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by

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Abstract

This report describes a new assessment and referral system that was designed to assist local welfare-to-work program staff in targeting employment services more effectively in order to help welfare recipients find jobs. The motivation for the development of this system was the potential effects of targeting services to meet the specific needs of customers. The system is based on statistical methods and uses administrative data typically collected by welfare-to-work agencies. The Kalamazoo-St. Joseph Workforce Development Board piloted the new system by integrating it within the existing Work First program that it administers for the local workforce development area. The pilot was conducted from January 1998 through March 2000, during which time more than 6,000 welfare recipients participated in the program and used the assessment and referral tools.

At the time of enrollment in the Work First program, staff used the statistical tool to make an initial assessment, referred to as an employability score, of each participant's ability to find and retain a job. The staff then used the individual employability scores to refer customers to service providers that offered the set of services and pursued an approach to delivering services that best met their needs.

An evaluation of the pilot, based on a random assignment design, found that referring participants to service providers according to their employability assessment increased the overall effectiveness of the program. Using a job retention rate of 90 consecutive days as the employment outcome, the optimal referral pattern based on the statistical assessment tool yielded retention rates that were 25 percent higher than if participants were randomly assigned to providers. The analysis also found that the difference in retention rates between the best and worst referral combinations was 56 percent. Using earnings as a measure of the additional benefits to participants of the new system, the benefit-to-cost ratio ranged between 3.25 and 5.8, depending upon assumptions regarding the length of time the earnings differential between the treatment and control groups persisted. The system was designed to be integrated into most existing welfare-to-work programs and once operational to require minimal (if any) additional staff. The W. E. Upjohn Institute developed the system, with funding from the Employment and Training Administration of the U.S. Department of Labor.

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Executive Summary

Purpose of the Work First Profiling Pilot Project

This report describes the development, implementation, and evaluation of a new assessment and referral system designed to assist staff of local welfare-to-work programs in targeting employment services more effectively to welfare recipients. The motivation for the development of this system is the potential benefit to program participants of addressing their specific needs rather than providing all customers with the same set of services, which has been the approach of most welfare-to-work programs. The assessment and referral system includes administrative tools that provide staff with a quick and efficient means to assess the needs of participants as they enroll in welfare-to-work programs and then to use the assessment to refer participants to service providers that are best suited to meet their needs. The assessment tool is based on a statistical method that uses administrative data to estimate a participant's level of employability. The employability estimate is then used to refer participants to appropriate service providers. The assessment and referral system is designed to be integrated into an existing intake process, to require minimal (if any) additional operations staff, and to comply with the procedures and practices of the various welfare-to-work programs administered by the states.

The Kalamazoo-St. Joseph Workforce Development Board (WDB) piloted the system by incorporating it into the welfare-to-work program, referred to as Work First, that it administers for a two-county area in southwestern Michigan. The W.E. Upjohn Institute for Employment Research developed the system, and the Employment and Training Administration of the U.S. Department of Labor sponsored the project. The pilot took place from January 1998 through March 2000, during which time more than 6,000 welfare recipients participated in the program.

The purpose of the pilot was to develop a statistical assessment and referral system and to determine the efficacy of integrating it into the operations of an existing welfare-to-work program. The Work First program administered by the Kalamazoo-St. Joseph WDB had been in operation for several

years before the pilot was initiated. The major difference in the operation of the Work First program during the pilot from its operation before was the use of the statistical assessment tool and the targeted referral. Before the pilot, all participants were treated the same. They attended the same orientation and were randomly assigned to one of three service providers. Random assignment was used because staff had insufficient information at the time of enrollment to identify the barriers to employment that participant's faced or the type of services that would best meet their needs. During the pilot, participants continued to attend the same orientation as before but were referred to service providers according to an assessment of their employability based on statistical methods and a determination of the comparative advantage of each provider in serving participants with different employment capabilities. Although each provider offered the same basic set of services as required under Michigan's Work First program, they varied in their approach in providing these services, which were seen as more effective for some participants than for others.

The pilot explored the following issues: 1) can statistical tools provide a reliable initial assessment of a participant's ability to find and retain a job, 2) can this assessment be used to refer participants to appropriate service providers, 3) are some providers actually better at meeting the needs of some participants than others (as predicted prior to the start of the pilot), and 4) can such a system improve outcomes?

Need for an Efficient Assessment and Referral System

Most welfare-to-work programs provide the same initial set of services to all welfare recipients, regardless of their needs and past work history. The skills, aptitudes, and motivations of welfare recipients vary widely, however. Many clients possess job-ready skills and significant work experience and thus need little assistance in obtaining a job. The harder-to-serve customers are confronted with multiple barriers to employment and stand to benefit from more intensive services. Only after clients have tried to find a job, but have failed to do so, do most local offices provide them with more than a

minimal set of services. Yet, studies have shown that work-first type programs are more effective when services are targeted to meet individual needs.

In order to target employment services more effectively, local offices must first assess the needs of clients and determine which services are most appropriate in meeting their needs. Limited program dollars, however, often preclude hiring enough case workers to assess the employment barriers faced by welfare recipients. Thus, there is a need for a low-cost assessment and referral system that can be integrated into existing operating systems of welfare-to-work programs. This pilot is an attempt to fulfill that need.

The Concept of Statistical Assessment and Referral

Central to the statistical assessment and referral system is an administrative tool that relates an individual's attributes to his or her employment outcomes. For instance, research shows that individuals with a post-high school education and prior work experience are more likely to find and retain a job than people who have less-than-a-high-school education and little work experience. Other factors, such as tenure on a previous job, also contribute to the predicted probability of employment, which we refer to as the employability score. Several factors were included in the statistical model. The relative contributions, or weights, of these factors were estimated using the administrative records of participants who recently participated in the local Work First program. Using these weights, an employability score was calculated for each individual who enrolled in the program. A person with attributes similar to past Work First participants who were successful in finding a job was assigned a high employability score, while a person with attributes similar to past Work First participants who were not successful was given a low score.

Since the predicted probability of employment reflects the extent to which an individual faces barriers to employment, the score can be used to determine the level and type of employment services that may help the individual find employment. Those with high employability scores are expected to

need relatively little assistance in finding a job, while those with low scores are expected to require significantly more assistance.

Operation of the Pilot

The Kalamazoo-St. Joseph WDB pilot used the statistical assessment tool to provide an initial appraisal of the needs of welfare recipients as they enrolled in the Work First program. Employability scores were estimated for each enrollee by using administrative data collected by the Work First agency. Local agency staff entered the information onto a laptop computer, which contained a database program and the statistical assessment algorithm. While the enrollees attended an orientation session, staff used the algorithm to compute an employability score for each participant and then used the scores to refer them to one of three service providers.

Prior to conducting the pilot, WDB staff determined which of the three service providers already under contract with the WDB would most benefit participants who have certain employability scores. The determination was based on analysis of past administrative data and the opinions of WDB staff regarding each service organization. Employability scores were separated into three groups. Participants with employability scores in roughly the lowest third of the distribution were assigned to one provider, those in the middle group were assigned to another provider, and those at the high end of the distribution were referred to a third subcontractor.

Evaluation of the Pilot

The pilot was evaluated using a random assignment design. Participants within each of the three groups of employability scores were randomly assigned to a control group and a treatment group. Those within the control groups were randomly assigned to each of the three subcontractors. Those in the treatment group were assigned to the provider that *a priori* was determined to be most beneficial to participants in each of the three groups. The treatment or intervention in the pilot is different from typical demonstrations. Instead of testing the effectiveness of receiving a specific service versus not receiving

the service, this pilot demonstrated the relative effectiveness of referring participants with specific employability scores (and thus specific needs) to various service providers. In order to examine the effectiveness of these different combinations of referrals, participants in the control group were randomly assigned to each of the three subcontractors, which yielded six combinations of service providers and employability groups (more combinations are possible, but we were constrained by the requirement that enrollees would be assigned to each of the three subcontractors). No participant was denied services. Each participant was referred to a provider that offered roughly the same services, albeit delivered in slightly different ways. It was the difference in styles and the focus on certain services over others that constituted the treatment in this pilot. Therefore, unlike typical evaluations, the purpose of this evaluation is *not* to compare the outcome of the treatment group with that of the control group. Rather, the purpose is to determine whether the different combinations of referrals yield significantly different outcomes. If they do, then the next step is to see whether or not the combination that yielded the highest outcome, in this case the highest job retention rate, is the same combination that was expected to yield the highest outcome (i.e., to best meet the needs of customers in the three groups) before the pilot began. That is, we check to see whether the combination found to yield the greatest outcome in the control group is the same combination as was chosen *a priori* for the treatment group. If so, then the evaluation suggests that targeting makes a difference and that the optimal combination can be determined beforehand.

The evaluation found that referring participants to service providers according to their employability score increased the overall effectiveness of the program. Using a job retention rate of 90 consecutive days as the employment outcome, the results showed that:

- The statistical assessment tool was successful in distinguishing among participants with respect to their likelihood of employment and retention.

- The optimal referral pattern based on the statistical assessment tool yielded retention rates that were 25 percent higher than retention rates of participants who were randomly assigned to providers.

- The difference in retention rates between the best and worst referral combinations was 56 percent.

Average weekly earnings of those who retained their jobs for 90 consecutive days were used to account for the benefits of the pilot system. The net present value of the difference in earnings between the treatment group (generated from the optimal assignment rule) and the control group was used to estimate the net impact of the program. The net present value, assuming that the earnings differentials persisted for 8 quarters, ranged from $471,000 to $841,000. Combining these estimates with the total cost of designing, implementing and operating the program of $145,000 yielded a benefit-to-cost ratio that ranged from 3.25 to 5.8.

Extension to Other Sites and Programs

This pilot expands upon the techniques used in the Worker Profiling and Reemployment Services (WPRS) system in which the likelihood that UI claimants will exhaust benefits are identified through statistical means. Evaluations of WPRS based on two states show that it yields expected benefits. The evaluation of the Work First pilot provides evidence that a statistical assessment and referral system can be integrated into an existing system of delivering employment services and that it can improve the effectiveness of the program.

At the writing of this report, another site has adopted a system similar to the statistical assessment and referral system used in the Kalamazoo-St. Joseph WDB pilot. The Broward County (Florida) Workforce Development Board, in cooperation with the Florida Institute for Career and Employment Training affiliated with Florida Atlantic University, piloted a similar system. They modeled

their approach after the one used in the pilot reported here. They referred customers to different services, not necessarily different providers, based on an employability score. An evaluation of this project has not yet been performed.

Another application using statistical means to identify needs and refer clients to services is being developed for One-Stop Centers. The Upjohn Institute, with funding from the Employment and Training Administration of the U.S. Department of Labor, is also developing a statistical assessment and referral system for the many services provided within a one-stop environment. These administrative tools, referred to as the Frontline Decision Support System (FDSS), are being developed to help front-line staff quickly assess the needs of customers and then to refer them to services that better meet their needs. FDSS includes new tools to 1) help customers conduct a systematic search for jobs that offer the best employment match and to set a realistic wage goal, and 2) assist staff in determining which one-stop center services are likely to be effective in meeting the needs of specific customers in becoming employed. The FDSS tools are designed to be used within the current data retrieval and display systems implemented by states for their One-Stop Centers.

I. Introduction

A. Purpose of the Work First Profiling Pilot

The welfare reform movement of the 1990s, marked by the passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PWRORA) in 1996, has focused on placing welfare recipients into jobs as quickly as possible. Underlying this reform is the premise that experience on the job is as valuable, if not more so, as classroom training or other forms of formal job preparation and skill development. In addition, actual work experience provides self-esteem, self-discipline, and job know-how skills, and it starts welfare recipients on the path of future career advancement and economic self-sufficiency.[1]

To make this approach successful, local welfare-to-work agencies and their providers are faced with the challenge of providing the appropriate level and mix of employment services that will quickly move welfare recipients into jobs and will also equip them with sufficient skills to retain those jobs.[2] Most welfare-to-work programs offer a minimal level of instruction in job-readiness skills and in job search techniques. Furthermore, most programs provide the same initial set of services to all welfare-to-work participants regardless of their needs and past history, even though their skills, aptitudes, work experience, and motivations vary widely. Yet, studies have shown that welfare-to-work programs are

[1]There are few rigorous evaluations of the welfare-to-work programs implemented under PWRORA. Most evidence related to the effectiveness of programs with an emphasis on employment have been gleaned from programs that resulted from waivers granted to states. Other evidence comes from evaluations of the Job Opportunities and Basic Skills Training (JOBS) program. There are several papers that synthesize the results from the evaluations of these studies. One such study, entitled *National Evaluation of Welfare-to-Work Strategies,* was prepared for the U.S. Department of Health and Human Services by the Manpower Demonstration Research Corporation. This report concludes that the programs they studied did not improve upon the already high rate of job finding of welfare recipients who did not participate in the programs, but "nearly all programs helped single parents work during more quarters of the follow-up and earn more than they would have in the absence of a program" (ES-1).

[2]The study, *National Evaluation of Welfare-to-Work Strategies,* prepared by the Manpower Demonstration Research Corporation, reports that evidence from evaluations suggest that a "'mixed' approach–one that blends employment search and education or training–might be the most effective" (ES-3).

more effective when services are targeted to meet the specific needs of individual participants.[3] While welfare caseloads have decreased significantly since the implementation of welfare reform under PWRORA, welfare-to-work programs have come under increased pressure to find jobs for the harder to serve and to find ways to assist former welfare recipients with retaining their jobs. Both challenges prove to be increasingly difficult in a less robust economy.

Therefore, targeting employment services to meet the specific needs of participants offers a promising avenue for improving the effectiveness of welfare-to-work programs and thus for achieving the overall goal of welfare reform of placing welfare recipients into jobs as quickly as possible. Targeting services requires first an assessment of the needs of clients and second an evaluation of which services are most appropriate in meeting their specific needs. Traditional means of assessment and referral require extensive use of staff to perform these functions. Limited program dollars under PWRORA for that purpose, however, often precludes hiring enough case workers to assess the needs of welfare recipients at the time of enrollment. Statistical assessment and referral methods potentially use fewer resources, and their use in programs such as the Worker Profiling and Reemployment Services (WPRS) system demonstrates their ability to target resources to clients who need additional assistance.

The purpose of this pilot project is to explore more cost-effective ways of targeting services to participants of welfare-to-work programs. In 1997, the Employment and Training Administration of the U.S. Department of Labor contracted with the W.E. Upjohn Institute for Employment Research to develop and implement an assessment and referral system based on statistical methods. The Kalamazoo-St. Joseph Workforce Development Board, which is responsible for administering Michigan's welfare-to-work program (referred to as Work First) for a two-county area in southwest Michigan, piloted the project. The pilot operated from January 1998 through March 2000, during which

[3]For example, Gueron and Pauly (1991), from their evaluations of welfare-to-work demonstrations, suggested that increased service intensity improves employment rates of clients and that spreading resources too thinly reduces program effectiveness. In addition, evaluations of programs such as California GAINS (1996) and the JOBS (1997) have suggested the importance of assessment in placing welfare recipients into jobs.

time more than 6,000 welfare recipients participated in the program.[4] Central to this system is an administrative tool that uses statistical methods to quickly assess the needs of participants during initial enrollment and then to use the assessment to refer participants to service providers that are best suited to meet their needs. The assessment and referral system is designed to be integrated into existing intake processes, to use existing administrative data, to require minimal, if any, additional staff, and to comply with the procedures and practices of existing welfare-to-work programs.

The Kalamazoo-St. Joseph pilot addressed the following issues: 1) can statistical tools provide a reliable initial assessment of a participant's ability to find and retain a job, 2) can this assessment be used to refer participants to appropriate service providers, 3) are some providers actually better at meeting the needs of some participants than others (as predicted prior to the start of the pilot), and 4) can such a system improve outcomes without significantly increasing daily operating costs?

This report describes the development, implementation, and evaluation of the Kalamazoo-St. Joseph WDB profiling pilot project and is intended to reach several groups of readers.[5] First, it is intended to inform administrators at the local, state, and federal levels about the basic concept of this assessment and referral system and to demonstrate the benefits of adopting such a system. Second, the report provides a detailed description of the statistical underpinnings of the system, so that researchers can scrutinize the methodology and so that local and state agencies may have sufficient information if they are interested in adopting this system for their own use. Third, the report presents a rigorous evaluation of the system, based on a random assignment design, in order to demonstrate the merit of the system and in order that future users may understand how the benefits were derived.

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[4]The W.E. Upjohn Institute for Employment Research is an independent, not-for-profit organization that conducts research on a variety of employment issues. In addition, the Institute is the administrative entity for the Kalamazoo-St. Joseph Workforce Development Board. Having both research and operations within the same organization offered a unique opportunity to develop and conduct such a pilot.

[5]At the start of the project, we used the term "profiling" to refer to the statistical assessment tool. As the project progressed and the tool was further developed, we found that the term "statistical assessment and referral system" better described the process. We use this latter term throughout the report. The title of this report still includes the initial terminology in order to be consistent with the original project title.

B. Welfare Reform and Michigan's Work First Program

The welfare reform movement of the 1990s transformed the existing 60-year-old system based on cash assistance entitlements to the needy into one predicated on moving the needy into jobs. With the passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) in 1996, Congress formally replaced the Aid to Families with Dependent Children (AFDC) entitlement program with the Temporary Assistance for Needy Families (TANF) program. TANF ended needy families' entitlement to cash welfare payments and gave states broad flexibility in how they could use the federal funds allocated to them. Congress also barred states from using TANF funds to assist families for more than 60 months over their life times and required states to put in placed incentives and sanctions in order to ensure that a larger portion of welfare recipients were working or engaged in work-related activities.

Most of the reform initiatives contained in PRWORA originated with the states, not with the federal government. Between 1992 and 1996, more than 40 states requested and were granted waivers from federal requirements under AFDC. Many of these states used their waivers to impose tougher work requirements on adult welfare recipients, including mothers with very young children, and to set limits on the receipt of cash welfare recipients. Some states embarked on programs that were designed to improve the financial and material conditions of needy families through encouraging work and by making employment more financially attractive. These states extended their earned income disregards which allowed welfare recipients to keep some of the cash assistance (and other assistance such as medical care and food stamps) if they worked. Some states also created or expanded their earned income tax credit programs, following the federal government's lead in expanding the Earned Income Credit (Bloom and Michalopoulos, 2001).

Michigan was one of the first states to use waivers to reform their state welfare programs and is often regarded as one of the leaders in establishing a work-based welfare system. Beginning in 1992, they requested and received waivers in order to encourage work through a system of rewards and

stricter sanctions. By 1994, the state had established its Work First program. As the name suggests, Michigan's Work First program stresses the placement of welfare recipients into jobs as quickly as possible with a major emphasis on job search but with limited opportunities for education and training. The program offers instruction in the proper techniques for writing resumes, completing applications, and interviewing for jobs. It also provides assistance in searching for a job. All enrollees receive similar services regardless of their needs and must find qualified employment within four weeks of enrollment. More intensive skill training is available only to those who hold a job or to those who have repeatedly failed to find employment.[6]

At the time of the pilot, Michigan's Work First program was administered locally by the 23 Service Delivery Areas (SDAs), which were originally created by the Job Training Partnership Act to administer and deliver job training programs to dislocated adults and economically disadvantaged individuals. With the enactment of the Workforce Investment Act (WIA) in 1998, the SDAs were reorganized as Workforce Development Boards. The Kalamazoo/St. Joseph SDA changed its name to the Kalamazoo/St. Joseph Workforce Development Board but maintained responsibility for the same geographical area as it had before the transition. Throughout this report, the local Kalamazoo/St. Joseph office will be referred to as a Workforce Development Board, even though it was still designated as an SDA during the first several months of the pilot.

