

Predicting Employment in the Mental Health Treatment Study: Do Client Factors Matter?

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Abstract For people with psychiatric disabilities, demographic characteristics and measures of clinical status are often used to allocate scarce employment services. This study examined a battery of potential client predictors of competitive employment, testing the hypothesis that evidence-based supported employment would mitigate the negative effects of poor work history, uncontrolled symptoms, substance abuse, and other client factors. In a secondary analysis of 2055 unemployed Social Security Disability Insurance beneficiaries with schizophrenia or affective disorders, we examined 20 baseline client factors as predictors of competitive employment. The analysis used logistic regression to identify significant client predictors and then examined interactions between significant predictors and receipt of evidence-based supported employment. Work history was a strong predictor of employment, and other client measures (fewer years on disability rolls, Hispanic ethnicity, and fewer physical health problems) were modestly

predictive. Evidence-based supported employment mitigated negative client factors, including poor work history. Participants with a poor work history benefitted from supported employment even more than those with a recent work experience. Evidence-based supported employment helps people with serious mental illness, especially those with poor job histories, to obtain competitive employment. Factors commonly considered barriers to employment, such as diagnosis, substance use, hospitalization history, and misconceptions about disability benefits, often have little or no impact on competitive employment outcomes.

Keywords Serious mental illness · Individual placement and support · Supported employment · Employment

Introduction

Individual Placement and Support (IPS) is the leading model of evidence-based supported employment for people with serious mental illness. It is based on eight principles: inclusion of all clients who want to work, no prevocational training, benefits counseling, rapid job search, integration of vocational and clinical services at the level of the treatment team, attention to client preferences in all decisions, assistance with job development, provision of follow-along supports after job attainment, and a focus on competitive employment. Competitive employment, defined as regular community jobs, in work settings with nondisabled workers, paying a comparable wage to that nondisabled workers receive for performing the same work, is the fundamental goal of IPS.

Demographic and clinical factors are often used to allocate scarce vocational services for people with psychiatric disabilities. Many studies have examined client factors as

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predictors of employment among people with serious mental illness (Anthony et al. 2002; Bond and Drake 2008; Cook and Razzano 2000; McGurk and Mueser 2004; Michon et al. 2005; Strauss and Carpenter 1974; Tsang et al. 2010; Wewiorski and Fabian 2004) and risk factors have often been used to exclude people from access to vocational services. In recent years, however, researchers have hypothesized that IPS may compensate for the negative impact of client factors on employment (Campbell et al. 2010; McGurk and Mueser 2004).

The purpose of this study was to identify client factors that predicted competitive employment and examine the potential mitigation effect of IPS supported employment on Social Security Disability Insurance beneficiaries with serious mental illness (Drake et al. 2013). We hypothesized that the predictive strength of all client factors, including poor work history, would be attenuated for beneficiaries receiving IPS.

Methods

Procedures

The current study was a secondary analysis of the Mental Health Treatment Study (MHTS), a multisite randomized controlled trial comparing the effectiveness of an intervention group receiving IPS, systematic medication management, and other behavioral services to a treatment-as-usual control group (Frey et al. 2011). The research team interviewed beneficiaries at baseline and quarterly over a 2-year follow-up period. For this analysis of predictors, we examined baseline interview information and competitive employment over the 2-year period.

We aligned our analytic approach to achieve three objectives: First, to generate a comparison model with which to assess the effect of work history, we examined all potential client predictors, including intervention group, without work history in the model. Second, we added work history to the significant predictors to test whether work history completely subsumed other variables. Third, we added interactions of significant predictors with intervention group, which may indicate that IPS supported employment overcomes some client barriers.

Participants

Study participants were Social Security Disability Insurance (SSDI) beneficiaries between 18 and 55 years of age, with a primary psychiatric diagnosis of schizophrenia or mood disorder, residing within postal zip codes served by the study sites. We excluded beneficiaries who had worked at a competitive job in the past 30 days. The final study

group included 2238 SSDI beneficiaries (Frey et al. 2011). For this analysis, we excluded beneficiaries who died during the study ($N=24$), did not complete at least two post-baseline interviews ($N=154$), or whose data were corrupted due to a computer malfunction ($N=5$), resulting in an analytic group of 2055 beneficiaries.

