



# Enrollment in the Supported Employment Demonstration: An Employment Intervention for Denied Disability Benefits Applicants with a Mental Impairment

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## Abstract

The Supported Employment Demonstration enrolled denied Social Security Disability Benefits applicants with alleged or documented mental impairment into an employment and health intervention. Recruiters attempted to contact 21,003 applicants located near participating community mental health agencies, and enrolled 2960 eligible applicants from November 2017 through March 2019. Among potentially eligible enrollees, 26.2% enrolled. We use regression analysis incorporating disability application data, local area economic characteristics, and benefits receipt information to assess probability of enrollment. Complementary qualitative data were drawn from ethnographic interviews with enrollees and non-enrollees. Quantitative results suggest males, people with limited work experience, and people with higher educational attainment were more likely to enroll. SSA denial based on assessment that the applicant could find alternative work in the national economy also strongly predicted enrollment. Denied applicants were also more likely to enroll if their local unemployment rate was high and if average wages in their county were rising rapidly. Qualitative interviews suggest that enrollees joined because they felt the study would improve their lives, although some enrollees reported they enrolled for the financial incentives of interview participation. Key reasons for non-enrollment include (1) lack of interest in work and (2) the perception that subjects' health prevented them from working. Comparisons between the sample selected for contact and the sample not selected for contact showed the two groups were largely identical. The SED achieved considerably higher recruitment rates than comparable studies. Applicant and local economic characteristics relate to the likelihood of enrollment. Clinical Trials Registration: This study is registered with ClinicalTrials.gov: registration number NCT03682263. This study follows the Mixed Methods guidelines.

**Keywords** Supported employment · Mental health · Disability · IPS

The Social Security Administration (SSA) oversees two cash benefit programs for people with an eligible disability: Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI). SSDI paid \$143.5 billion in cash benefits to almost 10.4 million disabled workers and their families in FY2020. SSA also paid \$51.8 billion in SSI income supports to 8 million recipients who were aged, blind, or disabled in that same year (2.6 million of them receive cash benefits from both programs).

The two programs have different eligibility criteria but share the same definition of disability, based on the severity and chronicity of a person's health condition and its predicted impact on the person's ability to engage in monthly earnings meeting SSA's substantial gainful activity (SGA) definition (\$1,260 for non-blind, \$2,110 for blind in 2020). About a quarter of SSDI beneficiaries and about 28 percent of SSI recipients are people with mental impairments (2019c; SSA, 2019a).<sup>1</sup>

In 2018, 35 percent of the individuals who applied for benefits (through the SSDI or SSI programs) received awards at the initial determination level. Following the various appeals for those who were denied, another 13 percent

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<sup>1</sup> In this analysis, and in the demonstration, "mental impairment" does not include intellectual disabilities in the absence of a mental disorder.

also received awards in 2018. Thus, in 2018, SSA awarded benefits to nearly 48 percent of its disability applicants (SSA, 2019b).

The SED is a multi-component intervention offered by the Social Security Administration (SSA) that aims to assist people with mental impairments achieve employment success (Riley et al., 2021). Many denied applicants with alleged or documented mental impairments persist in appealing or reapplying for benefits.<sup>2</sup> SSA sought to find out whether offering comprehensive and integrated employment and health services to these applicants would lead to employment and clinical recovery, and reduce demand for disability benefits. This report examines the recruitment and enrollment processes for those denied applicants with an alleged or documented mental impairment, comparing those who enrolled in the SED to those who did not enroll.

SSA hypothesizes that offering evidence-based return-to-work services to these denied disability applicants should increase their participation in the labor force and decrease the need to re-apply or continue appeals of the initial denial. Presumably, these individuals can work and earn at least above the SGA level because SSA determined that they do not have a health condition that meets the statutory definition of disability. SSA's hypothesis assumes that some significant number of denied applicants will opt into the SED intervention. Further, because enrollment is voluntary, SSA needs to know how those opting into the intervention differ from those who do not.

In this study, the authors tracked and carefully documented the decisions of denied disability applicants targeted for the study. SSA identified most of these applicants within approximately one month of their denial decision date. We present details about the characteristics of the eligible population and a comparison of the characteristics of those opting into the intervention versus those declining the intervention as well as those not contacted or ultimately offered the intervention. We also consider whether the recruitment results would likely be the same for any similar sample of denied applicants selected as meeting the study inclusion criteria. Finally, we examine retrospective accounts of enrollment decisions embedded in in-depth interviews to understand further what personal and contextual factors might drive enrollment. Qualitative data from in-depth interviews reveals the stated motivations driving personal enrollment decisions, and complement the regression analysis findings that compare denied applicants based on data in their disability applications and local economic characteristics.