Michigan's local Workforce Development Boards (WDBs) work closely with the local offices of the state's social service agency, the Family Independence Agency (FIA), to administer the Work First program. FIA determines welfare eligibility, issues welfare payments, and refers welfare recipients to Work First programs, while the Work First agency provides welfare recipients with employment services, through intermediaries. At the time of the pilot, FIA referred all applicants for public assistance to Work First, with the following exceptions: 1) persons less than 16 or older than 65 years of age; 2)

[6]For a more detailed description of the nature and history of Michigan's welfare reform see Seefeldt, et. al. (2001).

the mother of a child under the age of three months; 3) one parent or other caregiver of a child with a disability; 4) a person who is the full-time caregiver for his or her spouse suffering from a disability; 5) a child 16-17 years of age who is a full-time student in elementary school or high school; 6) a minor parent attending full-time elementary school or high school; 7) an individual employed or self-employed 20 hours or more a week at the minimum federal wage; and 8) a person suffering from a long-term physical or mental disability.

FIA refers all qualified applicants to Work First within 10 days of their applying for cash assistance. Applicants are notified of the date and time they are to enroll in the program and attend orientation. Orientation includes an introduction to the Work First program, specification of the roles and responsibilities of the program and client, and a brief assessment of the client's situation and immediate needs, including the possible need for supportive services.[7] In-depth assessment and counseling are offered only to those in considerable need. In most cases, all those referred by FIA to Work First are required to participate in the same job search and job readiness workshops regardless of their past work histories or qualifications. Job search/job club workshops provide training in appropriate skills in seeking, locating, applying for, and obtaining employment. Job search training is typically conducted in group settings. Each person is expected to develop a résumé and to understand the proper techniques for completing applications and interviewing for jobs.

After clients complete the core services, they are required to search intensively for work and to accept offers that provide at least 20 hours of work per week at or above the minimum wage. More extensive assessment and skill training are available through the local WIA program, but only for those who have extreme difficulty finding a job. Participants are expected to obtain a job within 90 days or risk a reduction in benefits. For example, if a single parent does not participate 20 hours per week in a Work First activity or employment, then sanctions are imposed by reducing welfare benefits and food

[7]The initial assessment that was performed at orientation before the pilot began was minimal, and staff at the Kalamazoo-St. Joseph WDB did not consider this assessment adequate to be used as a basis of referring customers to service providers. Therefore, prior to the pilot customers were randomly assigned to providers.

stamps. Two-parent families are subject to similar requirements and sanctions.[8] As an incentive for finding work, participants are allowed to keep the first $200 earned each month and 20 percent over that amount without reducing benefits. Participants also receive transportation, child care, and Medicaid for a limited time. Allowable work activities include 1) unsubsidized employment; 2) subsidized private sector employment; 3) subsidized public sector employment; 4) on-the-job training; 5) job search and job readiness training and activities up to six weeks; 6) community service programs, and 7) no more than 12 months of vocational educational training. Customers employed for 90 consecutive days in a qualified job are considered to have achieved a successful outcome, at which time they are terminated from the program.[9]

In Michigan, intermediaries, not the local WDBs, provide employment services to Work First participants. During the time the pilot was conducted, the Kalamazoo/St. Joseph WDB subcontracted with three local service organizations to provide employment services to participants included in the pilot. The formal agreements required that the organizations provide a set of basic services. Nevertheless, the number of hours in which customers participated in these activities varied, and in some cases, service providers offered additional services beyond those prescribed by the contract or they provided assistance using different approaches. Therefore, the level and intensity of services varied across service providers, although they all were in compliance with their contracts and state requirements.

C. Targeting Services to Welfare-to-Work Participants

Michigan's Work First program as well as many other welfare-to-work programs provide basic instruction in job search techniques and minimal assistance in contacting employers. All Work First participants, regardless of their qualifications and work experience, are required to participate in these services. Research, however, has shown that the benefits from these basic services vary across the

[8]The two-parent family program was not included in this pilot.

[9]The requirements described here are those in effect during the time the pilot was in operation. Some requirements have changed since that time.

welfare population and that this variation depends to a large extent on an individual's characteristics, past work experience, and welfare dependence.[10] Therefore, targeting services to the specific needs of participants instead of pursuing a one-size-fits-all approach opens the possibility of improving the effectiveness of welfare-to-work programs and of helping states make more efficient use of their resources.

The idea of targeting services to would-be welfare recipients who can benefit most from the assistance predates the current welfare reform movement. Ellwood (1986) explored the possibility of using statistical means to identify individuals who are most likely to be long-term welfare recipients. He estimated recidivism rates and exit rates using the characteristics of individuals and their previous employment and welfare histories as predictors. Based upon his ability to identify those at risk of becoming long-term welfare recipients, he concluded that the effectiveness of welfare programs (in particular AFDC) could be enhanced by targeting services to welfare recipients with specific characteristics. Support for targeting is further found in the evaluations of previous programs and demonstrations that targeted the welfare population. Gueron and Pauly (1991) reviewed the evaluations of a host of programs, both broad-coverage and small and selective voluntary programs, in order to discern whether the effectiveness of the service components within these programs vary among participants. They concluded that the impacts do vary among participants and that they are larger for more disadvantaged recipients. For example, they cited an analysis of the Supported Work program that shows that services were more effective for women who had never worked and had been on welfare longer. The same pattern emerged from a reanalysis of Supported Work and the quasi-experimental studies of WIN and CETA on AFDC recipients in which welfare recipients with little or no recent work experience benefitted substantially more than did those with some recent work experience (Grossman, Maynard, and Roberts, 1985). Friedlander (1988), in an analysis of five selected welfare employment programs, identified additional characteristics that affected program effectiveness, including

[10]See Bloom and Michalopoulos (2001) for a synthesis of research on the effectiveness of welfare-to-work programs.

marital status, education, and the number and ages of children. While still important, they are less strongly related to future employment and welfare receipt than past employment and welfare experience.

Once it is established that the effectiveness of programs varies by participants, the next issue regarding targeting services is the method by which various subgroups are identified. Identification methods vary widely, from using the subjective evaluations of staff to a much more objective assessment based on statistical techniques. The effectiveness of these approaches vary as well. Gueron and Pauly (1991) cited two studies that used the perceptions and knowledge of staff about their clients to refer them to services. The first case was a study of AFDC recipients in Louisville who were randomly assigned to participate in job club activities. Before they entered the job club, staff counselors rated them on job-readiness based upon their perception of the client's motivation and skills. The study analyzed the relationship between these initial ratings and participants' performance in the program, such as attending job club or dropping out, and finding a job during job club. The study found that there was no relationship between the job-readiness ratings and those measures of performance. In a second study cited by Gueron and Pauly, intake workers in the Homemaker-Home Health Aide Demonstrations rated the job readiness of clients by supplementing their own perceptions with quantitative information, such as a client's education, work experience, and other personal attributes. Even though this additional information was considered, the study found that the staff based their ratings primarily on perceptions, with only a weak relationship between a client's intake information and the ratings. The study further reported that although the ratings were correlated with post-program performance outcomes they did not help to distinguish the success of program participants from those in the control group.

More recent identification methods have relied exclusively on objective ratings. In particular, the Worker Profiling and Reemployment Services (WPRS) system uses statistical methods to relate individual attributes and local market conditions to the likelihood that a person will exhaust his or her benefits. In 1993, Congress mandated that all states implement a profiling system within their Unemployment Insurance system. The purpose of WPRS is to encourage UI claimants to receive

reemployment services and search actively for jobs sooner than later during their unemployment spell. The program was established in response to the widespread observation that many UI claimants were waiting until they had nearly exhausted their 26 weeks of benefits before actively searching for employment and taking advantage of the reemployment services available to them through the employment service. Each state has successfully integrated this statistical tool into the daily operations of their UI programs. An evaluation of the program, based on the experience of two states, New Jersey and Kentucky, found positive outcomes. Those who were profiled and referred to services, compared with those who were not, spent less time on unemployment insurance, had lower rates of benefit exhaustion, enjoyed increased earnings, and increased the amount of reemployment services they received (U.S. Department of Labor, 1997).

D. The Work First Pilot Project's Statistical Assessment and Referral System

The assessment and referral system developed for the Kalamazoo/St. Joseph Work First pilot uses a statistical method similar to that used by WPRS and proposed by Ellwood (1986). The assessment tool identifies welfare recipients who may have difficulty finding and retaining a job. Those with a low probability of employment presumably face a significant number of barriers to work while those with a high probability have fewer barriers. The probability is derived from a statistical model that uses information commonly collected at enrollment interviews. It estimates the relationship between an individual's propensity to find and hold a job and that person's personal attributes, work and welfare histories, and the local labor market conditions. The model is based on information about the experience of welfare recipients who previously entered the local Work First program.

The same critical elements that prompted the creation of WPRS and contributed to its successful implementation are present in welfare-to-work programs. First, participants in welfare-to-work programs vary widely in their dependency on welfare and in their response to reemployment services. Second, not enough funds are available to provide sufficient levels of reemployment services to all welfare recipients who could benefit from the programs. Third, the methodologies are available to

identify those individuals most likely to benefit from reemployment services. Fourth, the goals of the welfare reform program can be better met by targeting services to the specific needs of individuals, and thus incentives are present for state and local service providers to pursue a more targeted delivery of services.

Therefore, the statistical assessment and referral system developed for the pilot builds upon the methodology of previous programs, particularly WPRS. Unlike WPRS, however, the Kalamazoo/St. Joseph Work First pilot's assessment and referral system is used to determine the set of services that is most appropriate for the specific needs of groups of Work First participants. In contrast, profiling in the WPRS is used to determine who will receive services or not. All Work First participants in the pilot receive services, but the services differ by intensity and mix. In this respect, the task of the statistical assessment and referral system in the Work First pilot is more complex than that of WPRS. Not only must it identify the employability of participants, but it also must determine the set of services most appropriate for the customer.

The Kalamazoo-St. Joseph pilot incorporated the statistical assessment and referral system into the initial intake and orientation process. Each welfare recipient who enrolled in Work First was immediately assigned a score indicating his or her probability of finding employment. The score provided an assessment of each participant's need for services, based upon the past experience of local Work First participants like themselves. A high score indicated that a person had little need of services, since past participants with the same set of characteristics had a high probability of finding a job. Those with a low score required more services, since past recipients with similar attributes had less success in finding and retaining employment. Each participant was then referred to one of three subcontractors based on their employability scores.

The service providers under contract during the pilot differed in their approach to delivering services, while still complying with the requirements of the state's Work First program. Local office staff

determined before the pilot began which service provider was most appropriate in meeting the needs of participants whose employability scores fell within specific ranges. The participants were not informed of their scores; neither were the providers. Prior to the pilot, participants were assigned to the three service providers on a random basis, since staff had no meaningful way to assign customers.

The pilot's assessment and referral system provided an efficient way to target services to meet a customer's needs without requiring substantial increases in staff to make assessments and referrals. The only additional staff required to operate the system on a daily basis was a part-time employee who operated the computerized intake system. Consequently, local office staff was better able to meet the needs of its customers without incurring significant additional operating costs.

II. Statistical Assessment and Referral Model

A. Overview

The purpose of the statistical assessment model is to use information commonly collected during the enrollment process to identify Work First participants according to their need for assistance in finding and maintaining employment. The model generates employability scores for each participant when they enroll in the program. It uses a statistical technique, referred to as logit analysis, that relates an individual's personal characteristics, welfare and work histories and local labor market conditions to whether or not they retained a job for 90 consecutive days, which is the successful outcome of the program. The data used to estimate the model are obtained from administrative data recorded by the local Work First program.

B. Designing the Optimal Allocation Mechanism

The statistical assessment and referral system designed for this pilot is an allocation mechanism that assigns participants to providers based on one or more identifiable and measurable characteristics of the participant. The goal of this assignment mechanism is to improve the outcomes of the local Work First system. For this pilot, that means to increase the overall job retention rate of the program. This section describes the basic principles of an allocation mechanism and illustrates how it can be used to assign participants to services (or providers) and how it can increase the overall effectiveness of the program. Three papers are particularly helpful in formalizing the general framework for the allocation mechanism. Manski (1999, 2001) has developed a formal framework for understanding and assessing various allocation mechanisms, and Berger, Black, and Smith (2000) have applied this general framework to evaluate profiling under WPRS as a means of allocating government programs. Although these papers appeared after the allocation mechanism and the evaluation design for this pilot were developed, they are still helpful in understanding the principles underlying the allocation mechanism. In particular, Berger, Black, and Smith's notation and presentation is used here to frame the allocation problem.

The premise for developing an allocation mechanism based on individual characteristics is that responses to services (or treatments) may vary across program participants. The task in designing an allocation mechanism is to be able to identify characteristics that are associated with the variation in outcomes of each participant or group of participants across the various services. For example, if a participant with less than a high school education responds better (in terms of retaining a job) to services offered by provider A than by provider B, participants with less than a high school education should be assigned to provider A and vice versa. (Here we use providers instead of services to represent different types of treatments, since in the pilot the choice is between providers and not specific services.) More formally, the deterministic allocation mechanism is:

$$M(X): X \rightarrow T,$$

where X is the set of identifying characteristics, T is the set of providers, and M symbolizes the allocation mechanism that assigns a person with a specific characteristic (X_i) to a specific provider (T=A, B, ...). Suppose for now that the only characteristic included in the set of characteristics, X, is education (denoted by X_1); that is, education is the only characteristic that is associated with the variation in responses. Furthermore, suppose that a participant's education level is measured as either attaining a high school education or higher (X_1=1) or not (X_1=0). Using one characteristic to assign individuals to services is often referred to as a characteristics screen.

With two classifications of a single characteristic and two providers, there are two possible assignment rules if participants are assigned to each provider and no one provider receives all participants regardless of educational attainment. The two possible assignment rules are:
1) those with X_1=0 are assigned to provider A and those with X_1=1 are assigned to provider B, and 2) those with X_1=1 are assigned to provider A and those with X_1=0 are assigned to provider B. Since the allocation mechanism is based on only one characteristic, and it is assumed that participants with one dimension of that characteristic do better with one provider than with the other, it makes no sense to split

participants with the same dimension of the characteristic among the two providers. This is what would happen if the participants were randomly assigned to the two providers.

To determine which assignment rule is optimal, the outcomes of the individuals are evaluated based on the goal of the program, which in this case is to maximize the job retention rate of the participants. Suppose that through observing the outcomes of participants who were randomly assigned to the two providers, which presumably occurred before the allocation mechanism was adopted, outcomes were recorded as shown in Table 1. Participants with less than a high school education (X_1=0) who received services from provider A exhibited a retention rate of 30 percent. That is, for every 100 people who received services from provider A, 30 retained their jobs. Those with less than a high school education who received services from provider B exhibited a retention rate of 20 percent. Since individuals with the same level of education were randomly assigned to the two providers, one can assume that the variation in outcomes was the result of differences in the services offered by the two providers and not the result of differences in the ability of participants to retain jobs. For those with a high school education or more (X_1=1), suppose that the retention rate was 40 percent if they received services from provider A and 60 percent if they received services from provider B.

Table 1: Job Retention Rates by Provider and Participant's Education

		Providers	
		A	B
Education	X=0	30%	20%
	X=1	40%	60%

The outcomes of the two assignment rules can be determined from the information in the table and the assumption that each provider has the capacity for 100 participants. The first assignment rule assigns X_1=0 to A and X_1=1 to B with an outcome of S_1; the second assignment rule assigns X=0 to A and X=1 to B with an outcome of S_2. Table 2 exhibits the outcomes from the two assignment rules.

Table 2: Outcomes of Two Hypothetical Assignment Rules

Assignment Rules	Education	Provider	Total Participants	Number who Retained Jobs	System Total	
					Number	Rate
1	X=0	A	100	30	90	45%
	X=1	B	100	60		
2	X=0	B	100	20	60	30%
	X=1	A	100	40		

From Table 2, it can be seen that assignment rule 1 is optimal. It yields a system-wide job retention rate of 45 percent compared with a retention rate of 30 percent for assignment rule 2. Clearly, the difference in the outcomes of the two assignment rules shows that providers have a comparative advantage in serving one group over another.

The allocation mechanism based on one characteristic is relatively simple and straightforward. It is rarely the case, however, that responses to services vary with only one characteristic. For example, in addition to education, it is conceivable that retention rates may vary across services by past work history, marital status, age, and welfare dependency. Multiple characteristics complicate the allocation mechanism. One method in which more than one characteristic can be incorporated into an allocation mechanism is to use the characteristics to predict an outcome that is either the goal of the system or one that is closely aligned with that goal. The profiling system used in the WPRS is an example of such an allocation mechanism in which the assignment is based on a predicted outcome. Under WPRS the outcome is the probability of exhausting benefits, which is estimated using a set of personal characteristics (as well as local economic conditions). Following the presentation by Berger, Black and Smith (2000), denote the predicted value of the outcome for the individual participant by Q'(X), where X is the set of characteristics used to predict Q. The allocation mechanism using the predicted value is similar to the one that used only one characteristic:

$$S(Q'(X)):Q'(X)6T.$$

Once the predictive model is estimated, the allocation mechanism based on the predictive value of the outcome becomes a deterministic function of X. The distinction between the two mechanisms centers on the relationship between the Xs and the predicted value Q'. Instead of using a single characteristic, such as education, to assign a participant to a provider, a set of characteristics is used. The relative importance of each characteristic in making the assignment is determined by the estimated coefficients of the model used to predict the individual outcome Q.

An assessment of the optimal assignment rule under the statistical assessment allocation mechanism is similar to the process previously used to illustrate the deterministic allocation mechanism. Since the statistical allocation mechanism is similar to the one used in the pilot, we will use the actual data generated from the pilot to describe this mechanism. This will be provided in a subsequent section. The next issue is the estimation of the predictive model.

C. Data Requirements and Availability

The predictive model (that is, Q'(X)) for this pilot is the statistical assessment model that uses personal characteristics to explain the likelihood that a person will retain a job for 90 consecutive days. We refer to the statistical assessment tool as an employability score, and the two terms are interchangeable throughout the remainder of the report. Data were obtained from the intake forms that were maintained by the Kalamazoo-St. Joseph WDB in order to administer its Work First program. The intake process took place after the Family Independence Agency (FIA) referred welfare recipients to Work First and before those enrollees reported to the subcontractors for services. FIA collected additional information about the client, such as health problems that may limit work or training activities, current drug treatment, or prior convictions. This information, however, was not necessarily shared with the WDB and thus was not available for use in developing the statistical assessment tool.

For each participant, we constructed a file that chronicled their activities before, during, and after their most recent enrollment in the Work First program. Activities prior to their most recent enrollment

included employment status and the number of months on welfare. For those who had participated in Work First more than once, we also included their reason for leaving the program at that time. Work First activities during their most recent enrollment included the type of activity, the number of hours engaged in each activity, and the starting and ending dates of each activity. We also included their reason for leaving the program, which included among other possibilities success in finding a job. Finally, whether or not they retained a job for 90 consecutive days after they left the program was included in their record.

The purpose of the employability score is to use information that is available at the time of enrollment to predict a participant's likelihood of finding a job. Therefore, not all of the information pieced together for each participant can be used to predict future employment. At the time of enrollment, we know a person's characteristics, such as age and education, her prior work history, past enrollment in a Work First program, length of time on welfare. We do not know, however, the activities in which they are about to participate. These activities occur after they enroll and thus after we predict their employability scores. The following information is used in the statistical assessment model to predict future employment:

- Age
- Parental status
- Educational attainment
- AFDC history
- Target group (long-term welfare recipient, older children, little or no work experience or education)
- Subcontractor
- Employment prior to first assignment
- Compliance history in previous Work First enrollments.

As previously mentioned, during the operation of the pilot, the Work First program defined a successful outcome as a participant working in a qualified job for 90 consecutive days (with a grace period of no longer than a week if they changed jobs). A qualified job must offer a single parent at least a minimum wage and 20 hours a week of work. When this outcome was achieved, the person terminated from the program. Other reasons for termination included exemption for reasons such as health or medical problems (occurring or revealed after intake), family care responsibilities, no child care, noncompliance, and inappropriate referral. For those who participated in the program, a detailed log was kept of their activities and dates. These activities included job readiness training, job development and/or job placement services, assessment and employability planning, longer-term training, and unsubsidized employment. Wages and hours worked per week were recorded for each employment spell included in the files. The records also included information about each participant's unsubsidized employment immediately prior to their first enrollment in a Work First program. Those participants in this category were working in an unsubsidized job at the time they were referred to Work First, or obtained unsubsidized employment prior to reporting to the first activity offered by the service provider. Individuals who entered the program more than once had two or more employment spells included in the files. Hourly wages and hours worked were also recorded for each employment spell.