Baseline Measures

We included 20 baseline client measures, consisting of all available demographic measures and standardized scales, as potential predictors. Except as indicated, the measures came from self-report responses to the baseline interview.

Demographics

Variables included age, gender, race (white/African-American/other), Hispanic ethnicity, educational attainment (high school graduate/not), and marital status (married/not).

Years on Disability Rolls

The Social Security Administration provided dates that beneficiaries received SSDI benefits.

Work History

Work history indicated employment in a paid job in the last 2 years.

Health Status

The SF-12 is a brief self-reported health assessment with two subscales measuring physical and mental functioning (Ware et al. 1996). The physical component includes physical functioning, physical role limitations, bodily pain, and general health. The mental component includes vitality, social functioning, social role limitation, and mental health.

Quality of Life

The overall life satisfaction item represents the general life satisfaction domain of the Brief Version of the Quality of Life Interview (Lehman 1988) and consists of the question, "How do you feel about your life in general?" Responses range from 1 ("terrible") to 7 ("delighted").

Clinical Measures

We used the psychiatric diagnosis (schizophrenia/affective disorder) identified by the Social Security Administration records as the beneficiary's primary disability. This diagnosis was concordant in 88% of the cases with the

diagnosis obtained from a standardized clinical research interview conducted with beneficiaries in the intervention group (Frey et al. 2011). We measured alcohol and drug use with the Addiction Severity Index (ASI) (McLellan et al. 1992). A 6-item “alcohol composite score” assesses the frequency of alcohol use, frequency of intoxication, and perceived alcohol-related problems over the previous 30 days; a 13-item ASI “drug composite score” assesses the frequency of use of 11 types of drugs and perceived overall drug-related problems over the previous 30 days (McLellan et al. 1980).

Emergency Room and Hospitalizations

We measured number of emergency room visits in the 6 months prior to the baseline interview, and number of hospital admissions and days hospitalized in the year prior to baseline interview, including all hospitalizations (mental health, physical health, alcohol, drug, or other problems).

Cognitive Functioning

At baseline the interviewer administered a paper–pencil version of the Digit Symbol Test, a reliable and valid measure of information processing efficiency that correlates with many longer cognitive tests (Dickinson et al. 2007).

Misconceptions About Social Security benefits

Drawing on an earlier checklist (MacDonald-Wilson et al. 2003), we developed a seven-item scale assessing beliefs about the impact of working on SSDI (e.g., “As soon as people start working, they stop getting their benefit checks”). The endorsed items sum to a total score. The internal consistency (Cronbach’s alpha) for this scale at baseline was 0.54.

Employment

Employment is a complex construct that researchers have measured in diverse ways. Many researchers have distinguished between getting a job (*job acquisition*) and keeping it (*job retention*) (Danley and Anthony 1987). Job acquisition—whether or not a participant has worked during a time interval—has been by far the most common employment outcome measure used in the literature (Drebing et al. 2012), including program evaluations, large surveys (Luciano and Meara 2014), and meta-analyses (Modini et al. 2016). Importantly, employment measures are moderately to highly correlated with each other, as one study found in comparing eight dimensions of competitive employment (Bond et al. 2012). For these reasons, in the current analysis we chose the dichotomous measures of

job acquisition at any time during 2-year follow-up as our outcome measure. The outcome used in this analysis was working in a competitive job at any time during the 2-year follow-up, as reported by participants in any of eight interviews conducted every 3 months over the 2-year period.

Statistical Analyses

Loss to follow-up was limited. Of the 2055 participants in the final sample, 2007 (98%) participants completed the 1-year interview and 1884 (92%) completed the 2-year interview. Of the 171 participants who did not complete the final interview, 103 had not found employment by their last completed interview. These participants were classified as not working, based on the finding from many IPS studies that participants who do not work within the first 9 months after study enrollment are highly unlikely to gain employment subsequently (Burns et al. 2015). In the parent study, Drake et al. (2013) used participant weights adjusted for the removal of subjects who did not complete at least two post-baseline interviews. We chose not to use these weights, and for this reason the counts of competitive employment differ slightly from the Drake et al. (2013) report.