The overriding goal of this analysis was to inform replications of the SED or other interventions targeted at denied

disability applicants. Prior research suggests that denied applicants are at a high risk of adverse outcomes (Schimmel Barr et al., 2016; Hyde et al., 2018; Lindner et al., 2017; U.S. Government Accountability Office, 1989, 2020), which warrants considering such interventions. This study also contributes to a small but important population-based literature on take-up of people with potentially debilitating mental illness into supported employment and other targeted vocational interventions (Burstein et al., 1999; Ruiz-Quintanilla et al., 2006; Salkever et al., 2014, 2018). All such previous studies of enrollment or take-up focused on populations that were already receiving public income support. The current study is distinctive in that the population studied is restricted to those not already receiving such support.

## Program Sites and Catchment Areas

The implementation of the SED occurred at 30 locations around the country, with employment-focused interventions provided by 30 community agencies experienced in the Individual Placement and Support (IPS) supported employment intervention. The 30 agencies, with at least one in each of the nine U.S. census regions, were selected to provide services to enrollees randomized to either one of two intervention groups (Full-Service vs. Basic-Service) or to a Usual Services (control) group.

Full-Service participants received IPS supported employment services, behavioral health care, and medical care. The multidisciplinary team serving Full-Service participants included a team leader, an IPS employment specialist, a behavioral health care manager, and a nurse care coordinator (Riley et al., 2021). Participants randomized to the Basic-Service group received the same services as the Full-Service group with the exception of the nurse care coordinator. The Usual Services group received a manual describing employment and mental health services available in their community, state, and nationally.

Potential applicants for the SED differ in a number of ways from those who typically receive IPS services. IPS as originally designed serves people with severe mental illness (Becker & Drake, 2003). In many cases, SSA denied these applicants benefits because the agency found that these applicants did not provide evidence that their disabilities were severe enough to prevent them from working.<sup>3</sup> Furthermore, typical IPS clients sign up for services voluntarily and many are already receiving other social and mental health

<sup>2</sup> Section I of the Online Appendix describes the information used to identify applicants who alleged a mental impairment.

<sup>3</sup> If an applicant provides enough medical documentation, SSA may assign a diagnosis to denied applicants. See the Online Appendix for a summary of the mental health diagnoses assigned to some denied applicants.

services from the same site when they enroll in IPS services (Swanson & Becker, 2013). In contrast, denied disability applicants may be unfamiliar with the mental health and social services systems. The population of denied applicants targeted by the SED also differs from a similar evaluation incorporating IPS supported employment, the Mental Health Treatment Study (MHTS), which enrolled current disability beneficiaries (Salkever et al., 2014).

Each agency specified the catchment area in which it typically provides services. In areas that were large geographically (e.g., rural areas with multiple counties), or that had many applicants recently denied benefits, the agencies also specified smaller “priority” catchment areas. Westat identified 20 large-agency sites (each with a recruitment target of 120) and 10 small-agency sites (with a recruitment target of 60).