D. Characteristics of Work First Participants

The data used to estimate the statistical assessment model included Work First participants who entered the program during 1996. The next several sections describe the characteristics of these participants, the activities in which they participated, their employment outcomes, and differences in services offered by the three subcontractors during this time period.

As shown in Table 3, the typical participant during this time period was slightly under the age of 30, had completed 12th grade, and had received welfare payments for at least 36 of the last 60 months. Some of the participants had completed a GED, but few had vocational training. About a fifth of the participants had unsubsidized employment prior to enrolling in Work First. For example, while 39

Table 3. Variables Used in the Work First Statistical Assessment Model

Name	Description	Mean
single parent	=1 if single parent	0.827
age	age at time of enrollment	29.7
no schooling	no formal schooling	0.038
less than 9th grade education	grade level completed less than 9th grade	0.056
9th grade education	completed 9th grade	0.056
10th grade education	completed 10th grade	0.089
11th grade education	completed 11th grade	0.191
12th grade education	completed 12th grade (omitted from analysis, thus reference)	0.387
1 year post-secondary education	completed one year of post-secondary	0.012
2 years post-secondary education	completed two years of post-secondary	0.016
3 years post-secondary education	completed three years of post-secondary	0.004
GED	earned graduate equivalent certification	0.161
YOU	referred to Youth Opportunities Unlimited	0.189
Goodwill	referred to Goodwill Industries	0.179
Behavioral Foundation	referred to Behavioral Foundation	0.303
vocational education	attended postsecondary vocational education program	0.014
not a target group	not a target group, which includes AFDC received any 36 of preceding 60 months, youngest child 16-18, or custodial parent under 24 and who has not completed high school or with little or no work experience	0.528
AFDC36	received AFDC any 36 of preceding 60 months	0.343
employed prior to enrollment	qualified unsubsidized employment prior to assignment	0.190
employed prior to previous enrollment	qualified unsubsidized employment prior to assignment in previous enrollment	0.003
noncompliance	terminated as noncompliant in previous enrollment	0.057
employed	terminated as employed in qualified unsubsidized job	0.427
No. of observations		1546

percent completed high school, slightly over 4 percent went on to receive any education after high school, including those who attended post secondary vocational education programs. For those not completing high school, nearly 15 percent did not go beyond the 9th grade, and another 30 percent dropped out before completing their senior year. Yet, 16 percent did earn a graduate equivalent certification (GED), which when combined with those completing 12th grade puts the percentage of high

school graduates or equivalents at 55 percent. The Work First program targeted participants with characteristics that program staff believed created significant barriers to employment. Labeled "not a target group," in Table 3, this group included participants with a lengthy history of receiving welfare, little work experience, and child-rearing responsibilities. Slightly fewer than half of the participants were included in this category (the variable is entered in the table as not included in the group, so the percentage in the group is 1-0.528). An individual's AFDC history during the past 5 years is included separately from the targeted group. About a third of the participants received AFDC payments for three or more years during that five-year period. Only 19 percent held a job immediately prior to enrolling in the Work First program.

E. Reasons for Leaving Work First

Table 4 lists various reasons for leaving the program. Twenty-six percent found employment for 90 consecutive days.[11] Roughly 6 percent were terminated because of personal issues such as health problems or family responsibilities. Another 5 percent of the participants had their case closed by the FIA because they earned too much money to be eligible after working or they did not fill out the appropriate paperwork on time. Twelve percent were found to be ineligible, or were referred inappropriately to Work First. Thirty-two percent terminated the program either as a no-show, a noncompliant, or one who attended orientation only. Some of the participants whose reason for leaving was recorded as other (code 55) may have been no-shows or minimal participants, but because those individuals did not participate in Work First or left without an exit interview, no specific termination type is recorded in their files. For these four groups, we do not know the activities, if any, in which they participated, and we do not know whether they had unsubsidized employment prior to the first assignment. The latter information is critical, since prior employment is considered important to work force attachment and future labor market success. The importance of prior employment to the

[11]The retention rates shown here are different from those shown in reports submitted to the states because of a different denominator. We used the number of participants who entered the program as the denominator and then followed that cohort until their determination. The reports use the number of participants placed in jobs that expected to lead to long-term employment as the denominator. As a result, the reports to the state show a much higher retention rate than shown here.

predictive power of the model is an empirical issue, and we wish to estimate the assessment model both ways. The need to have prior employment history, which is included in a participant's activities file, dictates that we use only those individuals with activity information to estimate the assessment model.

Table 4. Termination Types

Code	Termination type	Frequency	Percent	Cumulative
40	Employed 90 days	1030	26.18	26.18
50	Institutionalized	9	0.23	26.40
51	Health/medical	202	5.13	31.54
52	Family care	43	1.09	32.63
53	Lacks transport	21	0.53	33.16
54	Cannot locate	84	2.13	35.30
55	Other	517	13.14	48.44
57	No child care	12	0.30	48.74
59	Attended orientation only	287	7.29	56.04
60	No-show	430	10.93	66.96
61	Noncompliance	543	13.80	80.76
64	Out of county	57	1.45	82.21
65	Case closure	188	4.78	86.99
66	Inappropriate referral	218	5.54	92.53
67	Ineligible	277	7.04	99.57
70	Other parent excused	17	0.43	100.00
Total		3,935	100.00	

Noncompliance (termination code 61) is different from codes 59 and 60 in that some individuals who terminated as such did have activities while enrolled. The reason is that a person can be considered out of compliance for three reasons: 1) disruptive behavior; 2) the client threatened or physically abused FIA/Michigan Works Agency staff; and 3) the client quit or was dismissed from a job. Those separating from a job held while enrolled in Work First will have other activities recorded (such as employment in an unsubsidized job). Unfortunately, we do not know which of the three reasons actually pertained to a person being terminated as noncompliant. However, we do know that 63 percent of those terminated as noncompliant were recorded as having an unsubsidized job while enrolled (code 01), which suggests that the same percentage was recorded as noncompliant because they quit or were dismissed from that job.

F. Work First Activities

Work First participants engaged in a variety of activities as part of their requirement for successfully participating in Work First and, consequently, for receiving cash assistance. Most participants began with assessment and employability planning (code 12). As shown in Table 5, 83 percent of all participants received this service in 1996. The percentage was higher, about 90 percent, for those who were not employed prior to entering Work First. About half the participants engaged in group or individual job-search assistance, which includes counseling, job-seeking skills training, and may include support on a one-to-one basis (code 13). These activities were designed to help participants become familiar with general workplace expectations and learn about behavior and attitudes necessary to compete successfully in the labor market (Glossary of Terms and Definitions, *Work First Management Information Guide*, Issued 2/97). Fifty-three percent were employed in a qualified job (code 1) that paid minimum wage or more and offered at least 20 hours of work per week (or 35 hours if a working spouse). Another 6 percent were employed in unsubsidized employment that offered minimum wage but less than 20 hours per week. Nineteen percent of the participants were in unsubsidized employment when referred, obtained subsidized employment meeting the requirements of code 01 prior to reporting, or obtained the appropriate employment prior to reporting to the first activity. Only a few participants (2 percent) were referred to community service programs or vocational educational training.

Table 5. Selected Activities of Work First Programs

Activity	Code	Mean	Standard deviation	Minimum	Maximum
Unsubsidized employment	01	0.53	0.50	0	1
Job readiness	10	0.09	0.28	0	1
Assessment and employability planning	12	0.83	0.37	0	1
Job search	13	0.55	0.50	0	1
Part-time employment	19	0.06	0.24	0	1
Employment prior to assignment	20	0.19	0.39	0	1
Community service	33	0.01	0.11	0	1
Vocational education training	34	0.01	0.09	0	1

G. Differences in Activities among Providers

The Kalamazoo/St. Joseph WDB contracted with three organizations to provide employment services to participants of the Work First program. The providers delivered services that met state and federal requirements regarding content and duration. Nevertheless, there was some flexibility within the requirements. WDB staff observed that providers differed in their style and philosophies in delivering services and in the number of hours in which participants were engaged in specific activities. These observed differences were critical to the pilot project by providing the opportunity to refer participants to the provider, and thus the mix and style of services, that best met their needs.

The length of time that Work First enrollees engaged in activities varied by type of activity and by subcontractor. For example, as shown in Table 6, 38.1 percent of the participants spent two hours in the assessment and employability planning activity (code 12), while 39.6 percent spent 20 hours in the same activity. Of the three subcontractors within the Kalamazoo area, participants at YOU averaged 7.3 hours, those at Behavioral Foundation averaged 11.2 hours, and those at Goodwill averaged 16.0 hours in this activity. The higher average for Goodwill results from a much larger percentage of participants spending time engaged in this activity than those assigned to other providers. Over three-quarters of those going to Goodwill spent 20 hours in this service. Only 27 percent of the participants receiving services from either YOU or Behavioral Foundation received 20 hours of this service. For those going to YOU, two-thirds of the participants received two hours or less of assessment and employability planning. Hours spent in this activity for those receiving services from Behavioral Foundation were split between 2, 15, 16, and 20 hours. Hours spent in group or individual job-search activities were much more uniform (Table 7). Ninety-seven percent of the participants spent 20 hours, and there was no significant difference in the amount of hours the three subcontractors devoted to this activity.

Table 6. Distribution of Hours Engaged in Assessment and Employability Planning

No. of Hours	Percent			
	All	Foundation	Goodwill	YOU
1	5.9	1.9	1.9	14.6
2	38.1	38.3	19.0	52.8
3	0.2	0.5	0.0	0.0
4	0.4	0.5	0.5	0.0
5	0.1	0.0	0.5	0.0
6	0.1	0.0	0.0	0.4
7	0.0	0.0	0.0	0.0
8	0.1	0.0	0.0	0.4
9	0.0	0.0	0.0	0.0
10	0.1	0.0	0.0	0.4
11	0.7	0.0	0.5	1.9
12	0.2	0.5	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.2	0.5	0.0	0.0
15	4.8	11.1	0.0	0.0
16	9.3	19.6	0.9	1.9
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	39.6	26.9	76.8	27.7

Table 7. Distribution of Hours Engaged in Job Search Activities

No. of Hours	Percent			
	All	Foundation	Goodwill	YOU
1	0.4	0.3	0.0	0.8
2	0.2	0.3	0.0	0.0
3	0.2	0.3	0.0	0.0
4	0.4	0.7	0.0	0.0
5	0.2	0.3	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.2	0.3	0.3	0.0
8	0.0	0.0	0.0	0.0
10	0.5	0.0	0.0	0.8
12	0.2	0.0	0.0	0.0
15	0.2	0.0	0.0	0.0
20	96.9	97.6	95.2	97.0
35	0.7	0.0	2.4	0.8

The service providers also differed to some degree in their approach to delivering services. For instance, Behavioral Foundation stressed a goal-oriented approach to job search, requiring that participants contact a given number of employers each day until they find a job. Goodwill offered more assistance to customers in conducting phone inquiries and in interviewing for jobs. Their staff would work directly with customers to show them how to find employment postings and telephone numbers, how to inquire about job postings, and how to present themselves during interviews. This same organization would also provide more intensive training to those who were not able to find a job during their initial several weeks in the program.

H. Employment Outcomes

The goal of Work First is to move welfare recipients off the welfare rolls and into jobs so that they can become economically self-sufficient. Employment success can be measured in several ways: whether or not a participant holds a job, the length of time a participant holds a job, the hours worked,

or the hourly wage received. The positive outcome for Work First is for a participant to obtain unsubsidized employment in a qualified job and to remain employed for 90 consecutive working days (with a short grace period of no more than a week between jobs if they change jobs).[12] Some enrollees experienced periods of unemployment. Others had a job when they entered the program and continued with that job throughout the program, ending with a successful termination.

I. Estimating the Statistical Assessment Model

A logit statistical technique was used to estimate the relationship between a Work First participant's personal characteristics and the likelihood of finding and retaining qualified employment for 90 consecutive days. The dependent variable in this statistical model is discrete, taking on the value of 1 (if employed) or 0 (if not employed). A logit estimation procedure transforms the discrete event into a smooth functional form bounded by 0 and 1 and estimates the effect of specified variables on the probability of employment.

Estimates were based on a sample of Work First participants from the Kalamazoo-St. Joseph WDB who enrolled in the program during 1996. The 1996 period is used because all who enrolled in Work First during that time had completed the program before the start of the pilot and thus their outcomes were known. Individuals can and do enroll in Work First several times. However, only about 8 percent of those who enrolled during 1996 enrolled more than once. We included each enrollee only once in the sample and included their latest appearance so that we could use any previous history in the analysis. The variable definitions and sample means were displayed in Table 3.

[12]Another outcome of the Work First program, used by the state to measure effectiveness, is the placement rate. The placement rate is defined as whether or not the participant held any unsubsidized employment during the time they were enrolled (activity code 01). This measure is less of a hurdle to overcome, but it does show some attachment to the workforce even if it does not terminate in 90 consecutive days of employment. Since the goal of Work First is for welfare recipients to achieve economic self-sufficiency, we found the retention rate to be more consistent with this goal.

Results of the logit estimation are shown in Table 8. Focusing on the signs of the statistically significant coefficients, Work First participants were more likely to complete 90 consecutive days of employment if they had completed 12th grade (the omitted variable in the equation), were older, were employed prior to first assignment, enrolled in the program earlier in the year rather than later, and were not out of compliance if they had previously enrolled in Work First.

Table 8. Logit Estimates of the Basic Statistical Assessment Model

Employed	Coefficient	Std. Err.	z	P>|z|	[95% Conf.	Interval]
single parent	0.223	0.156	1.429	0.153	-0.083	0.528
age	0.115*	0.041	2.790	0.005	0.034	0.196
age squared	-0.002*	0.001	-2.602	0.009	-0.003	-0.000
no schooling	-1.801*	0.555	-3.244	0.001	-2.889	-0.713
less than 9th grade education	-0.454	0.304	-1.495	0.135	-1.049	0.141
9th grade education	-0.167	0.252	-0.662	0.508	-0.661	0.327
10th grade education	-0.775*	0.218	-3.553	0.000	-1.203	-0.348
11th grade education	-0.431*	0.157	-2.744	0.006	-0.739	-0.123
GED	0.174	0.162	1.074	0.283	-0.143	0.492
vocational education	-0.591	0.487	-1.212	0.225	-1.546	0.364
1 year postsecondary education	0.079	0.501	0.159	0.874	-0.903	1.062
2 years postsecondary education	0.162	0.438	0.371	0.711	-0.695	1.020
3 years postsecondary education	0.011	0.884	0.013	0.990	-1.721	1.744
Goodwill	-0.463*	0.187	-2.485	0.013	-0.829	-0.098
Behavioral Foundation	-0.560*	0.164	-3.406	0.001	-0.883	-0.238
not a target group	0.064	0.116	0.555	0.579	-0.163	0.292
enrollment date	-0.003*	0.001	-5.424	0.000	-0.004	-0.002
employed prior to enrollment	1.107*	0.144	7.683	0.000	0.825	1.390
employed prior to previous enroll	-0.393	1.055	-0.373	0.709	-2.46	1.674
noncompliance	-0.750*	0.281	-2.672	0.008	-1.301	-0.200
constant	36.921*	7.260	5.086	0.000	22.693	51.150

Note: Number of obs=1,546, chi2(23)=213.10, prob > chi2=0.00, pseudo R2=0.10, and Log Likelihood = -948.47. (*) denotes statistical significance at the 0.05 level. YOU is the omitted provider.

The only variable that may need an explanation for its inclusion in the model is the date of enrollment into Work First. The coefficient on this variable is negative and statistically significant, which indicates that those who enrolled in Work First in more recent periods experienced a lower probability of finding and maintaining employment for 90 consecutive days. The percentage of participants who achieved this outcome steadily declined during the operation of the pilot. During the first and second quarters of 1996, 53 percent of participants in the sample were employed for 90 days, after which the percentage dropped to 50 percent during the third quarter, 31 percent during the fourth quarter, and 24 percent during the first quarter of 1997. The admission date variable can be interpreted as a proxy for attributes of Work First participants that are not captured in the characteristics included in the model. Work First staff observed that as the pool of welfare recipients going through the program diminished, enrollees were increasingly less qualified to find and hold jobs. The variable may also capture changes in the program and changes in local labor market conditions over time.[13]

Applying the estimated coefficients to the characteristics associated with each Work First participant yields predictions of the probabilities of employment for each individual. Consequently, each Work First enrollee can be ranked according to this estimated probability. One criterion for judging the utility of the model is its ability to distinguish among Work First participants as to their likelihood of finding employment. This ability can be measured in two ways: 1) the relative steepness of the distribution of each individual's employment probabilities, and 2) the width of the confidence intervals. If the function is flat throughout the range of individual probabilities, then its ability to differentiate among participants is minimal. On the other hand, if the function increases throughout the range of individuals, then its ability to distinguish between participants with different employment propensities is greater.

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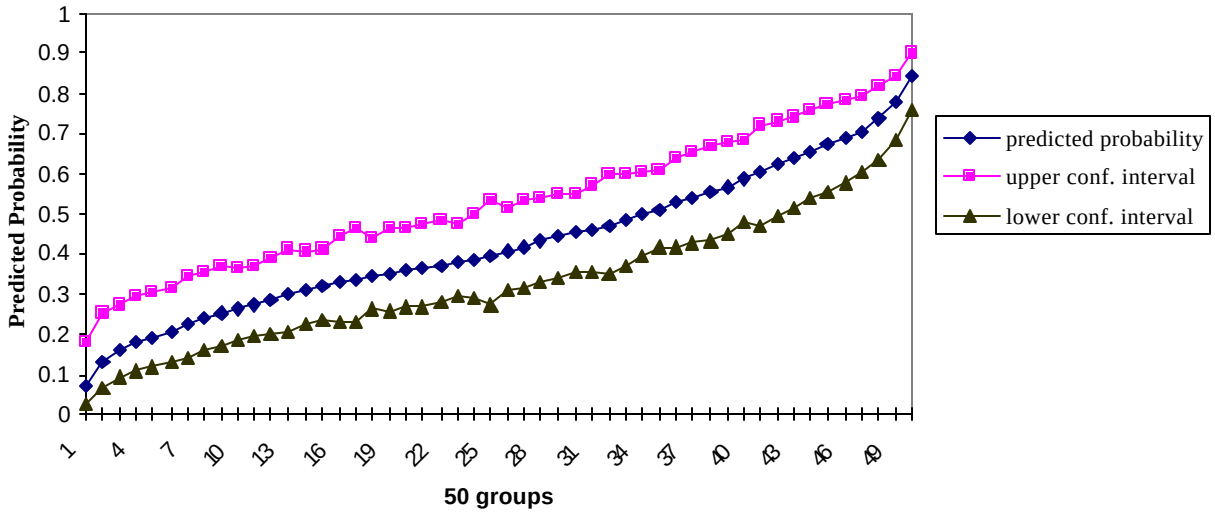
[13]These results are consistent with previous studies that examine the employment prospects of welfare recipients. Estimates based on the national SIPP survey found that education and prior employment history were important determinants of the likelihood of leaving welfare for employment (see appendix in Eberts 1997). A study for the state of Texas also found these factors to be important (Schexnayder, King, and Olson 1991). The Texas study also found that the number of children, the age of the welfare recipient, the duration on welfare, and the use of the employment service and participation in job training programs also affected the likelihood of employment in the expected direction. The employment- and training-related results from Texas are consistent with our results from Work First that prior employment and compliance with previous Work First enrollment positively affect the likelihood of qualified employment.