To aid in interpretation of our logistic regression models, we centered age, the SF-12 physical and mental subscale scores, and the Digit Symbol Score to their means and Quality of Life to its median. We also rescaled age, years as a Social Security beneficiary, Digit Symbol Score, and the SF-12 subscale scores to maintain consistent ranges and facilitate comparisons of effects across larger increments. We used basic descriptive statistics, examining data distributions for skew and identifying outliers, and random effects logistic regression diagnostic procedures, including predicted probability plots, leverage plots, and Pearson and deviance residuals, to identify potential outliers and to assess fit. Instead of providing incomplete control for potential site-level confounders, the vast majority of which are unmeasured, we assumed that the effect of IPS is not fixed and would vary by site. Therefore, we used random effects models with random intercepts for each site to compensate for site-level clustering of outcomes (Rothman et al. 2008).

Our analyses proceeded in five steps. First, we defined two groups, *the competitively employed group* (beneficiaries who held a competitive job during follow-up) and *the unemployed group* (those who did not). We performed bivariate tests of significance (t tests and χ^2) to compare the two groups on all the baseline client factors. We calculated Cohen’s (1992) effect size (d) for all significant factors, using the arc sine approximation for dichotomous predictors (Lipsey 1990). A d effect size $<.33$ is considered small, between $.33$ and $.55$ is considered “medium,” and

>.55 is considered “large” (Lipsey 1990). Second, using these two groups to define our dichotomous employment outcome, we performed a multivariable random effects logistic regression with a random intercept for site, including study condition and all 20 baseline client factors except work history as predictors. Third, to this model we added the work history measure. Fourth, to assess whether the effects of baseline client factors differed between the intervention and control groups, we generated an interaction model containing both the main effects of all covariates and interaction terms for every significant predictor ($\alpha=.05$) with study condition. These models are intended to assess the predictive power, not the causal effect, of the covariates. In addition, we compared this hierarchy of three models to assess both the effect sizes and relative importance of work history and other baseline covariates. We used the Area Under the Receiver Operating Characteristics Curve (AUC) to describe the relative explanatory power of the various logistic regression models’ fixed effects (Hanley and McNeil 1982). AUC enabled us to summarize and compare the overall predictive power of each model. We also performed standard nonparametric tests of contrast to assign significance levels to differences in AUC. We converted effect sizes and their confidence intervals from the log-odds scale and presented them as odds ratios. Finally, we examined the 2×2 crosstab of study condition and work history with competitive employment rate (i.e., percentage gaining competitive employment during follow-up) as the outcome measure.

Because of the large sample and multiple tests of significance, we used an alpha level of $p \leq .01$ to minimize alpha inflation. We used SAS software and proc glimmix (SAS 2011) for all logistic analyses.

Results

Table 1 shows that the study group averaged 47 years of age and over 8 years as SSDI beneficiaries. Most beneficiaries had a diagnosis of affective disorder and most had not worked in the past 2 years.

Table 1 also shows that beneficiaries were more likely to gain competitive employment during follow-up if they had worked in the 2 years prior to baseline ($d=.58$), were younger ($d=.17$), had spent less time on disability rolls ($d=.20$), were Hispanic ($d=.16$), reported fewer physical health problems ($d=.24$), and performed better on the Digit Symbol Test ($d=.14$). With the exception of work history, all of the effect sizes were small. A multivariable random effects logistic regression including all client baseline factors except work history yielded the same significant baseline predictors as the bivariate tests, with the exception of age, which no longer reached significance.

Table 2 shows the significant fixed effects of two regression models, and odds ratios are presented under the assumption that all other covariates are being held constant. The second model added work history, which became the strongest predictor and did not reduce the predictive strength of the other client factors, indicating that work history was relatively independent of the other factors. The third model added interactions of treatment with effects found to be significant in the previous model and Digit Symbol Score, which was included due to its marginal significance ($p=.012$). Table 3 presents the effects of these predictors on outcome by treatment condition. Only the interaction of work history with study condition was significant at $\alpha=.01$, and the reduced effect of work history in the treatment group indicates that IPS lessens the advantage associated with having a work history that is observed in the control group. Figure 1 shows that adding work history to the model containing significant predictors significantly improved model fit, but that addition of interaction terms did not yield a significant improvement.

Unadjusted rates of competitive employment confirm the interaction between study condition and work history. Among beneficiaries who had worked in the last 2 years, the intervention group had a higher competitive employment rate ($195/284=69\%$) than the control group ($198/329=60\%$). However, among beneficiaries who had not worked, the difference between the intervention group ($331/717=46\%$) and control group ($153/720=21\%$) was much greater.

