April) 1975.

Weisbrod, Burton A. "Collective Consumption Services of Individual-Consumption Goods." Quarterly Journal of Economics, Volume 78, No. 3 (August 1964), pp. 470-477.

_____. "Costs and Benefits of Medical Research: A Case Study of Poliomyelitis." Journal of Political Economy, Volume 79, No. 3 (1971), pp. 527-545.

Worrall, John D. "Benefit-Cost Models of the Federal-State Vocational Rehabilitation Program." Evaluation of the Structure and Functions of Disability Programs. New Brunswick, N.J.: Rutgers University, 1975.

Zivan, Norton. "State Rehabilitation Services for the Adult Offender: A Survey." Journal of Rehabilitation, Volume 41, No. 5, National Rehabilitation Association, pp. 27-30.