For heuristic purposes, one can view a plot of employability scores as representing participants lined up to enter the Work First program according to their probabilities of finding employment. If the door of the intake facility is envisioned to be on the left side of the graph in Figure 1, then participants with the least propensity to find a job are at the front of the line and those with the highest propensity are at the end on the right. For presentation purposes, the 1,546 observations included in this analysis have been collapsed into 50 groups of about 30 people each. According to our model, the estimated probabilities of employment range from a low of 0.02 to a high of 0.90. Therefore, the person at the head of the line has almost no chance of finding a job and would need considerably more assistance than the person at the end of the line, who is almost certain to find employment without much help.

Figure 1.
Predicted Probability of 90-day Employment
(95% confidence intervals)



Also shown in Figure 1 are the 95 percent confidence intervals for each point on the logit function, as represented by the 50 groups. A confidence interval shows the range of probabilities that are statistically indistinguishable. The wider the confidence interval for any point on the logit function, the less able the model is to differentiate among participants with any degree of statistical confidence. The band is relatively tight along most of the curve, with the narrowest part of the band at the steepest segment to the far right. Accordingly, an individual with a 70 percent probability (0.7 in the figure) of

finding employment is indistinguishable from the 60 people to her right in the queue and the 210 people to her left. A confidence interval of roughly 210 individuals on either side of a specific person is maintained throughout much of the graph, except at the two tails.

Figure 2 shows the relatively close relationship between the predicted probability and the percentage of participants who are employed. Observations are within each of the 50 groups of 30 people. If the sample were larger within each group, the percentage employed would be tighter and closer to the average predicted probabilities for each group.

Figure 2.
Actual and Predicted Probability of 90-day Employment

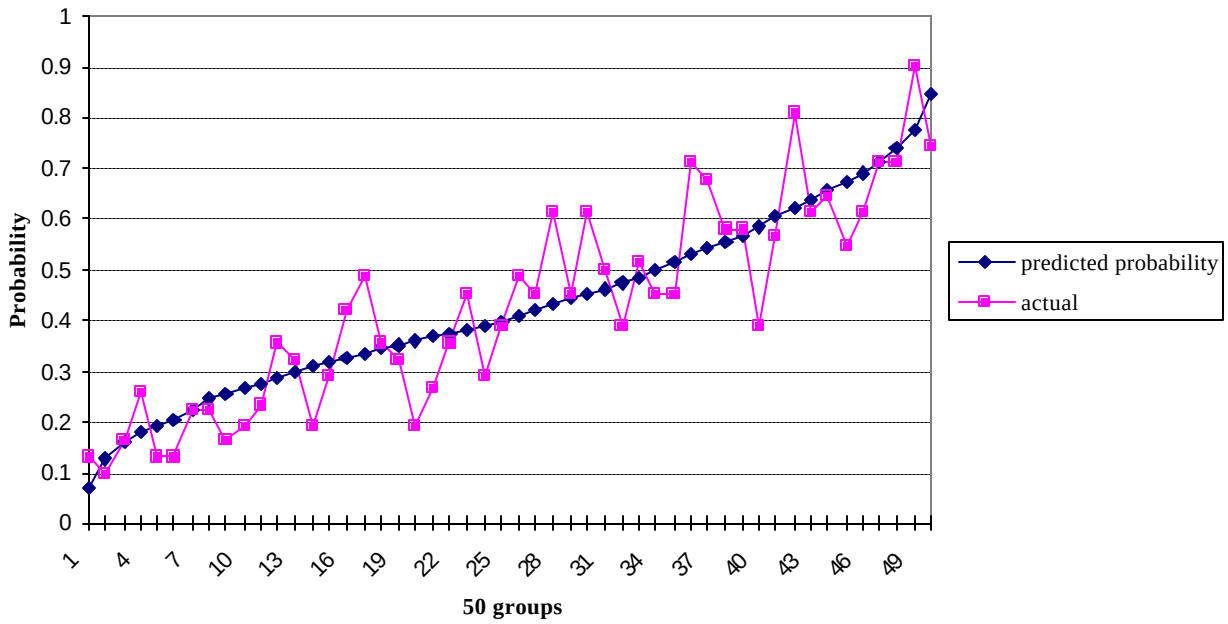


Table 9 illustrates how the estimated coefficients are combined with an individual's specific characteristics to generate a predicted probability of employment. Note that most of the explanatory variables are binary, that is, the value of 1 is recorded when the characteristic describes the recipient and 0 otherwise. Three examples are given in Table 9. The first person described (Person A) is a single

parent with no formal schooling and no employment immediately prior to being assigned to Work First. She entered the Work First program in mid October 1996. She also was enrolled in Work First previously, but left because of noncompliance. She was not employed for 90 days, and her probability of finding a job was estimated to be 3.5 percent. Persons B and C, on the other hand, are single parents in their mid-thirties. One has a 12th grade education and the other her GED. Both were employed prior to assignment to Work First, and neither were terminated from previous enrollment in Work First as noncompliant. They entered the program in the first quarter of 1996, and both had been employed for at least 90 days. Each has a probability of employment of 88 percent.

Table 9. Characteristics of Participants with Low and High Employability Scores

Characteristics	Person A	Person B	Person C
single parent (=1)	1	1	1
age	22	35	38
no formal schooling	1	0	0
9th grade or less	0	0	0
9th grade	0	0	0
10th grade	0	0	0
11th grade	0	0	0
12th grade	0	0	1
one year post-secondary	0	0	0
two years post-secondary	0	0	0
graduate equivalent degree	0	1	0
vocational education	0	0	0
notarget	1	0	0
prior employment	0	1	1
noncompliance	1	0	0
enrollment date	10/17/96	3/5/96	1/17/96
predicted probability of employment	0.035	0.884	0.880
employed 90 consecutive days (=1)	0	1	1

The statistical assessment model assigns a probability of employment to each individual participant. Thus, the probabilities, when ranked by size, create a continuum bounded by 0 and 1. In order to examine the characteristics of individuals along the continuum, we divided the distribution of 1,546 participants into five groups, or quintiles, of equal numbers of participants. Table 10 shows the relationships between education (particularly completing 12th grade and obtaining a GED), prior employment, and noncompliance on the predicted probability and the percentage employed. Figures 3, 4, 5, and 6 show these relationships graphically relative to the predicted probability, but by using 50 groups instead of five.

Figure 3.
Grade 12 Completion and Predicted Probability of 90-day Employment

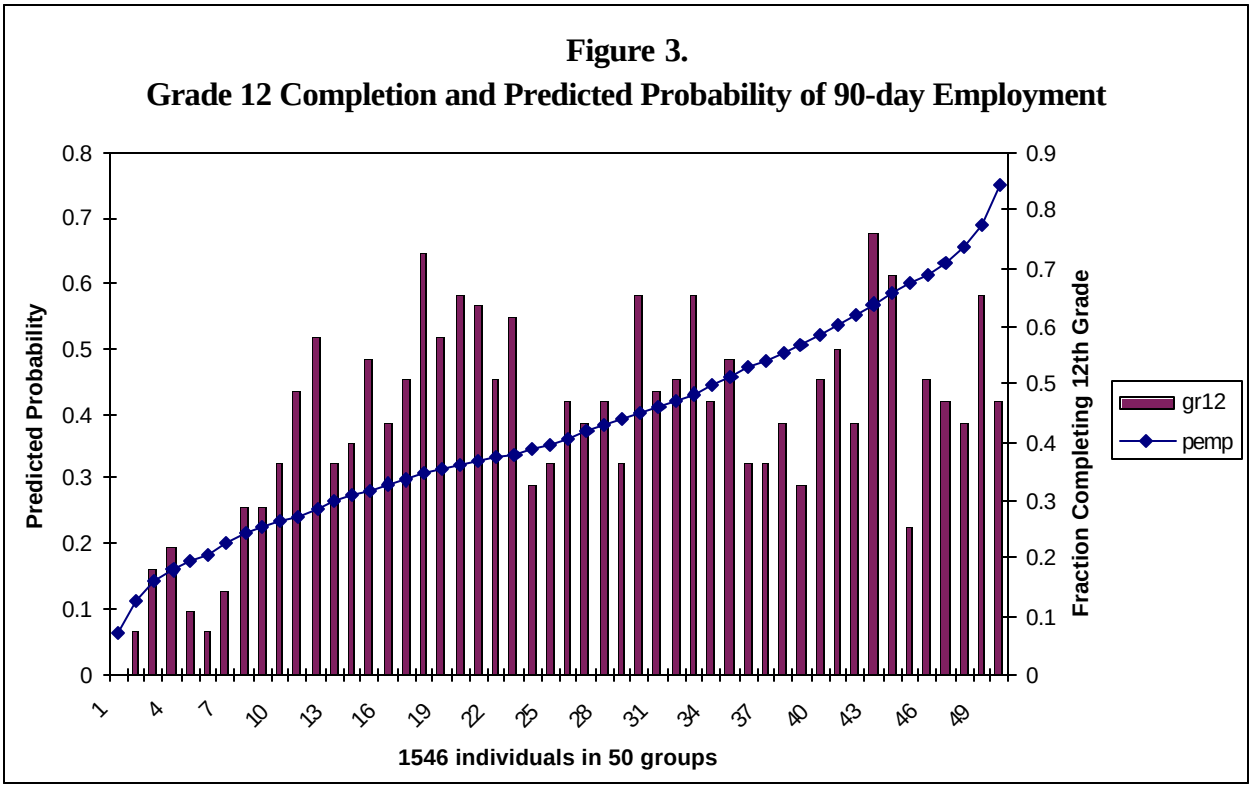


Figure 4.
GED and Predicted Probability of 90-day Employment

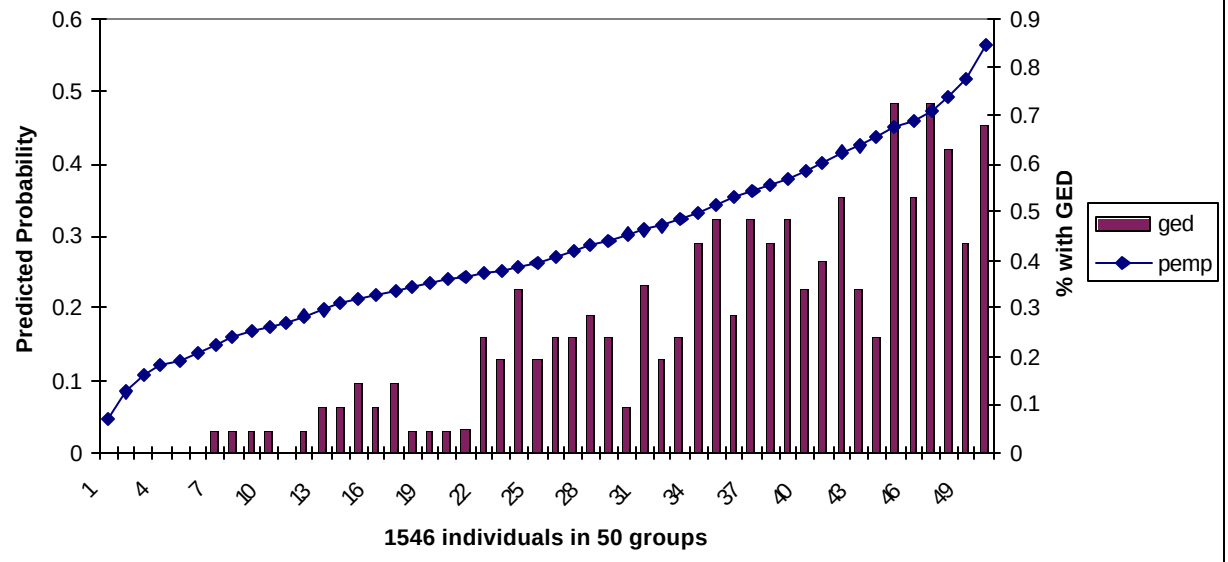


Figure 5.
Prior Employment and Predicted Probability of 90-day Employment

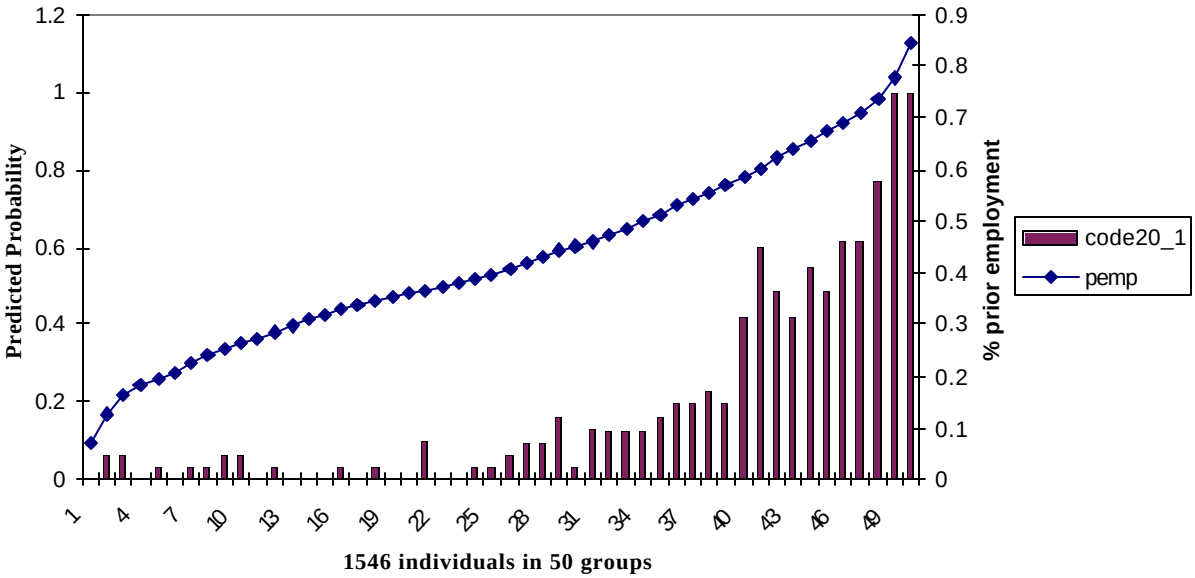


Figure 6.
Noncompliance and Predicted Probability of 90-day Employment

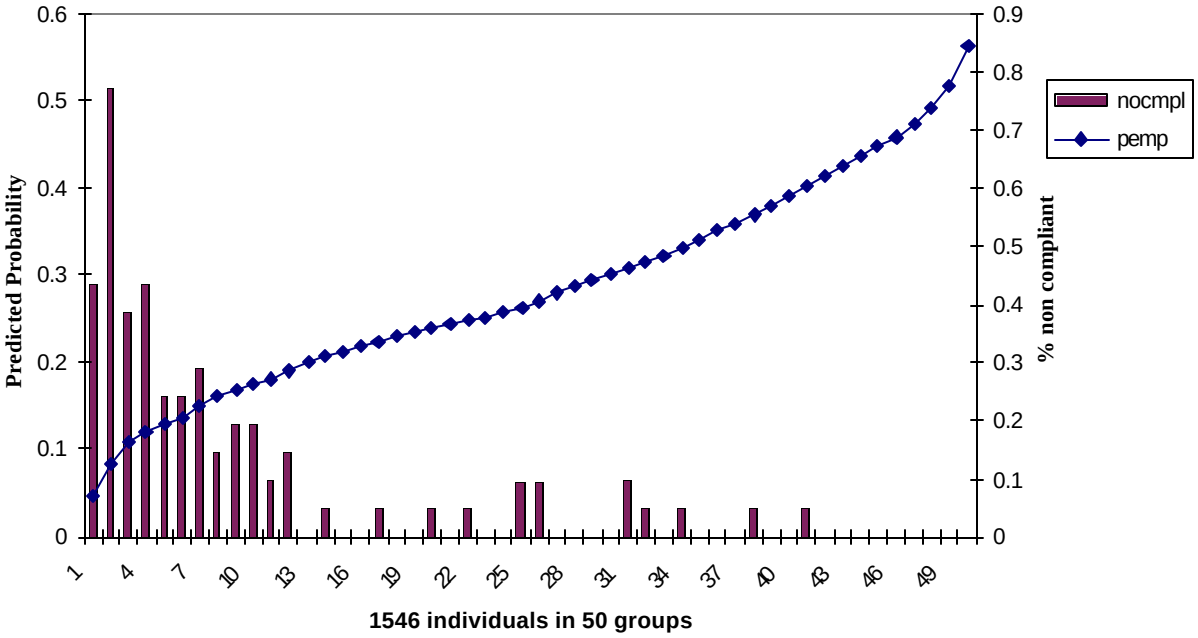


Table 10 also shows that the average predicted probability of employment generated by the model is reasonably close to the percentage employed for each of the five groups, with perhaps the exception of the first group. Only by dividing the distribution into groups can we discern the relationship between the predicted probability and the actual probability. As shown in Table 11, the model classifies 66.2 percent of the cases correctly. To determine the percentage correct, a participant is classified as "employed" and the variable is given a value of 1 if the predicted probability is greater than or equal to 0.5. Based on this criterion, 79.1 percent of the cases in which employment does not occur are classified accordingly, whereas 48.9 percent of the cases that are true are classified as such. These percentages can be changed depending upon the cutoff level chosen for classifying the event.

Table 10. Characteristics by Quintiles of Employability Scores

Characteristics	Group 1	Group 2	Group 3	Group 4	Group 5
single parent (=1)	0.789	0.787	0.830	0.86	0.862
age	28.2	28.8	30.7	29.6	31.0
no formal schooling	0.120	0.003	0	0	0
9th grade or less	0.077	0.050	0.023	0.033	0.012
9th grade	0.070	0.077	0.057	0.033	0.043
10th grade	0.244	0.067	0.083	0.043	0.017
11th grade	0.268	0.217	0.183	0.203	0.098
12th grade	0.144	0.453	0.437	0.423	0.464
one year post-secondary	0.010	0.020	0.017	0.013	0.003
two years post-secondary	0.007	0.020	0.030	0.007	0.017
graduate equivalent degree	0.013	0.053	0.140	0.233	0.337
vocational education	0.040	0.007	0.013	0.01	0.003
notarget	0.448	0.530	0.567	0.537	0.553
prior employment	0.033	0.013	0.060	0.147	0.660
noncompliance	0.227	0.027	0.020	0.017	0.003
predicted probability of employment	0.035	0.316	0.398	0.506	0.683
employed	0.167	0.330	0.397	0.543	0.660

Table 11. Relationship Between Actual and Classified Events

Dependent Variable: 90-day Employment=1

	True		
Classified	Employed (D)	Not Employed (~D)	Total
Employed (+)	323	185	508
Not Employed (-)	337	701	1038
Total	660	886	1546
Classified as employed if predicted Pr(Employed) >= 0.5			
True Event "employed" defined as employed ~= 0			
Sensitivity		Pr (+| D)	48.94%
Specificity		Pr (- |~D)	79.12%
Positive predictive value		Pr (D|+)	63.58%
Negative predictive value		Pr (~D| -)	67.53%
False + rate for true ~D		Pr (+|~D)	20.88%
False - rate for true D		Pr (-| D)	51.06%
False + rate for classified +		Pr (~D|+)	36.42%
False - rate for classified -		Pr (D| -)	32.47%
Correctly classified			66.24%

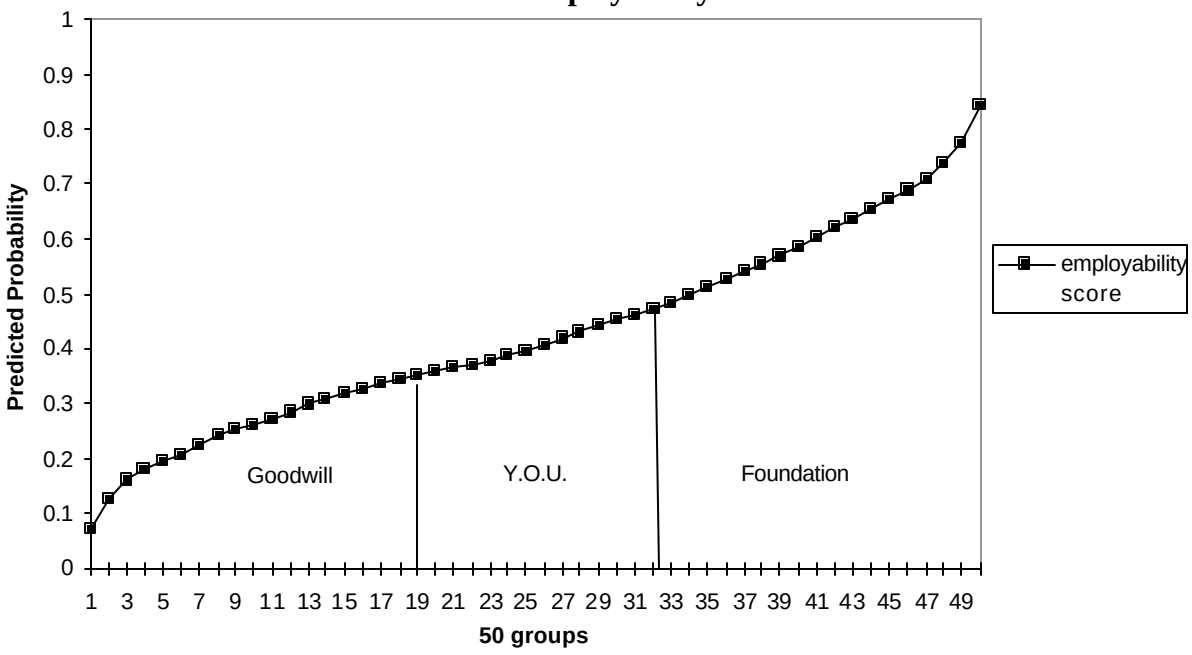
J. Assigning Probabilities on a Weekly Basis

The purpose of the model is to distinguish between participants according to their likelihood of finding and holding a job. Participants in the treatment group were assigned to the three providers according to their employability score, as shown in Figure 7.[14] The distribution of employability scores was divided into three groups, which roughly approximated the capacity of the three providers to accommodate the participants. Actually, YOU was able to accommodate only 20 percent of the

[14]For evaluation purposes, half of the participants were assigned to the treatment group and the other half were assigned to a control group. This will be discussed later in the report. For operational purposes, when an evaluation is not called for, all would be assigned to providers according to this method.

workers. The cutoff points in the distribution that determined the assignments (as shown by the vertical lines in the figure) could be moved depending upon changes in the capacity of providers.