Discussion

In a large sample of disability beneficiaries with serious mental illness, a positive, recent history of working was, as expected, the strongest predictor of employment. Three other client factors added predictive power: fewer years on disability rolls, Hispanic ethnicity, and fewer physical health problems. Work history interacted with intervention group, showing that the intervention package with IPS supported employment benefitted those with a positive work history but helped those with no recent work history to a greater extent.

We predicted the work history finding based on many previous studies. The finding of a significant impact of physical problems was congruent with clinician reports during the study (Milfort et al. 2015) and warrants greater attention. Despite the growing recognition of comorbid physical health problems among people with serious mental (Druss et al. 2011), clinicians and researchers rarely incorporate medical conditions into employment services and studies. The unpredicted higher competitive employment rate for Hispanics compared

Table 1 Baseline characteristics: comparison of competitively employed and unemployed groups

Measure	Competitively employed during follow-up (N = 867)		Unemployed during follow-up (N = 1188)		Total (N = 2055)		Test statistic	df	p
	M ± SD (count)	%	M ± SD (count)	%	M ± SD (count)	%			
Study condition							$\chi^2 = 77.3$	1	<.001
Intervention	522	60	482	41	1004	49			
Control	345	40	706	59	1051	51			
Age at enrollment (years)	46.6 ± 8.1		47.9 ± 7.5		47.4 ± 7.8		t = 3.79	1780.9	<.001
Years on disability rolls	8.33 ± 5.58		9.48 ± 6.18		9.00 ± 5.96		t = 4.43	1962.5	<.001
Work history (worked during prior 2 years)							$\chi^2 = 166$	1	<.001
Yes	390	45	223	19	613	30			
No	473	55	964	81	1437	70			
Gender							$\chi^2 = .15$	1	.69
Male	404	47	564	47	968	47			
Female	463	53	624	53	1087	53			
Race							$\chi^2 = 4.27$	2	.12
White	515	60	750	63	1265	62			
Black or African American	245	28	323	27	568	28			
Other	104	12	113	10	217	11			
Ethnicity							$\chi^2 = 13.6$	1	<.001
Hispanic	122	14	106	9	228	11			
Not Hispanic	743	86	1081	91	1824	89			
Marital status							$\chi^2 = .15$	1	.70
Married	157	18	223	19	380	19			
Not married	709	82	963	81	1672	81			
Education							$\chi^2 = .002$	1	.97
Graduate high school	762	88	1042	88	1804	88			
Did not graduate high graduate	104	12	143	12	247	12			
Diagnosis							$\chi^2 = .08$	1	.77
Schizophrenia	246	28	344	29	590	29			
Affective disorder	621	72	844	71	1465	71			
SF-12 mental subscale	35.9 ± 13.2		35.9 ± 12.8		35.9 ± 13.0		t = .04	2052	.97
SF-12 physical subscale	45.7 ± 11.8		42.9 ± 11.8		44.11 ± 11.9		t = 5.30	2053	<.001
Quality of life	3.9 ± 1.5		3.7 ± 1.5		3.8 ± 1.5		t = 1.77	2053	.08
Drug use	.034 ± .056		.039 ± .063		.037 ± .06		t = 1.94	1975.1	.05
Alcohol use	.048 ± .097		.045 ± .096		.046 ± .097		t = .64	2053	.52
Digit Symbol Test	53.1 ± 17.3		50.7 ± 17.3		51.8 ± 17.3		t = 3.05	1959	.002
Misconceptions about social security	4.11 ± 1.85		4.00 ± 1.92		4.05 ± 1.89		t = 1.41	2053	.16
Emergency room visits in past 6 months	.47 ± .86		.45 ± .85		.46 ± .86		t = .53	2053	.60
Hospital admissions in past 12 months	.22 ± .56		.23 ± .59		.23 ± .57		t = .50	2053	.61
Hospital nights in past 12 months	1.93 ± 9.39		2.05 ± 7.46		2.00 ± 8.32		t = .32	1600.1	.75

SF-12 scores range from 0 to 100, with higher scores indicating a higher level of health

The Quality of Life interview scale ranges from 1 to 7, with higher scores indicating higher quality of life