Figure 7.
Referral of Participants to Providers
Based on Employability Score



In practice, probabilities were assigned to individuals as they enrolled in Work First twice weekly. Using the model estimated from the sample of 1996 Work First participants, Table 12 displays the range of predicted probabilities by week starting in April 1997 and ending in June. For the weekly assignment to approximate the assignment that would have occurred if everyone who participated in the program over a year's time were assigned at one time, the weekly and annual distributions need to be similar. Table 12 shows that the means and the end points of the weekly distributions are similar to the overall distribution and that the weekly distributions are fairly constant over time. This provides some confidence that the weekly intake process is assigning participants in a consistent manner. Analysis of the three employability groups in the evaluation section of this report gives additional support to the fact that this occurred.

Table 12. Assigned Predicted Probabilities by Weekly Intake

Week	Number of persons	Predicted probability		
		Mean	Minimum	Maximum
1	55	0.280	0.071	0.642
2	73	0.270	0.072	0.603
3	77	0.247	0.054	0.571
4	52	0.246	0.045	0.619
5	71	0.256	0.026	0.596
6	60	0.244	0.038	0.597
7	59	0.244	0.029	0.667
8	62	0.229	0.030	0.583
9	51	0.218	0.032	0.506
10	61	0.247	0.030	0.534
11	63	0.243	0.052	0.552
12	113	0.212	0.023	0.590
13	85	0.223	0.034	0.584

K. Alternative Specifications

Several variations of the model used to estimate employability scores were tried. The first variation excluded the prior employment variables--prior to current enrollment and prior to previous enrollment. The results are in column A of Table 13. As indicated by the pseudo R^2, the percentage of the variation explained in the occurrence of employment is smaller without the prior employment variable. Another issue was whether different model specifications would change the ranking of individuals according to the predicted probability. Table 14 displays the correlations of the predicted probabilities from the various models. The high correlations indicate that the ranking of participants using the various specifications is similar. The correlation of the predicted probabilities derived from the model with the prior employment variables (labeled “pempq4") and without the prior employment variables (labeled pempq4b) is 0.84. Since including age in the statistical assessment model may be a concern, we have excluded it from the basic model but left in the prior employment variables. The correlation between the two probabilities is 0.98, suggesting that excluding age may not change the ranking of the employability scores to any significant extent.

Table 13. Logit Model Specifications

	Basic model		Basic model minus prior employment		Basic model minus age	
	coef.	t-ratio	coef.	t-ratio	coef.	t-ratio
single parent	0.223	1.49	0.171	1.13	0.209	1.35
age	0.115*	2.79	0.115	2.66		
age2	-0.002*	2.60	-0.0016	2.47		
no schooling	-1.80*	3.24	-1.74	3.18	-1.80	3.25
grlt9	-0.454	1.50	-0.497	1.67	-0.481	1.61
gr9	-0.167	0.66	-0.156	0.635	-0.190	0.756
gr10	-0.775*	3.55	-0.743	3.48	-0.780	3.59
gr11	-0.431*	2.74	-0.429	2.79	-0.475	3.04
ged	0.174	1.07	0.185	1.17	0.209	1.30
voc ed	-0.591	1.21	-0.643	1.34	-0.539	0.486
post1	0.079	0.159	-0.017	0.034	0.115	0.230
post2	0.162	0.371	0.248	0.587	0.202	0.460
post3	0.011	0.013	-0.218	0.246	0.051	0.058
goodwill	-0.463*	2.49	-0.480	2.65	-0.467	2.51
foundation	-0.560*	3.41	-0.642	3.98	-0.569	3.47
notarget	0.064	0.055	0.071	0.625	0.090	0.782
addate	-0.003*	5.42	-0.003	5.38	-0.003	5.60
code20_1	1.11*	7.68			1.10	7.65
code20_2	-0.394	0.373			-0.294	0.278
nocompl	-0.750*	2.67	-0.804	2.92	-0.721	2.57
constant	36.92*	7.26	36.05	7.09	39.97	7.17
R^2	0.101		0.072		0.096	

Note: (*) denotes statistical significance at the 0.05 level. YOU is the omitted service provider.

Table 14. Correlations of the Predicted Probabilities of Different Model Specifications

	pnoage	pempq4	pempq4b
pnoage (no age variables)	1.0000		
pempq4 (basic model)	0.9787	1.0000	
pempq4b (no prior employment variables)	0.8141	0.8440	1.0000

III. Implementation of the Statistical Assessment and Referral Work First Operating System

A. Assignment of Providers to Serve Customers with Specific Scores

The purpose of the Kalamazoo/St. Joseph Work First pilot was to demonstrate the usefulness of statistical tools in assessing the needs of customers and in referring them to services that are more appropriate in meeting their needs. The desired outcome was an improvement in the retention rate (as measured by 90 consecutive days of employment) of welfare recipients. The pilot was designed to comply with state regulations for administering and delivering services and to work within the existing operating system of the local Work First program.

The pilot was launched in January 1998. The staff of the Kalamazoo/St. Joseph WDB operated the pilot, in cooperation with staff of the three organizations providing services to Work First participants. The pilot focused on Work First participants residing in the greater Kalamazoo area. This area was served by three providers: Goodwill Industries, Behavioral Foundation, and Youth Opportunities Unlimited (YOU). The three subcontractors provided employment services to welfare recipients in accordance with state guidelines for Work First. Before the pilot was initiated, participants were randomly assigned to the three providers, because there was no way to assess the needs of individual customers.

Under the pilot, Work First participants were referred to one of the three providers depending upon their employability score. WDB staff determined through their own observations and through the development of the statistical assessment tool that each provider differed sufficiently in their approach and philosophy toward delivering the prescribed services. Staff also observed that different providers met the needs of some customers better than the needs of others. This tendency was supported by the statistical analysis. The staff determined that Goodwill should serve customers with the lowest predicted probability of employment, since it provided more hours of assessment and employability and since its approach to services was more conducive to helping those with fewer job-ready skills. The staff also

determined that Behavioral Foundation should serve those participants with the highest employability scores, since their philosophy of delivering services was more self-directed and self-paced. These two decisions left YOU to provide services to the middle group.

The staff's determination as to which provider should service which target group was supported by analysis of administrative data prior to launching the pilot. After the assessment tool was estimated, additional administrative data were used to estimate the relative effectiveness of the three subcontractors in contributing to the outcomes of the three groups of clients. This test was based on the performance of the three providers at a time clients were randomly assigned to each of them. The random assignment helped to provide a valid test of the providers' effectiveness. If this were not the case, then econometric methodologies to adjust for selection bias would have had to be considered.

Since each of the three subcontractors could accommodate roughly a third of the participants, we divided the distribution into thirds. If the capacity of any of the three providers changed, the distribution was divided accordingly.[15] Figure 8 shows how participants in the treatment group were assigned. Those participants with scores in the first third of the distribution (low scores) were assigned to Goodwill; those in the middle third to YOU; and those in the top third (high scores) to Behavioral Foundation.

For the purpose of conducting an evaluation of the pilot, participants were split into two groups–a treatment and control group–within each of the three segments of the employability score distribution.[16] The treatment group was assigned to providers according to the criteria described above.

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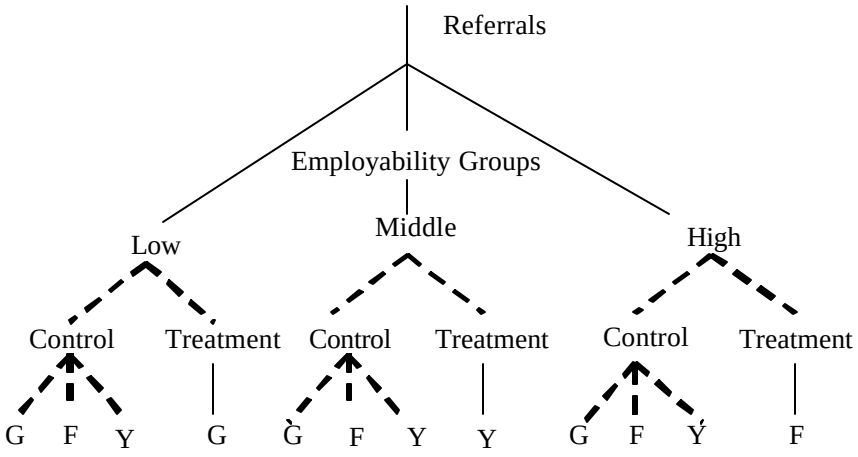
[15]As discussed below, it turned out that throughout much of the pilot YOU could accommodate only 20 percent of the participants, leaving Goodwill and Behavioral Foundation to split evenly the remaining 80 percent.

[16]Later on in the paper when the evaluation of the program is discussed, the term "treatment group" and "control group" is used in a different way. Here, treatment refers to the assignment made before the pilot began, and the control group is randomly assigned to providers. Later on in the paper, the treatment group refers to the optimal assignment derived from different combinations of referrals to providers of those in the control group, whereas the control group refers to the group derived from randomly assigning participants to providers. Additional explanation will be offered in the evaluation section.

The purpose of the treatment group is to determine whether the assignment of participants to providers before the pilot began is consistent with the optimal assignment determined after the evaluation of the pilot. The control group was randomly assigned to the three subcontractors within each of the three groupings of the distribution. The purpose of the control group is to determine if different combinations of referrals for each of the three groups of participants yielded different employment outcomes. If so, this would support the premise that targeted referrals, based on a statistical assessment tool, could improve the outcomes of the Work First system.

Figure 8: Random Assignment Procedure



Note: Dashed lines indicate that participants were randomly assigned to the next stage of the process. G refers to Goodwill, F to Foundation, Y to Youth Opportunities Unlimited.

B. Intake Software Development

After the statistical assessment tool was estimated and the assignment of providers was determined, the next step in implementing the pilot was to design a computerized intake process. Employability scores were assigned to each participant during the intake process and those scores were used to assign participants to providers, as described above. For purposes of evaluation, the intake process also randomly assigned participants to a treatment and control group and assigned those within

the control group to the three providers. An overarching criterion for the computerized intake process was for it to be easily understood, for a staff person to be able to operate it easily, and for it not to encumber the intake process.

The computerized intake process was developed so that one staff member could operate it on a laptop computer using a readily available database software package, in this case Lotus Approach. The system was developed by research staff from the Upjohn Institute in collaboration with WDB staff. A detailed description of the computerized intake process is included in the appendix. A key component of the process was the ability to enter into the laptop's database the relevant information about each participant who was scheduled to report for orientation on a specific day. Having much of their information already loaded onto the laptop reduced the amount of time required to the time of enrollment. The software program was designed to visually flag variables that were missing from the downloaded data so that the participant could supply the missing information as they enrolled in the program.

Two staff members from the WDB were trained to operate the computerized intake process. Only one part-time staff person was needed to operate the laptop during the actual intake process, but an additional person was trained in order that someone was available to fill in if needed. The training took about half a day, with some updating of procedures as changes in the reporting of some information occurred during the time the pilot was in operation. It was also necessary to coordinate activities with the data entry staff from the WDB, who maintained the administrative database for the Work First program. Coordination was required because data had to be downloaded from the Work First master administrative database to the laptop. Data from the laptop were not uploaded to the master files. Any information that was supplied by the participant and generated for the pilot program, such as who was assigned to a control or treatment group, was maintained on a standalone file.

C. Intake Procedure

The intake process took place as follows. Individuals who were granted cash assistance from the Family Independent Agency (FIA) and met certain requirements were referred to Work First. Those individuals were then notified to report to orientation at a specific time. Orientation typically took place once a week. Prior to the day of orientation, data for those participants who were scheduled to report for orientation that day were downloaded to the laptop computer from the state master file. The staff person responsible for the intake process verified that the data were for the correct date, that the printed sheets reflected the correct total participants, and that all the relevant information present in the master file was properly downloaded into the spreadsheet.

As individuals entered the facility where the orientation was held, they were handed a sheet that listed the information needed to generate their employability scores, such as prior employment, education, and so forth. They were asked to fill in any missing information that was not already downloaded from the master file. As they entered the orientation session, they returned the sheets to the staff person operating the laptop computer. During orientation, which typically lasted up to two hours, the laptop computer operator entered the missing information supplied by the participants. For those who were on the schedule, the operator had only to enter their social security number and the pre-downloaded data appeared. If information was missing, the operator entered it into the computer database from the sheets filled out by the participants. For those who reported to the program but were not scheduled to enroll that day, a new record was created so long as their information was found in the master file.

Once all the participants' information was entered into the database, the program automatically computed employability scores for each individual and assigned participants to providers. The program printed a form for each participant that included the name of the provider to whom they were to report, the time and day they were expected to report, and the provider's address and telephone number. The appropriate form was distributed to participants as they exited the orientation session. For the few

individuals who did not want to report to their assigned provider, perhaps because of a prior experience, they were assigned to an alternative provider, which was duly recorded in the database. Very few participants requested a provider other than the one to which they were originally assigned.

The rest of the Work First program remained the same as it was before the pilot. Participants reported to their assigned provider and received the services that they offered. The WDB tracked and recorded the activities of the enrollees while they participated in the program. WDB staff contacted welfare recipients who left the program with a job after 90 days to determine their employment status. Those employed for 90 consecutive days were considered to have achieved a successful outcome.

IV. Evaluation of the Kalamazoo/St. Joseph Work First Pilot Project

A. Purpose and Design of the Evaluation

The Kalamazoo/St. Joseph Work First pilot was evaluated using a random assignment methodology. The goal of the pilot was to determine whether a statistical assessment tool can help identify the needs of clients and then whether using that tool to refer participants to service providers increases the effectiveness of the Work First program. The principal measure of effectiveness was the *retention rate*, which is defined as the percentage of participants who were employed 90 consecutive days in a qualified job.[17] A qualified job was one that was unsubsidized, offered a minimum wage, and at which the participant worked more than 20 hours per week. The state designated the retention rate as one of the performance criteria for Work First. The other performance criterion was the placement rate, which was defined as the percentage of participants who engaged in full time or part time work in an unsubsidized qualified job. The evaluation focused on retention rates as the performance outcome. Placement rates were not considered in the evaluation, because the statistical assessment tool used to separate participants into the three employability groups was based on retention rates and not placement rates. Hourly wages and weekly hours worked, however, were used along with the cost of the pilot to compute a benefit-to-cost ratio.

The evaluation included participants who entered the program from March 1998 to March 2000. Although the pilot began in January 1998, the evaluation was delayed a few months in order for the staff to become acquainted with the program and to minimize any difficulties associated with the computerized intake process. During the two-year period, nearly 3,600 welfare recipients who were single parents were assigned to the three providers serving the Kalamazoo area. Two-parent families were also served, but they were not included in the pilot nor in the evaluation. About half the

[17] During the last six months of the two-year pilot, the state replaced the retention rate, defined as 90 consecutive days of employment, with a slightly different criterion. This criterion was based on the wage level and weekly hours. However, success rates using the new criterion compared favorably with the success rates based on the previous one, so we used the new criteria for the last six months without concern about biasing the results in any significant way.

participants went through the program at least twice. For purposes of the evaluation, if a person appeared more than once in the program, only their last appearance was included. This approach was adopted to avoid biasing the evaluation towards multiple enrollees.[18]

In order for the pilot to be successful, three components had to be effective. First, the statistical assessment tool had to predict the employability of welfare recipients with sufficient precision to separate the participants into three distinct groups. Second, providers had to offer services in a sufficiently different way so that services could be targeted to meet the particular needs of the various groups. Third, one had to determine which provider could best meet the needs of each group of welfare recipients. The first condition–the precision of the statistical assessment tool--was discussed in a previous section, and it was shown that it could separate the welfare recipients into three relatively distinct groups, as indicated by the confidence intervals. The second condition was supported by opinions of the WDB staff that the three providers had different philosophies and approaches to providing employment services to welfare recipients and that those differences could serve one group better than another. The statistical analysis also suggested that the participants spent varying amounts of time engaged in at least one service activity, depending upon to which service provider they were assigned.

The third condition requires that the proper assignment of welfare recipients to providers is known before they enroll in the program. The proper assignment is one that yields a higher retention rate among the possible combinations of providers and groups of welfare recipients than would occur from simply randomly assigning participants to providers, as was done prior to the pilot project. Three methods are possible. One is to use the opinions of staff to determine the proper assignment. The second is to analyze the outcomes of participants who had enrolled in Work First prior to the pilot. The third approach combines the two, which was the method used in the pilot to assign participants in the

[18]One could argue that including the same person more than once in the evaluation overweights that person's experience relative to those who entered the program only once. More will be said about this approach in a subsequent section.

treatment group to the various providers. Those in the low employability group were assigned to Goodwill Industries, those in the middle group to YOU, and those in the high group were assigned to Behavioral Foundation. Of course, other combinations of referrals are possible. Manski (2001) suggests that the best approach of determining the proper assignment is to run a small random assignment experiment before the targeting program begins and then to use the results of this experiment to assign participants in the treatment group to service providers.

B. Random Assignment Procedure

The treatment in this pilot project was different from that typically found in other demonstrations. Instead of testing the effectiveness of receiving a specific service versus not receiving the service, the purpose of the pilot was to demonstrate the relative effectiveness of referring participants with specific employability scores (and thus specific needs) to various service providers. In order to examine the effectiveness of these different combinations of referrals, participants in the control group were randomly assigned to each of the three subcontractors. The relative effectiveness of the six combinations of referrals was evaluated.[19] By comparing the retention rates of the combinations from the treatment group that correspond to those in the comparison, we can then determine the relative performance of the treatment group. Since the referrals to the treatment and control groups and to the various combinations within the control group were randomly assigned, the combinations of referrals in the treatment and control groups should closely match.