The drug and alcohol ASI scale ranges from 0 to .9, with higher scores indicating greater degrees of impairment

The Digit Symbol Test score ranges from 0 to 133, with higher scores indicating more efficient information processing

The Misconceptions About Social Security scale ranges from 0 to 7, with higher scores indicating higher levels of understanding

Discrepancies between the overall Ns for the employed group and for the unemployed group and the Ns reported within each predictor are due to missing baseline data

Table 2 Significant predictors ($\alpha = .01$, fixed effects) from multivariable random effects logistic regression models (full models available in online appendix)

Measure	Odds ratio	95% confidence interval	p	Area under ROC curve	Significance of increase over prior model
Baseline characteristics excluding work history (N=1945)				.654	–
IPS intervention	2.22	1.84–2.69	<.001		
Years on disability rolls	.75	.62–.89	.001		
Hispanic	1.79	1.23–2.60	.002		
SF-12 physical subscale	1.21	1.11–1.32	<.001		
Digit Symbol Score	1.09	1.02–1.16	.007		
Baseline characteristics including work history (N=1941)				.719	<.001
IPS intervention	2.50	2.05–3.05	<.001		
Work history (worked prior 2 years)	3.65	2.92–4.55	<.001		
Years on disability rolls	.74	.62–.89	.002		
Hispanic	1.70	1.14–2.53	.008		
SF-12 physical subscale	1.17	1.07–1.29	.001		
Digit Symbol Test	1.09	1.02–1.16	.012		

Odds ratios and parameter fixed effects for SF-12, Digit Symbol Test, and Years On Disability Rolls based on 10 unit increase. Subjects were omitted from regression models due to missing predictor variables. Digit Symbol Test, insignificant at $\alpha = .01$, is included with the significant predictors from the second model for purposes of comparison

Table 3 Fixed effect size by study condition, tests of difference by predictor ($\alpha = .01$), and area under the ROC curve of interaction terms in the interaction model

Measure	Odds ratio by study condition		Test of difference, IPS versus control, p value	Model area under ROC curve	Significance of increase over prior model
	Intervention	Control			
Full interaction model with study condition (N=1941)					
Work history (worked prior 2 years)	2.24	5.61	<.001	.723	.17
Years on Disability Rolls	.62	.90	.03		
Hispanic	1.80	1.71	.88		
SF-12 physical subscale	1.22	1.12	.35		
Digit Symbol Test	1.09	1.09	.99		

Odds ratios and parameter effects for SF-12, Digit Symbol Test, and Years on Disability Rolls based on 10 unit increase

to non-Hispanics does not accord with prior research (Mueser et al. 2014). This association has not been studied in analyses of the MHTS and may be due to site-level confounding.

The significant finding of time on disability rolls aligns with the literature on the demoralizing effects of entering the disability system and continuing on the disability rolls (Maestas et al. 2013). An analysis of the predictors of participation among beneficiaries invited to join the MHTS found that this variable (time on SSDI) also predicted study participation (Salkever et al. 2014). Extended time on the disability rolls may reinforce one's identity as a disabled person and make it difficult to return to work (Estroff et al. 1997). The emphasis on early intervention for young adults with early psychosis includes helping them to gain

employment in the interest of avoiding entry into the disability system (McGorry 2015).

Notably, several client factors did not predict employment, including measures often identified as significant predictors in the literature. Many researchers have found that cognitive measures predict work, and but our single cognitive measure achieved only a borderline significance. We chose the Digit Symbol Test to serve as a proxy for general cognitive functioning based on a meta-analysis (Dickinson et al. 2007), but a broader battery of cognitive measures may have identified stronger cognitive predictors. Also surprising was the lack of an association between educational attainment and employment. Education is a robust predictor of employment in the general population (Luciano and Meara 2014), but in studies of people with