The random assignment procedure, integrated into the computerized intake process, took place in three steps. As shown in Figure 8, participants were first divided into one of three groups, depending upon their employability score. Assignment of participants to the three employability groups was based on their relative ranking in the distribution of employability scores of those who enrolled in Work First at that session: it was not based on a pre-determined cutoff value. Those participants with employability

[19]Three providers and three groups of participants can be sorted into nine distinct combinations. Only six are used in the evaluation, however, since participants had to be referred to each provider, according to the contractual arrangements.

scores in the lowest 40 percent of the distribution were assigned to the low employability group (L), the next 20 percent were assigned to the middle group (M), and the highest 40 percent were assigned to the high group (H). Second, those within each of the three groups were divided equally into control and treatment groups. Third, enrollees in the control group were randomly assigned to one of the three providers. Those in the treatment group were assigned to a pre-determined provider that was considered to be most effective for those in each of the three employability groups. The middle group included only 20 percent of the participants because the treatment provider for that group, YOU, was limited by its capacity to accommodate only that percentage of enrollees.

The actual assignment of employability scores was different from the way in which the statistical assessment model was originally estimated. The model was estimated based on the entire set of individuals who participated in and completed the program during a year's time. The computation of employability scores, based on the coefficients from the model, was done at each intake and orientation session, which took place twice a week. Obviously, only a small number of people who participated in the program attended each session. During the pilot, 30 to 40 people would typically show up for each session. When we developed the pilot, we anticipated that there might be a difference in the distribution of participants with respect to employability scores at each session. We found, however, that the distribution was roughly the same each week, for a sample of several weeks, and that the range was comparable to the range of the full sample of participants enrolling in the program during an entire year, as shown in Table 12.

The actual intake process was confounded by other factors. First, not all participants who showed for orientation were included in the pilot. Of the 30 to 40 people who showed up, only about half were included. Some were excluded because their records were not found in the master file. Without those records, participants could not be assigned an employability score, and without being part of the master file their activities and their employment outcome could not be tracked. In addition, others were dropped from the evaluation because they were enrolled in the two-parent program, which was

not part of this evaluation (even though they received services alongside those in the single-parent program).

Because of the small number of participants at each session, it may be the case that individuals in attendance on any given day were not fully representative of the Work First population. In examining the distribution of employability scores for each session, we found that on some days the employability scores would cluster on the high side, while on other days they would center on the low side of the distribution. Since the cutoffs were determined by dividing the distribution of scores of individuals who showed up on a given day, it is possible that individuals with lower-than-average employability scores on one orientation day were assigned to the "high" employability group, while on another day individuals with higher-than-average employability scores were assigned to the "low" employability group. It depended upon who was referred to a particular session.

Another difference between the employability scores as originally estimated and those assigned to participants during the pilot was the magnitude of the score. We noticed that the employability scores declined over the year in which the statistical assessment model was estimated. This relationship was consistent with the general observation by the WDB staff that as an increasing number of Work First participants found jobs, those remaining had lower skills and were harder to place into jobs and more difficult to serve. To account for this trend, we included in the model the date that the participant enrolled in the program. The coefficient on this variable (enrollment date), as shown in Table 8, was relatively large and highly statistically significant. The value of the coefficient (-0.003) was large relative to the mean of the variable (approximately 14460, which is the date expressed in machine language).

Nevertheless, it turned out that, as time increased from the date in which the model was estimated to when it was used to assign the employability scores, the coefficient played a much larger role in determining the size of the predicted value. The mean value of the employability score fell from about 0.30 in the original model to 0.05 in the evaluation. Most of the difference was due to the more

advanced date. When the date is rolled back to its average value during the period in which the model was estimated, the mean employability score for the sample used in the evaluation increases to 0.46.

Further investigation shows that the rank ordering of employability scores computed with and without the adjustment for the time is highly correlated. The correlation coefficient of the actual employability score assigned to participants during the evaluation and the hypothetical one when the date of enrollment is rolled back by two years is 0.82. Therefore, since the assignment of a participant to a provider is based on the relative position of the individual in the distribution and not on a specific cutoff point, it is reasonable to conclude that the referrals would be roughly comparable regardless of whether the actual score or the time-adjusted score was used.[20]

Despite these confounding factors, the employability score still serves as a way to provide a relative ranking of the likelihood that an individual will find a job. Table 15 shows the means and ranges of employability scores by the three employability groups. With respect to the means, the three groups have the employability scores that one would expect. The scores rank individuals from low to high probability of employment. Although the overall means of the score are lower than the actual employment rates (0.049 vs. 0.157), there is some spread in scores between the three groups. The mean score for the middle group is 52 percent higher than the mean score for the low group, and the mean score for the high group is 65 percent higher than the middle group's average. The range does not follow this pattern as neatly, however. While the person with the highest employability score was assigned to the high employability group, so was the person with the lowest employability score. This assignment presumably resulted from the small number of participants in each session and the nonrandom nature of the referrals by FIA to each session at various times.

[20]In hindsight, however, it would have been better to specify the admission date in another way, perhaps as a quadratic, so that the time effect would not be accentuated so much. The quadratic specification would allow the data to determine whether or not the retention variable linearly related to the admission date.

Table 15. Estimated Employability Scores by Employability Groups

	Mean	Standard Deviation	Minimum	Maximum	Number
Low	0.028	0.026	0.003	0.148	783
Middle	0.043	0.035	0.005	0.142	377
High	0.071	0.071	0.003	0.587	826
All	0.049	0.055	0.003	0.587	1986

The characteristics of participants in each of the three employability groups were also consistent with sorting individuals according to their likelihood of employment. Consider educational attainment and age, displayed in Table 16, both of which have been shown to be positively correlated with the prospects of employment. With respect to educational attainment, those in the high employability group have roughly 1.2 more years of schooling than those in the middle group, and those in the middle group have slightly more than one additional year of schooling than those in the low group. Within each group, educational attainment is roughly the same across providers, although YOU deviates slightly from the norm in the middle and high groups. A participant's age, another variable positively related to employability, also exhibits a consistent pattern across employability groups. Members in the high employability group are two years older than those in the middle group, and those in the middle group are about a year older than those in the low employability group.

C. Program Outcome: Retention Rates

The primary outcome measure for the evaluation is the retention rate–whether the participant was employed 90 consecutive days. Table 17 shows the retention rates of those in the control and treatment groups by employability group and provider. In this case, there is considerable variation both across groups and within groups. Note that the actual retention rate averaged for each group increases from the lowest employability group to the highest. For the control group, it increases from 11.6 percent for the lowest group to 21.7 percent for the highest employability group. The treatment group also follows the pattern of increasing retention rates from low to high employability groups. The same

monotonic increase is exhibited for each provider, except for YOU. Nevertheless, as shown in Table 18, the upper and lower bounds of the 95 percent confidence intervals overlap across the various groups.[21]

Table 16. Years of Education and Age by Provider and Employability Group

Education

	Employability Group					
	Low		Middle		High	
Provider	Control	Treatment	Control	Treatment	Control	Treatment
Goodwill	10.67	10.76	11.80		13.24	
Foundation	10.89		11.76		13.10	12.76
YOU	10.71		12.48	12.60	12.57	
Average	10.78		11.88		13.09	

Age of Participant

	Employability Group					
	Low		Middle		High	
Provider	Control	Treatment	Control	Treatment	Control	Treatment
Goodwill	25.76	26.44	27.51		28.28	
Foundation	25.93		26.52		29.87	29.73
YOU	25.93		28.37	28.07	29.69	
Average	25.87		27.19		29.24	

Table 17. Retention Rates by Provider and Employability Group

	Employability Group					
	Low		Middle		High	
Provider	Control	Treatment	Control	Treatment	Control	Treatment
Goodwill	0.153	0.154	0.219		0.226	
Foundation	0.079		0.145		0.223	0.234
YOU	0.136		0.370	0.170	0.167	
Average	0.116		0.208		0.217	

[21]The overlap is not as great between the low and middle employability groups as it is between the middle and high groups. The difference in the average retention rates for the low and middle employability groups is statistically significant at the 95 percent significance level. On the other hand, the difference in the average retention rates for the middle and high employability groups is not.

Table 18. Upper and Lower Bounds of 95 Percent Confidence Intervals for the Retention Rates of Each Provider

A. Control Group	Employability Groups								
	Low			Middle			High		
	Lower	Mean	Upper	Lower	Mean	Upper	Lower	Mean	Upper
Goodwill	0.094	0.153	0.212	0.124	0.219	0.314	0.162	0.226	0.290
Foundation	0.039	0.079	0.119	0.069	0.145	0.221	0.167	0.223	0.279
YOU	0.049	0.136	0.223	0.188	0.370	0.552	0.068	0.167	0.266

B. Treatment Group	Employability Groups								
	Low			Middle			High		
	Lower	Mean	Upper	Lower	Mean	Upper	Lower	Mean	Upper
	0.119	0.154	0.189	0.117	0.170	0.223	0.193	0.234	0.275

For YOU, the retention rate is much higher for the middle employability group than it is for the high employability group.[22] While the retention rates increase for each provider from low to high employability groups, the difference in retention rates varies from group to group for each provider. This variation, along with differences in retention rates among providers, indicates a comparative advantage among providers in serving participants of various abilities. This will be discussed later as well.

For those who entered the program more than once between March 1998 and March 2000, we included only their last appearance in the evaluation. Table 19 compares the retention rates of the sample that includes only that last appearance to the retention rates of the sample that includes multiple appearances. The retention rate of the sample with multiple appearances is slightly lower, 15.7 percent versus 18.4 percent. This difference reflects the possibility that those who enrolled in Work First more than once have had greater difficulty finding and retaining a job. It is also consistent with the view that by including their last appearance only, the sample contains people who have had more experience with the Work First program and with searching for employment. Nonetheless, there is little difference in the observed comparative advantage of each provider in serving their assigned customers, as measured by the ranking of providers according to their effectiveness in promoting retention. The ranking of the effectiveness of each provider within each group is the same, with one exception: within the low

[22]This difference in retention rates will be discussed later.

employability group, the retention rates for those receiving services from Behavioral Foundation and YOU are virtually identical. The differences in the retention rates, however, are more pronounced in the sample with single appearances than the one with multiple appearances. While recognizing that differences in the retention rates across different combinations of providers and employability groups may not be as large, we base the rest of the evaluation on the sample that includes last appearances only.

Table 19: Comparison of Retention Rates from Single and Multiple Appearance Samples

	Low		Middle		High	
	Multiple	Once	Multiple	Once	Multiple	Once
Goodwill	0.133	0.153	0.202	0.219	0.203	0.226
Foundation	0.104	0.079	0.143	0.145	0.171	0.223
YOU	0.103	0.136	0.265	0.370	0.149	0.167
All	0.113	0.116	0.183	0.208	0.180	0.217

As noted earlier, participants were randomly assigned to a control group and to a treatment group, and the two groups included roughly the same number of participants. Another check of the validity of the random assignment technique used at intake is to compare the retention rates of those within the control group who were randomly assigned to a provider with those in the treatment group who were purposely assigned, or targeted, to a provider. Since enrollees are randomly assigned to the control group or treatment group, this comparison is instructive. As shown in Table 17, the retention rates are similar for the low and high employability groups. In the low group, the treatment group was assigned to Goodwill. This group had a retention rate of 15.4 percent, which is virtually identical to the retention rate of 15.3 for those in the control group assigned to Goodwill. In the high group, the treatment group was referred to Behavioral Foundation. This group had nearly the same retention rate as those in the control group who were referred to Behavioral Foundation, 23.4 percent versus 22.3 percent. Results of a *t*-test show that the retention rates are not statistically significantly different at the 95 percent confidence level.

The only statistically significant difference in retention rates between the treatment and control groups for the same combination was with the middle group. The treatment group, which was assigned

to YOU, had a retention rate of 17.0 percent. The difference in the two rates is much larger than expected, and the rate for the control group is out of line with those of the retention rates of YOU participants in the low and high employability groups. One explanation for this difference is the small sample size of the control group referred to YOU. As shown in Table 20, the control group assigned to YOU in the middle employability group included only 26 participants, compared with 194 for the treatment group. The assignment to a control group and treatment group was blind to both the participants and the staff of YOU. Participants from both groups attended the same services provided by YOU. Because the assignment was blind, there is no reason to believe that the staff treated the two groups differently.[23]

Table 20: Number of Participants Assigned to Each Provider

	Employability Group							
	Low		Middle		High		Total	
Provider	Control	Treatment	Control	Treatment	Control	Treatment	Control	Treatment
Goodwill	144	402	73		164		381	402
Foundation	177		83		211	402	471	402
YOU	59		26	194	54		140	194
Total	380	402	183	194	429	402	992	998

D. Variation in the Outcomes of Different Combinations of Providers

In order to determine whether different combinations of assignments of employability groups to service providers yield different outcomes, we examined six combinations that occurred during the study period. More than six combinations are possible with three providers and three employability groups by assigning more than one employability group to a provider. Nevertheless, we adhered to the WDB's contractual arrangement during the pilot that all three providers would deliver services. Therefore, we eliminated from consideration combinations that assigned two or three groups to one service provider.

[23]One difference between YOU and the other two providers was that YOU served two-parent families at the same time it served single parent families. The programs are different, but there is no apparent reason why this would have yielded the high retention rates for the control group.

The effects of the various combinations are measured by computing the number of participants belonging to each employability group who retained their jobs, assuming everyone in that group received services from the same provider. To illustrate this approach, consider the first combination listed in Table 21. The designation "gyk" refers to the combination in which all participants in the low employability group (the left-most group in Table 17) are assigned to Goodwill (g); all participants in the middle employability group are assigned to YOU (y); and all participants in the high employability group are assigned to Behavioral Foundation (k). Since participants in the control group were randomly assigned to each of the providers within each of the three employability groups, using the subgroup assigned to a particular subcontractor to represent the effects for everyone in that employability group is a sound approach.

Table 21: Number of Participants Employed 90 Consecutive Days by Combination of Providers

		Employability Group				
Combination of Providers		Low	Middle	High	Total	Ranking
1	gyk	58	68	96	222	1
2	gky	58	26	72	156	5
3	ygk	52	40	96	188	3
4	ykg	52	26	97	175	4
5	kyg	30	68	97	195	2
6	kgy	30	40	72	142	6

Note: Providers are designated as letters: "g" Goodwill; "k" foundation; and "y" YOU. The combination "gyk" refers to low employability group assigned to Goodwill, the middle employability group to YOU, and the high employability group to Behavioral Foundation.

Using this approach, the appropriate retention rate for each employability group (obtained from Table 17) is multiplied by the total number of participants in the control group in order to compute the number of participants within that group who retained their jobs for 90 consecutive days. For instance, for the first combination, the retention rate of 0.153 for Goodwill is multiplied by 380, the size of the control for the low employment group. This yields 58, which indicates that 58 participants (out of a total of 380) in the low employability group of the control group would have retained their jobs if all were assigned to Goodwill. The same calculation is performed for the middle group, multiplying 0.370 by 183 which yields 68, and for the high group, multiplying 0.223 by 429 gives 96. Summing these three figures

yields the total number of participants in the three control groups who retained their jobs. Dividing by the total number of participants in the control groups (992) results in the hypothetical retention rate if the combination "gyk" were used to assign participants.

Performing these calculations for all six combinations provides a convenient measure of the effectiveness of the various combinations. As shown in Table 21, the number of retentions ranges from a high of 222 for the combination "gyk" to a low of 142 for "kgy". The difference between the highest and lowest is 80 retentions, or 56 percent. The difference between the highest number and the average is 47, or 27 percent. That is, the optimal combination of providers "gyk" yields a 27 percent higher retention rate than if the participants were randomly assigned to the providers. The results indicate that using the statistical tool to assess and refer Work First participants to providers increases the effectiveness of the program without significantly increasing staffing or changing the nature of the services.

Most of the differences between any of the various pairs of combinations are statistically significant at the 95 percent significance level. Table 22 displays the difference in the retention rates and the *t*-statistics for each pair of combinations. For instance, the difference between the retention rate for combination "gyk" and combination "gky" is 0.066 (e.g., 65/992). The *t*-statistic for this pair is 5.26, which is much greater than the critical value of 1.96 for a 95 percent significance level. Note that 10 out of the possible 15 pairs are statistically significant. Only those with differences in the retention rates of less than two percentage points (approximately 20 participants out of 992) are not statistically significant.

Based upon the analysis of the effectiveness of the combinations of providers, it appears that Goodwill had a comparative advantage in serving low employability participants, YOU in serving middle employability participants, and Behavioral Foundation in serving high employability customers. This combination of assignments was the same as the treatment group, which was determined by staff knowledge of the approaches taken by each provider and an analysis of welfare recipients who had

participated in the program before the pilot began. It was beyond the scope of the pilot, however, to determine the specific aspects of each provider's approach that led to this outcome.

Table 22. Differences in Retention Rates between Pairs of Combinations of Providers

A. Differences in Retention Rates

Provider Combination		1	2	3	4	5	6
1	gyk	-	0.066*	0.034*	0.046*	0.026*	0.080*
2	gky		-	-0.031*	-0.019	-0.039*	0.014
3	ygk			-	0.012	-0.008	0.045*
4	ykg				-	-0.020	0.033*
5	kyg					-	0.053*
6	kgy						-

B. *t*-Test of Difference in Retention Rates

		1	2	3	4	5	6
1	gyk	-	5.260	2.671	3.654	2.028	6.487
2	gky		-	-2.603	-1.618	-3.245	1.244
3	ygk			-	0.986	-0.644	3.842
4	ykg				-	-1.630	2.860
5	kyg					-	4.481
6	kgy						-

Note: Standard deviation derived according to the following formula:

$$\sqrt{\hat{p}\,\hat{q}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}$$

where $\hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$; $\hat{q} = 1 - \hat{p}$; and x_1, x_2 are number of successes in the samples of size n_1 and n_2. *t*-statistics greater than 1.96 indicate that the null hypothesis of no difference in retention rates can be rejected at the 95 percent significance level, denoted by asterisk (*).

As previously noted, the retention rate for those in the middle employability control group assigned to YOU is higher than the rate for the treatment group assigned to YOU. If, as intended, individuals were randomly assigned to the treatment and control groups and then those within the control group were randomly assigned to the providers, one would expect the two retention rates to be similar. We tried two alternative approaches of deriving retention estimates for the different combinations that

may mitigate the problem. The first approach controls for factors that could be responsible for the significant difference between the treatment and control groups assigned to a specific provider. One possible factor is the date in which participants enter the program. It could be the case that, because of the small number enrolled during each session and the nonrandom nature of referrals from FIA, the time of enrollment may lead to these differences. The second method was to combine the outcomes of both control and treatment groups. In this way, we reduce the effect of the timing of enrollment by considering outcomes from both groups.

The first approach entailed estimating the retention rates for each grouping by controlling for the date of enrollment. Logit estimation was used to relate the event that a person was employed for 90 consecutive days (a binary variable) to the date of enrollment. In addition, nine binary variables, one for each of the nine cells created by the intersection of the employability group and providers, as shown back in Table 16, were generated and included in the estimation. For instance, a binary variable for assignment to Goodwill within the low employability group took the value of 1 if an individual was assigned to that cell and 0 otherwise. The same procedure was followed for the other eight cells. One binary variable was omitted for the estimation. Only the control group was used in the estimation.

The results (not shown) exhibit a statistically significant negative relationship between the probability of employment and the date of enrollment. However, the adjustment did not change the retention rates significantly. In fact, as shown in Table 23, the adjusted retention rate for those in the middle employability group assigned to Goodwill was identical to the actual rate. When these rates are used to compute the retention rate of the various combinations of providers, the ordering is generally the same as it is for the actual rates. As shown in Table 24, the adjusted rates maintain the same general ordering, except for the order of the second and third place, which is virtually a tie. In addition, differences in retention rates are statistically significant for the same pairs of providers as were found for the unadjusted rates, with only two exceptions (Tables 25 and 26). These exceptions did not alter the total number of statistically significant pairs.