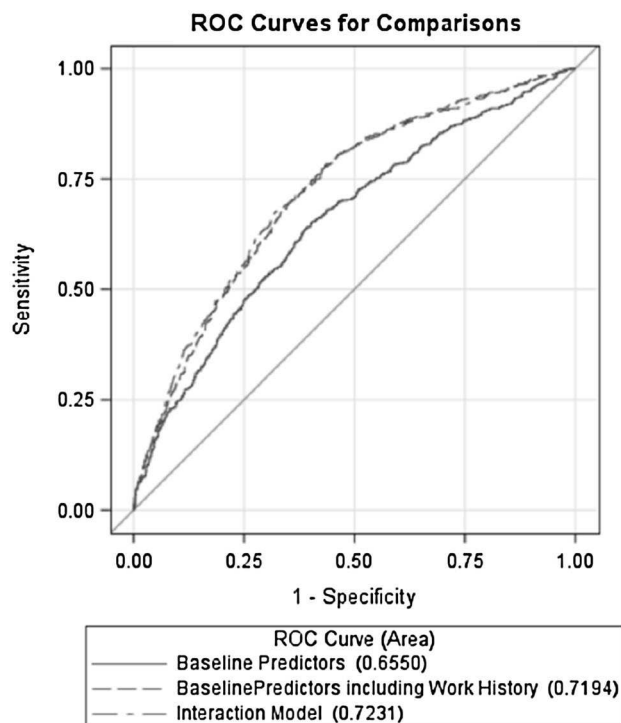


Fig. 1 ROC curves

serious mental illness, the findings are mixed (Burke-Miller et al. 2006; Campbell et al. 2011; Luciano and Meara 2014; Michon et al. 2005). Still other surprising non-findings were the lack of associations with employment outcome for age, self-reported mental health, and misconceptions about Social Security. The weakness of age as a predictor in this analysis may be related to the narrow range of ages present in the sample, with most participants being in their forties and fifties. The measures used to describe mental health status and misconceptions about Social Security may not have been valid and/or sufficiently sensitive to discern the roles of complex constructs. Finally, it is possible that confounding by site-level characteristics reduced the observed associations between predictor variables and competitive employment.

We hypothesized that IPS would mitigate the impact of client barriers to employment because reasonably high-quality, integrated mental health and vocational services can help many different people and can overcome most individual differences. With regard to work history, the IPS intervention package clearly had a stronger impact on clients who had not worked in the last 2 years and a smaller impact on clients who had worked. In that sense, IPS compensated for poor work history. The lack of other significant interactions between study condition and client factors suggests that IPS did not compensate for any other client factor. Thus the hypothesis that IPS compensates for

client deficits was supported for one important characteristic (work history), but none other. Thus this study did not show that IPS compensates for cognitive impairments and symptoms on work, as earlier studies have found (McGurk and Mueser 2004). These findings are not consistent across studies because study groups, services, and methods vary widely. In addition, they apply only to SSDI beneficiaries who want to work and receive reasonably high-quality, integrated mental health and vocational services (a rare situation).

Limitations

The study had several limitations. First, the study group consisted of SSDI recipients, who are generally older and have more work experience than the community mental health center samples of clients with psychiatric disabilities, limiting generalizability. That only 14% of the initial sampling frame joined the study further diminishes generalizability to the typical SSDI recipient. Second, the client factors we examined were not comprehensive; several important potential predictor variables, including detailed diagnostic information and standardized measures of psychiatric symptoms, were not collected. Third, most of the measures used in this study were brief self-report measures. Fourth, the Misconceptions About Social Security Scale has a low internal consistency and the validity for this scale is questionable. Fifth, this study examined a single employment outcome—job acquisition. Other employment outcomes may have yielded different results. Finally, the study had a relatively brief follow-up period. Finally, the statistical associations observed in this analysis do not demonstrate causality.

Conclusions

Work history was a robust predictor of employment for SSDI beneficiaries. The Mental Health Treatment Study intervention (IPS supported employment plus mental health treatment) helped beneficiaries with no recent work history even more than those with a recent work history. Only three additional client measures (fewer years on disability rolls, Hispanic ethnicity, and fewer physical health problems) were modestly predictive. Factors commonly considered barriers to employment, such as diagnosis, substance use, hospitalization history, and misconceptions about disability benefits were not significant. Although many of these characteristics have been used to exclude people from receiving employment services, research shows that clients benefit from evidence-based supported employment regardless of their background characteristics (Campbell et al. 2011). The current study supports the IPS supported employment

principle that everyone with serious mental illness who wishes to work is eligible for employment services (Becker and Drake 2003).

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Availability of Data and Materials The data were collected under contract SS00-05-60072 and are under the auspice of the Social Security Administration.

Compliance with Ethical Standards

Conflict of interest None.

Ethical Standards The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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