Table 23. Estimated Retention Rates Using Logit Estimates Controlling for Admission Date

Provider	Employability Group					
	Low		Middle		High	
	Estimated	Actual	Estimated	Actual	Estimated	Actual
g	0.153	0.153	0.239	0.219	0.235	0.226
k	0.078	0.079	0.158	0.145	0.240	0.223
y	0.150	0.136	0.369	0.370	0.120	0.167

Table 24. Retention Rates by Combination of Providers

Provider	Employability Group					
	A		B		C	
Combination	Actual	Rank	Adjusted	Rank	Combined	Rank
gyk	0.223	1	0.231	1	0.206	1
gky	0.157	5	0.171	5	0.157	5
ygk	0.189	3	0.205	2	0.202	2
ykg	0.176	4	0.188	4	0.177	4
kyg	0.197	2	0.200	3	0.192	3
kgy	0.143	6	0.157	6	0.143	6

Note: "Actual" refers to all means from random assignment; "adjusted" refers to logit estimates using admission date; and "combined" refers to including both control and treatment groups to compute all means.

Table 25. Differences in Retention Rates between Pairs of Combinations of Providers Using Logit Estimates Controlling for Admission Date

A. Differences in Retention Rates

Provider Combination		1	2	3	4	5	6
1	gyk	-	0.060*	0.026*	0.043*	0.031*	0.074*
2	gky		-	-0.034*	-0.017	-0.029*	0.014
3	ygk			-	0.017	0.005	0.048*
4	ykg				-	-0.012	0.031*
5	kyg					-	0.043*
6	kgy						-

B. *t*-Statistic of Difference in Retention Rates

		1	2	3	4	5	6
1	gyk	-	4.726	1.986	3.334	2.379	5.905
2	gky		-	-2.745	-1.397	-2.355	1.193
3	ygk			-	1.349	0.392	3.931
4	ykg				-	-0.957	2.588
5	kyg					-	3.550
6	kgy						-

Note: *t*-statistics greater than 1.96 indicate that the null hypothesis of no difference in retention rates can be rejected at the 95 percent significance level, denoted by asterisk (*). See Table 22 note for the standard deviation formula.

Table 26. Differences in Retention Rates Between Pairs of Combinations of Providers Using Combined Treatment and Control Groups

A. Combined Treatment and Control

		1	2	3	4	5	6
1	gyk	-	0.050*	0.004*	0.030*	0.014	0.063*
2	gky		-	-0.045*	-0.020	-0.035*	0.014
3	ygk			-	0.025*	0.010	0.059*
4	ykg				-	-0.015	0.034*
5	kyg					-	0.049*
6	kgy						-

B. *t*-Statistic of Differences in Retention Rates

		1	2	3	4	5	6
1	gyk	-	4.893	0.442	2.885	1.423	6.301
2	gky		-	-4.418	-1.865	-3.364	1.319
3	ygk			-	2.226	0.900	5.339
4	ykg				-	-1.307	2.897
5	kyg					-	4.315
6	kgy						-

Note: *t*-statistics greater than 1.96 indicate that the null hypothesis of no difference in retention rates can be rejected as the 95 percent significance level, denoted by asterisk(*). See Table 22 note for the standard deviation formula.

The second approach combined the outcomes of both control and treatment groups. The retention rates for the various combinations of providers are also included in Table 24. Note that the ordering is the same as it is for the adjusted rates, although there is a virtual tie for first place.

The range in outcomes from the various combinations of service providers indicates the difference in effectiveness of the providers in meeting the needs of Work First participants. It also indicates the ability of the employability assessment tool to distinguish among participants. If the tool was not an adequate predictor of a participant's needs, there would not have been the systematic difference in retention rates across employability groups. Furthermore, the differences in outcomes across combinations would not have been as great.

E. Benefit/Cost Analysis of the Statistical Assessment and Referral System[24]

The benefits of using the statistical assessment and referral system can be valued by taking into account the earnings received by those additional participants who retained their jobs. As described in the previous section, the optimal assignment rule yielded a net increase of 47 participants who retained their jobs 90 consecutive days over the number in the group created by random assignment. Consequently, the net effect of the statistical assessment and referral system can be computed by comparing the earnings of those referred by the optimal assignment rule with the earnings of those assigned to the randomly assigned group. A benefit-to-cost ratio is then calculated by first using the net effect to measure the benefit of the system and then dividing it by the cost of the pilot. The benefit-to-cost ratio measures the return to society of implementing and operating the program.[25]

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[24]I wish to thank Kevin Hollenbeck and Jeff Smith for suggestions and guidance on conducting the benefit/cost analysis.

[25]The social value of the new system may be less than the value computed here because of displacement effects among the welfare population. It is conceivable that the additional retention by participants of the program with the new system may displace other welfare recipients from their existing jobs or preclude new Work First participants from finding jobs since the additional retentions reduce the job vacancies. Bartik (2001) estimates that the displacement effect among low-wage workers ranges from 20 to 60 percent. That is, for every ten additional Work First participants who find a retain a job, two to six jobs are lost by other less-educated workers. Therefore, the social value of the additional placements and retained jobs by Work First participants is less than the value

To compute the net effect of the system, the first step is to calculate the earnings for both the treatment group (the optimal referral design) and the control group (the group that would result from randomly assigning participants to providers). Let B_T denote the earnings of the treatment group, and B_C denote the earnings of the control group. The earnings are made up of two components: the number of participants who retained their jobs (R) and the average weekly earnings of each participant in that group during the 90 days (calculated here as 13 weeks) of employment (E). Therefore, the net effect is the difference in the earnings of the treatment group (B_T) and the earnings of the control group (B_C). This difference can be decomposed in the following way, using the control group as the base of comparison:

$$B_T - B_C = [(R_T - R_C) * E_C] + [(E_T - E_C) * R_C] + [(R_T - R_C) * (E_T - E_C)]$$

This decomposition yields the net effect in terms of additional earnings to program participants as a result of the statistical assessment and referral system. Although data are available only at the time of the 90-day followup (these are the values included in Table 27), more than likely the earnings difference continues for several quarters. It is assumed here that the earnings difference continues for eight quarters, with two possible scenarios considered.[26] The first scenario assumes that the difference in the number of participants retaining their jobs for 90 days persists throughout the 8 quarters. The second scenario assumes that the difference in job retention narrows throughout the eight-quarter period until they are equal. In both scenarios, wages are assumed to grow by 3 percent per year, and a 10 percent annual discount rate is used when computing the net present value of the earnings streams.

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computed for the program itself. It should also be mentioned that while society (and most directly participants) may benefit from the additional earnings, current funding arrangements for Michigan's Work First program do not provide additional revenue to local workforce developments boards that generate higher earnings.

[26]Eight quarters may be a conservative estimate, and there is no way to determine from our data the average length of time a participant remains employed nor is it possible to determine the length of time the earnings difference persists. Evaluations of the pre-PRWORA welfare-to-work programs show that the impact on earnings was as strong in the third year after a participant left the program as it was during the first two years (U.S. Department of Health and Human Services and U.S. Department of Education, January 2001, p. 61).

The value for the number of participants in the treatment group who retained employment for 90 days is found in Table 21, and the number of retainees for the control group is computed from the retention rates in Table 17. Average weekly earnings are computed from the hourly wages and weekly hours displayed in Table 27. Table 28 shows average weekly earnings for the various assignment rules and for the control group.

Table 27: Hourly Wages and Weekly Hours of Participants Working 90 Consecutive Days

	Employability Group					
	Low		Middle		High	
	wage	hours	wage	hours	wage	hours
Goodwill	7.02	32.95	6.08	25.94	6.02	28.22
Foundation	5.04	24.64	5.14	25.83	7.43	32.17
YOU	7.03	31.88	6.23	32.00	7.21	32.33
Weighted Average	6.39	30.11	5.82	27.50	6.85	30.61

Table 28. Average Weekly Earnings by Different Combinations of Providers

Combination of Providers	Average Weekly Earnings
gyk (treatment group)	192
gky	211
ygk	181
ykg	175
kyg	165
kgy	189
Randomly assigned (control group)	195

Note: Providers are designated by letters: "g" Goodwill; "k" Foundation; and "y" YOU. The combination "gyk" refers to low employability group assigned to Goodwill, the middle employability group to YOU, and the high employability group to Foundation.

Using these figures, the difference in the earnings streams over 8 quarters is computed and displayed in Tables 29 and 30. The results in Table 29 are based on the assumption that the retention rates remain constant during the 8 quarters after the participant leaves the program. As one can see from the table, the total number of participants in the treatment group who retained their jobs 90 consecutive days remained the same, as did the number retaining their jobs in the control group. It is

assumed, however, that the earnings of the two groups converge, as shown in the last two columns of the table. Based on these assumptions, the net present value of the earnings differential equals $840,827. The results shown in Table 30 are similar to those in Table 29 except that the difference in the number of retained jobs converges until they are equal after 8 quarters. In this case, the net present value of the earnings differential between the two groups is $471,054.

Table 29: Difference in Earnings between Treatment and Control Groups and Benefit-to-Cost Ratio of the System, Assuming Retention Rates Remain Constant

Quarters after leaving program	$B_T - B_C$	R_T	R_C	E_T	E_C
1	$112,179	222	175	$192.00	$195.00
2	$113,666	222	175	$193.44	$196.08
3	$115,165	222	175	$194.89	$197.18
4	$116,675	222	175	$196.35	$198.28
5	$118,197	222	175	$197.83	$199.39
6	$119,730	222	175	$199.31	$200.51
7	$121,274	222	175	$200.80	$201.63
8	$122,830	222	175	$202.31	$202.77
Net present value	$840,827				
Program Cost	$145,000				
Benefit-to-cost Ratio	5.8				

Note: This calculation of net impact and benefit-to-cost ratio assumes that the retention rates remain the same throughout the eight-quarter period, while the average weekly earnings converge. Wages are assumed to increase 3 percent per year and a 10 percent discount rate is assumed for the net present value calculation.

Table 30: Difference in Earnings between Treatment and Control Groups and Benefit-to-Cost Ratio of the System, Assuming Retention Rates Converge

Quarters after leaving the program	$B_T - B_C$	R_T	R_C	E_T	E_C
1	$112,179	222	175	$192.00	$195.00
2	$98,706	216	175	$193.44	$196.08
3	$85,073	210	175	$194.89	$197.18
4	$71,279	204	175	$196.35	$198.28
5	$57,321	198	175	$197.83	$199.39
6	$43,197	193	175	$199.31	$200.51
7	$28,906	187	175	$200.80	$201.63
8	$14,445	181	175	$202.31	$202.77
Net present value	$471,054				
Program Cost	$145,000				
Benefit-to-cost Ratio	3.25				

Note: This calculation of net impact and benefit-to-cost ratio assumes that the retention rates and the average weekly earnings converge during the eight-quarter period. Wages are assumed to increase 3 percent per year and a 10 percent discount rate is assumed for the net present value calculation.

The additional costs incurred to develop and operate the statistical assessment and referral system for the two-year life of the pilot totaled $145,000. This expense included designing and integrating the system into the existing Work First program, which cost roughly $105,000, and hiring a part-time person to administer the system during the intake and orientation process, which amounted to another $40,000 during the two-year period.[27] Operating this system requires hiring a part-time staff person who downloads the data from the master files prior to the weekly orientation, enters missing data during the orientation, and runs the programs that generates the employability score for each participant and refers them to providers. These tasks took no more than 6 hours a week for the pilot project. The

[27]The development of the system was funded by the U.S. Department of Labor. Therefore, including the entire cost of development when calculating the benefits and costs of the system to an individual program overstates the costs. Replicating this system in other Work First programs would conceivably cost considerably less, since these other programs can adopt the general design and the basic structure of the system already developed for this pilot program.

amount of staff time required to operate the system in other programs depends upon the number of participants going through the program and the frequency of the orientation sessions. Obviously, if the retention rates are roughly the same regardless of the size of the program, those programs with more participants will also have proportionally more participants retaining their jobs. Therefore, the additional earnings due to the system will also be proportionally larger and is likely to exceed the additional costs.

Based on the difference in earnings computed above and the total cost of designing, implementing and operating the system, the benefit-to-cost ratio ranges from 3.25 to 5.8, as shown in the bottom rows of Tables 29 and 30. Assuming longer streams of earnings differentials between the two groups would obviously increase the return to this program. Nevertheless, the more conservative estimates of earnings used here demonstrate that the benefits of the system exceed its costs.

V. Replicating the Pilot in Other Areas: Broward County, Florida

As part of its responsibilities under a grant from the U.S. Department of Labor to conduct the Work First pilot, the Upjohn Institute was asked to provide technical assistance to states and local employment service agencies that were interested in developing a similar assessment and referral tool. The Florida Institute for Career and Employment Training (FICET), located in Broward County, Florida, expressed an interest in the tools developed by the Institute. FICET is affiliated with Florida Atlantic University and is sanctioned under the Florida Board of Regents with responsibilities in welfare reform and workforce development, among other employment-related activities. Members of their staff, including the executive director, Dr. Phillip Rokicki, and the assistant director, Jorge Zumaeta, attended a technical workshop that the Institute held in August 1998. FICET subsequently applied for and received a grant from the U.S. Department of Labor to develop similar tools for use by Broward's County Work First staff.

FICET developed tools that were similar to those designed by the Upjohn Institute. The overall objective of the pilot was to use the information typically collected at intake to shape a participant's particular mix of programs and services in order to offer the best chance for success. The statistical tools were expected to perform three functions: 1) calculate success ratios based on client characteristics and past performance, 2) estimate the effect of various job training programs/services on employment, and 3) evaluate the program on an on-going basis. These objectives were very similar to those of the Upjohn Institute Work First pilot.

The statistical model was based on a logit estimation in which employment outcome was related to demographic information, a person's work history, and employment services offered by the Work First program. The demographic variables included age, number of children under the age of 13, gender, ethnicity, education, and work experience. The services included employment preparation, GED preparation or some high school, vocational education training, unsubsidized employment, assessment, English as a second language, and other counseling. The option to choose among a set of

services, depending upon the customer's needs, was one of the features that distinguished the Florida program from the Michigan program. In Michigan, each customer received the same set of services regardless of need, with few exceptions. Therefore, in the Michigan pilot, the variation in services was achieved by referring customers to different providers, which offered the same basic services but delivered them in slightly different ways that appeared to benefit some clients more than others. In Florida, the variation of services was more direct by actually referring clients to different services.

Data to estimate the logit model were derived from the TANF database maintained by the Florida Department of Children and Families, which determines eligibility, and from the Work Activity Database, which records activities of TANF clients. The initial estimates were based on more than 7,000 records of Work First participants in Broward County. Broward County has a population of approximately 1.4 million with a labor force of 650,000. The county's unemployment rate during the initial phase of the pilot was about 4.8 percent. The pilot began with about 3,800 active TANF cases.

Work First participants had the following characteristics: 1) the average age was 31, with a range from 16 to 68; 2) 31 percent of the population had completed the 12^{th} grade; 3) 43 percent were classified as high school dropouts, 4) 27 percent graduated from high school or received a GED; and 5) 28 percent had not worked at any job in the past two years.

The statistical model was used to estimate an employability score for each customer. Based upon that score, customers were placed in one of two tracks. Track I included customers with minimal barriers to employment. The cutoff value of the success ratio for this track was set at 70 percent. Customers assigned to Track II had moderate barriers and had a success ratio of less than 70 percent. Once assigned to a specific track, customers then received prescribed services. For instance, those in Track I received core services as described under the Workforce Investment Act. Those in Track II could participate in intensive services, such as job skills training, vocational training, and GED prep, among others. The tool was integrated into the Broward County's MIS system and was used during the intake process.

VI. Conclusion

The purpose of the Work First pilot project is to determine the benefits of targeting employment services to meet the individual needs of Work First participants. The pilot developed a statistical assessment tool to identify the employability of welfare recipients and then used the tool to refer them to service providers that were determined beforehand to best meet their needs. The pilot was conducted at the Kalamazoo/St. Joseph WDB, and its design, implementation, and evaluation was carried out by the W.E. Upjohn Institute for Employment Research. The pilot operated within the budget and program requirements of Michigan's Work First program.

A. Statistical Assessment and Referral System

The statistical assessment tool related personal characteristics and work history of former Work First participants to the event that they worked for 90 consecutive days. Estimates were based on administrative records of welfare recipients who had participated in the Work First program prior to the time of the pilot. The assessment tool was incorporated into an automated intake process that used the estimated coefficients corresponding to the various personal characteristics and other factors included in the model to compute a score, indicating the probability of working 90 consecutive days. A score was computed for each person who enrolled in the Work First program. The score was then used to assign new enrollees to a service provider that was predetermined to best meet their needs.

B. Evaluation Findings

The pilot was evaluated using a random assignment design. At the time of enrollment, participants were randomly assigned to a control group and a treatment group, and within the control group to each of the three providers. Success of the pilot depended upon three components: 1) the ability of the statistical assessment tool to predict with adequate precision the employability of individual participants; 2) sufficient differences in the type of services and the methods of delivering services among the three subcontractors so that some participants may benefit more than others from these packages of

services; and 3) the ability to determine before the referral is made as to which provider is better suited to assist participants as identified by their employability score.

The evaluation yielded the following results. First, the statistical model exhibited sufficient precision to distinguish among participants according to their likelihood of working 90 consecutive days. Second, there was considerable variation in the retention rates among the various combinations of providers offering services to participants in the three employability groups, as identified by the assessment tool. The retention rate of the combination of providers that yielded the highest rate was 56 percent higher than the combination yielding the lowest rate, and 27 percent higher than the average. Third, the predetermined assignment of participants to providers in the treatment group, as determined by the judgement of the staff and by statistical analysis, was the same combination that yielded the highest retention rate according to the random assignment experiment.

While the large difference in outcomes associated with the various combinations of referrals demonstrates the effectiveness of targeting services, it also underscores the importance of properly aligning the statistical assessment tool with the goals of the program and in accurately estimating the statistical assessment model. Results showed a 56 percent difference in job retention rates between the most effective and least effective combination of referrals. If the statistical assessment model is not properly specified and estimated or the model is not aligned with the goals of the program, then the targeting procedure could yield a suboptimal outcome, and perhaps lead to an outcome that is worse than simply randomly referring clients to providers. Consequently, care has to be exercised in specifying the statistical assessment model and in estimating the predicted outcomes, such as the estimation of job retention by the employability score used in the Kalamazoo-St. Joseph Work First pilot program. As shown in the pilot program, successful implementation of such a procedure can increase the effectiveness of a welfare-to-work program, or other similar employment service, in meeting its objectives.

The net present value of the difference in earnings between the treatment group (generated from the optimal assignment rule) and the control group was used to estimate the net impact of the program. The net present value, assuming that the earnings differentials persisted for 8 quarters, ranged from $471,000 to $841,000. Combining these estimates with the total cost of designing, implementing and operating the program of $145,000 yielded a benefit-to-cost ratio that ranged from 3.25 to 5.8. Therefore, the benefits of the statistical and referral system sufficiently covered the operating expenses and the fixed cost of designing and implementing the pilot.

C. Extensions to Other Sites and Programs

The assessment and referral system developed for the Kalamazoo/St. Joseph Work First pilot has been adopted elsewhere. The Broward County (Florida) WIB, in cooperation with the Florida Institute for Career and Employment Training, has adopted an approach that is similar to the one in Kalamazoo. It has been successfully integrated into the WIB's operating system. Employability scores are assigned to individuals entering the program and referral to specific sets of services are based on a participant's score.

The success of the Kalamazoo-St. Joseph Work First pilot in increasing job retention and the successful implementation of the Broward County WIB program open the possibility of adopting similar approaches in other areas and for other programs. The computerized intake process developed for the Kalamazoo/St. Joseph pilot is easily adaptable to other systems. Its standalone nature presents few compatibility problems when integrating it into an existing operating system.

Within Work First programs, the statistical assessment and referral system may take on added value as staff is faced with customers who have fewer skills and thus are harder to serve. As an increasing percentage of Work First customers are having difficulty finding and holding a job, they end up cycling through the program, which increases their frustration in finding a job and uses resources that are proving not to be effective. The evaluation of the Kalamazoo/St. Joseph pilot provides evidence that

targeting services may increase the effectiveness of Work First programs for those who are harder to serve.

The Upjohn Institute, with funding from the Employment and Training Administration of the U.S. Department of Labor, is extending the techniques used in the Work First pilot to develop a set of administrative tools for use within One-Stop Centers. Referred to as the Frontline Decision Support System (FDSS), the purpose of this system is to assist staff in quickly assessing the needs of customers and in referring customers to services that better meet their needs. FDSS includes new tools to 1) help customers conduct a systematic search for jobs that offer the best employment match and to set a realistic wage goal, and 2) assist staff in determining which One-Stop Center services are likely to be effective in meeting the needs of specific customers in becoming employed. The FDSS tools are designed to be used within the current data retrieval and display systems implemented by the states for their One-Stop Centers. These tools have the flexibility to interface with existing operating systems and visual displays of various One-Stop Centers.

The results of the Kalamazoo/St. Joseph Work First pilot and efforts elsewhere provide evidence that the statistical assessment and referral system can be successful in identifying needs and in targeting services to help customers find jobs. The Work First pilot demonstrates that integrating the system into an existing welfare-to-work program can increase the retention rate of participants at little additional cost to the program. The pilot opens the possibility for statistical tools to be used to help improve the effectiveness and efficiency of other employment programs and service delivery systems.

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Appendix

Description of the Automated Database Implemented by Kalamazoo/St. Joseph's Work First Profiling Pilot Project

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I. Introduction: The Purpose of Statistical Assessment and the Role of the Automated Database

The Upjohn Institute designed, tested, and implemented a statistical assessment and referral system, which was integrated into the daily operations of the Work First program that the Institute administers for the Kalamazoo-St. Joseph WDB. As part of this effort, the Institute developed an automated data base system to perform the task of calculating the probability of success in finding and retaining employment for Work First clients, and thus to allocate resources according to levels of need. This appendix includes a description of the automated intake process and a set of instructions that were prepared to train staff on the use of the system. The system, written as an APPROACH database program, is available free of charge to interested parties.

The intake system performed four basic functions. First, it retrieved data on each participant that was scheduled to enroll in Work First on a particular day. The data were obtained from the master files of the Family Independence Agency and downloaded onto the laptop computer which was used during the intake process. Second, the system computed the employability scores, based on the downloaded data. Third, the system assigned participants to the various treatment and control groups and to the various providers, based on the employability score. Fourth, it stored the relevant data that were necessary to evaluate the pilot. The purpose of this appendix is to provide a brief description of the automated database and computerized intake system.

II. The Database: Structure, Record Storage, and Access

A. Structure and Storage

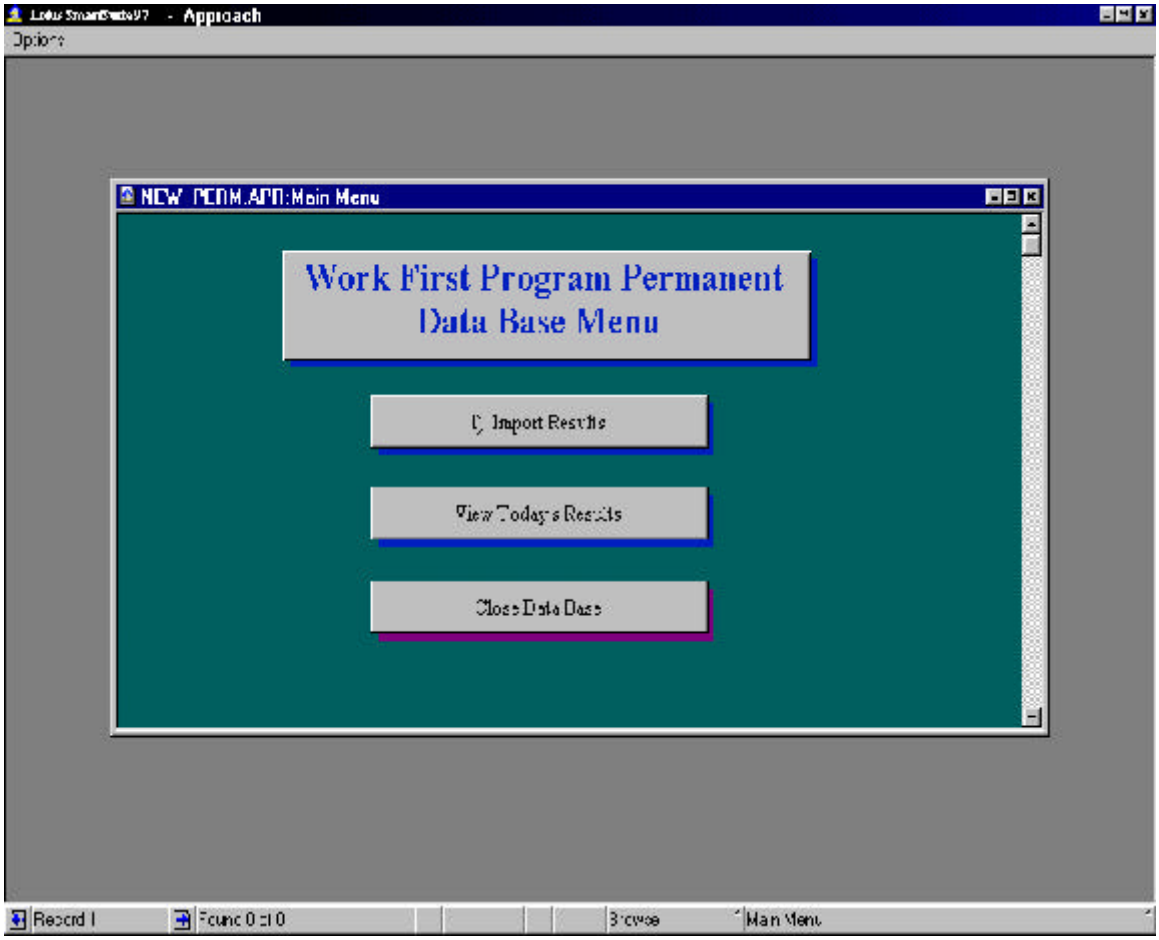
The Work First database used for the assessment and referral system actually consisted of two databases: a "temporary" one for running calculations in the assessment process, and a permanent one to hold the results. Such a composition allowed for a database that stores information with greater integrity. The database was written in Lotus Approach, but other database programs could be used.

With that structure, data for expected orientation participants were imported into the temporary database each day or for each orientation within a day. The data remained in the first database through the completion of calculations. At that point, a flag marking the current orientation's records was set. When the database was closed, the records were then imported into the permanent database, because upon opening the temporary one again, all records with a flag would be deleted.

Since the temporary database contained only records of those individuals expected to enroll on a particular day, there was no possibility that when the processor searched for a person's record it would find or harm a record that was stored from a previous orientation. All such records were maintained in the permanent database for tracking and other purposes.

The temporary database was used primarily by the processor who checked records and completed the statistical assessment for clients present at a given orientation. It was the processor's responsibility to import the current orientation's records into the permanent database. The main menu of the second database contained a button to initialize the importation of data. The computer requested a confirmation for importing, after which the step was completed. At that time, the day's results could be viewed if necessary, but normally a Work First Assignment Sheet for each person would have been printed.

Other than importing and viewing the day's results, the processor had no responsibilities nor privileges within the permanent database. That database had been constructed for the purpose of storing past records and was intended to be used by management or other persons who may be tracking the results and conducting statistical analyses. Certain measures had been taken that allowed for a distinction among users and therefore a distinction of different user levels of access.


Approach
Work First Program Permanent
Data Base Menu
Import Results
View Todays Results
Close Data Base
Record 1
Main Menu

B. Levels of Access

Unique privileges had been assigned to distinct database users for the purpose of maintaining quality data. Through the use of passwords, different types of database users could gain different levels of access. For instance, since the processor worked primarily with the statistical assessment in the temporary database, he or she had privileges only to import and view data in the permanent database. The screen in which the day's results could be viewed was protected by read-only access in this case.

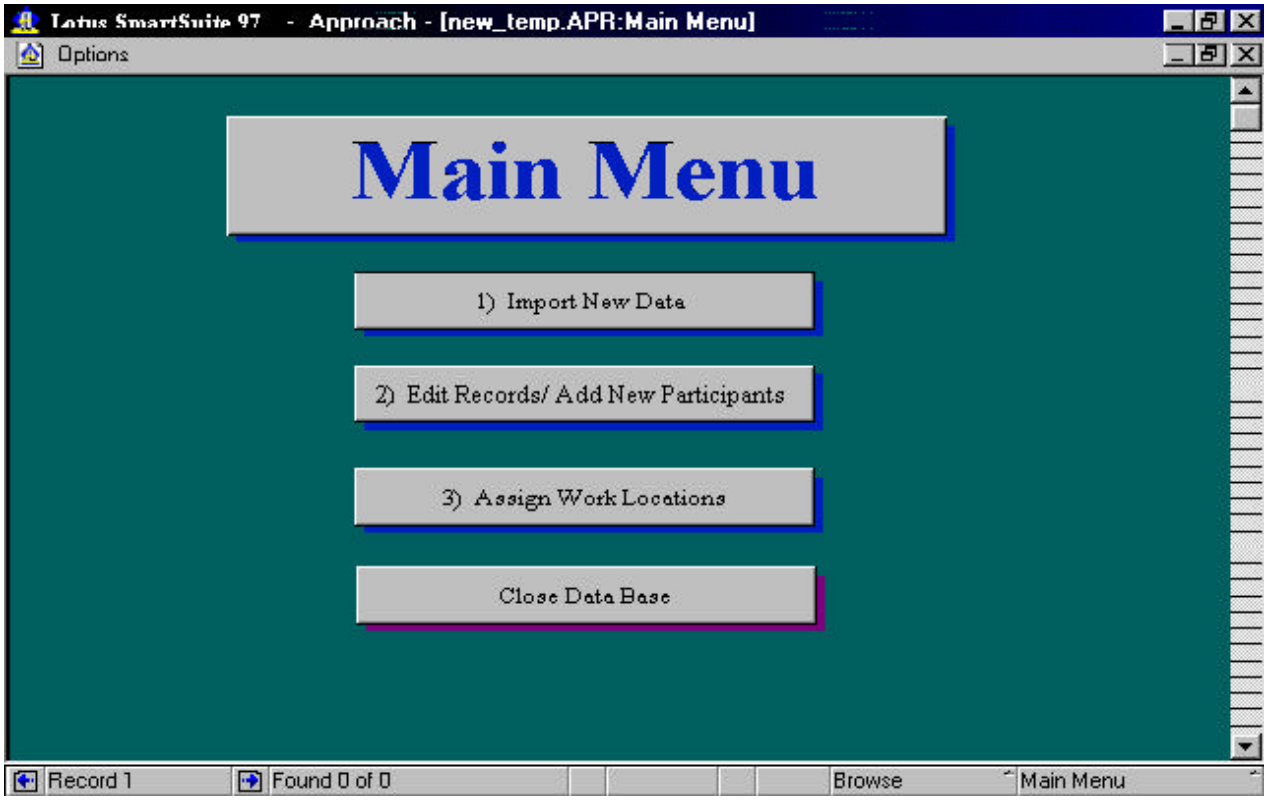
The manager or other persons who used mostly the permanent database had a separate password with greater privileges. While the main menu appeared the same, the pop-up menu in the lower right corner of the status bar allowed access to other spreadsheets or reports he or she created. In addition, the pallet of menus along the top of the screen allowed for many more options.

III. Using the Database: The Statistical Assessment and Referral Process

This section of the Appendix provides instructions for operating the statistical assessment and referral process. In order to use the statistical tool to assess the employability of the welfare recipients referred to Work First, there are four steps in completing the process:

1. Importing new data for each orientation's expected participants.
2. Editing expected participants' records and adding new records for those not scheduled to report at that session.
3. Computing and assigning participants to program destinations.
4. Distributing referral sheets.

While the database program is designed to guide the processor through each of those steps with ease, a walk-through of the process is described below.

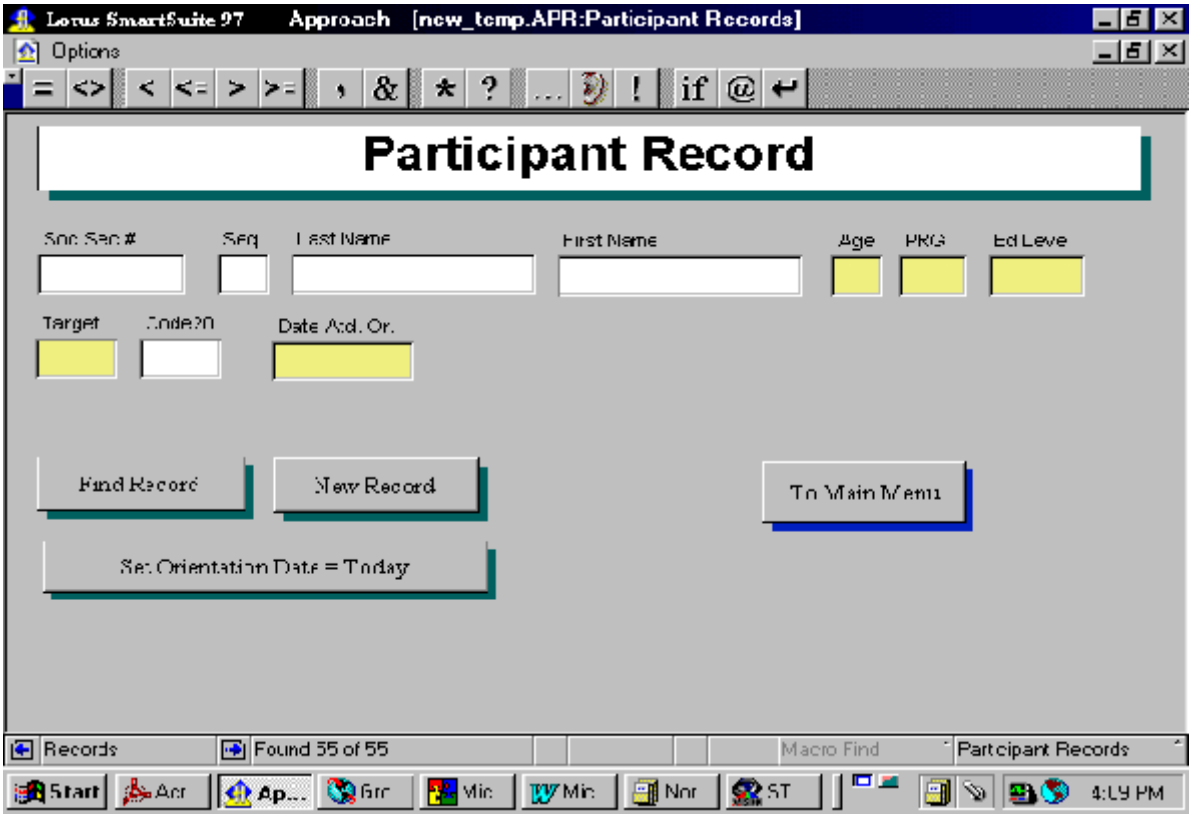


A. Importing New Data

The statistical assessment process begins when the Approach file is opened. By default, the Main Menu is the first view that appears on the computer screen. This view contains four options, the first of which is to import new data. Before importation, data for the day's possible participants are extracted from the master database for the Work First program and then stored in a spreadsheet file. With a click of a button, importing the spreadsheet is automatic, except for confirming that you do want to go ahead with the selection action.

B. Editing and Adding Records

After the day's data have been imported, the processor then moves along to the Participant Record view in order to edit or add new records for today's participants. Upon entering this view, the screen is equipped to search for a record simply by entering a unique identifier, such as a social security number or first and last name, and then pressing <Enter>.



To type a person's social security number or name into a field and find a record, use either the <Tab> key or the mouse. Tabbing is consistent throughout the database and may be a faster means of entering data.

Since search mode is the default when entering the Participant Record view, in order to return to the main menu or do anything aside from searching for a record, one must first hit <Enter> to deactivate the mode.

Upon finding a participant's record, missing information is completed and the orientation date added. While there is an automatic check that the age, marital status, education level, target and code 20 are completed for each record, there is no check for the orientation date. It is particularly important that the processor enter the date for participants in attendance. Without completion of the orientation date, the record and therefore the person will receive neither a group assignment, nor a Work First destination assignment. The process is the same for each person that is present.

If any of the fields for age, marital status, education level, target or code 20 is left blank, a message will appear. The optional responses will be "OK" and "Help." Since "OK" is highlighted, pressing <Enter> will allow the processor to go back and enter the missing age. In order for each of the present participants to be profiled and referred to receivers, these fields must be completed for each of their corresponding records.

When the last name field is used to search for a record, since it is not guaranteed to be unique, as in the case of "Smith" or "Brown," the computer may find more than one record that corresponds to the name entered. The portion of the status bar in the bottom left corner of the screen will indicate if this should occur. In the case that more than one record is found, the processor may forward to the next or previous record by clicking on the arrows in the status bar.

If a person's record is not found or does not exist, he or she was not expected to attend the orientation that day and his or her data were not imported. However, a new record may be added simply by clicking on the New Record button and the person's information entered at the time they enter orientation.

When all participants have been checked in, the processor must then return to the main menu in order to assign participants to a Work First site.

C. Computing Calculations and Assignments

On the main menu there is a button entitled "Assign Work Locations." By clicking on this button, the algorithm calculates the employability scores for each participant and assigns the participant to the appropriate provider. A sheet is printed that contains Work First destination information for each participant. To receive the output, however, the algorithm goes through several steps.

First, since the data that was imported at the beginning of the intake process contained records for all of the day's possible orientation attendees, those not in attendance (or whose records were not found and the dates were not added) are thus deleted. In addition, for the duration of the calculations, people with

a Work First Referral code equal to two are disregarded since they are referred to orientation only and not assigned to a Work First program location.

Next, from the remaining records, participants from a two-parent household (that is PRG=2) are automatically assigned to the destination YOU. These participants are neither part of the treatment group nor the control group for this project. While two-parent families are included in the same intake and orientation session, they are not profiled in the pilot. Only single parents (PRG=1) are targeted for profiling.

The probability of success for each participant is calculated automatically when the data are imported, so the computer needs only to sort the records (where PRG=1) in descending order of probability after which it assigns a rank to each one. Using a random number generating function, each of the single parent participants are placed randomly in either the treatment or the control group. Members of the control group are then randomly assigned, within the bounds of subcontractor capacity, to one of the three possible Work First sites in the pilot model. Capacity is represented in the calculation process as a weight for the percent of total participants that each location may handle.

The remaining members of the treatment group are assigned to destinations according to their probability of success and based upon their ranking among the entire sample of single-parent participants in both the control and treatment groups. Once again, this assignment depends on the available capacity at each of the locations.

Finally, the destination results are printed for each individual.

D. Distributing Referral Sheets

On the Work First Assignment Sheet printed for each individual, only information relevant to the participants is disclosed. Each person receives a print-out containing his or her name, social security number, the orientation date and the place of assignment along with its address. Even the date and time to report are printed according to each individual's Work First site.

For tracking purposes, calculation results such as the probability of success, ranking, group, destination, etc. are stored in a separate and permanent database. If there should be a need to view the profiling results of the current day, there is easy access to the information in the second database.

Work First Assignment

Soc Sec #: **Case Number:**

First Name:

Last Name:

Address:

Today's Date:

The Michigan Family Independence Agency has assigned you to the Work First program. You are scheduled to report to the following agency for services:

Work First Site:

Work First Site Address:

Phone Number:

Contact:

Date to Report:

Time to Report:

The primary purpose of the Work First program is to assist you in locating and obtaining gainful employment. We will begin the assessment of your needs at the above location and time. **We do not have daycare on site.** You will need to find child care for your child/children. If you have any questions, cannot make the appointment, or are currently working, please contact the above person immediately.

If you fail or refuse to appear for this scheduled appointment, action may be taken to reduce or cancel you FIA grant.

In accordance with the Americans with Disabilities Act, this information will be made available in alternative format upon request. Michigan Relay Center, 1-800-649-3777 (Voice and TDD).