## Recruitment Process

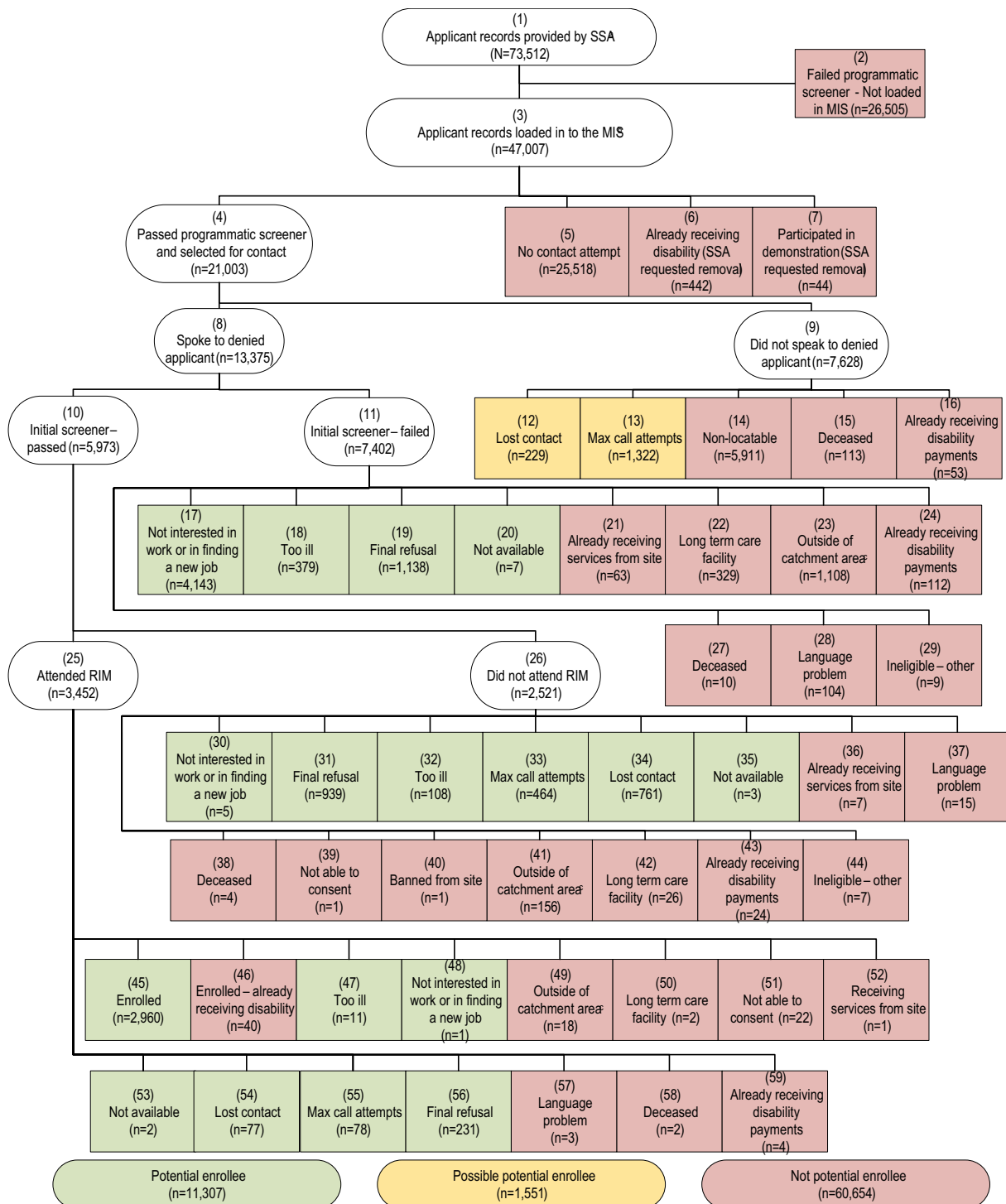
Westat received monthly files from SSA containing contact information of applicants denied in the previous month who lived within the ZIP codes of any site catchment area. The only exception to the monthly files was the initial file received from SSA. Westat received the file in September 2017 for applicants denied over a somewhat longer post-denial preceding period (mean of 129 days) and contact attempts began in November 2017. In comparison, the overall average of the post-denial period preceding contact attempt for all study applicants with contact attempts was 62 days.

Recruitment began in late November 2017 and ended in mid-March 2019. Figure 1 presents an overview of the recruitment results based on codes provided by recruiters for each attempted contact, with numbered boxes indicating the code and the stage recruitment ended. Altogether, Westat received SSA records for 73,512 denied applicants (box 1) recorded as within targeted zip codes, who either alleged a mental impairment on their disability application or were assessed by SSA disability evaluators as having a primary or secondary mental impairment, and who met the study’s age requirement of 18–49 years old. Westat applied a programmatic screen to the SSA data and flagged 26,505 of these disability applicants (box 2) as ineligible due to SED study limitations including the following: (1) they did not speak English or Spanish, (2) they had an intellectual impairment, or (3) they currently resided in jail or in a residential mental health treatment facility. The programmatic screen also eliminated another 486 people who were already receiving benefits or had participated in a previous SSA demonstration (boxes 6 and 7). From the remaining 46,521 applicants, Westat randomly selected 21,003 denied applicants for contact in the catchment areas of study sites (box 4).

To ensure potential enrollees could make an informed decision about SED participation, Westat designed a multi-step process for explaining what study participation entailed and the benefits and risks of participation. Potential enrollees had multiple opportunities to ask questions prior to deciding to participate or refuse. The process began with a mailed study invitation packet to denied applicants. This included an introductory letter and brochure, which gave a study overview. The letter indicated a local recruiter would contact them shortly. Allowing time for the invitation packet to arrive, the recruiters waited for 5 days after the mailing before attempting to make phone contact with a potential enrollee. They followed up with an in-person visit if they were unable to reach the potential enrollee by phone. Recruiters, however, were not able to make contact with 7628 denied applicants (box 9, representing 36.3 percent of applicants selected for contact). In the majority of these cases (77.5%), recruiters could not verify location and contact information for the applicant (box 14). In a few other cases, the denied applicants were recently deceased (box 15; 1.5%) or had their denials reversed and had begun receiving benefits (box 16; 0.7%). In the remaining 1551 cases, contact information was verified but repeated calls and in-person home visits either did not result in personal contacts with applicants (box 13;  $n=1322$ ) or in personal contacts did not result in completed recruitment processes despite repeated follow-up attempts (box 12;  $n=229$ ).

At initial contact, the recruiter screened the potential enrollee for study eligibility. The eligibility screener consisted of three questions, pertaining to study inclusion criteria, that were designed to ascertain whether the potential enrollee was interested in working, wanted a better job if they were working, or whether they currently receive employment services from the demonstration site (at the time of recruitment). If they wanted a job (or a better job), were living in the catchment area, and did not already receive employment services at the demonstration site, the recruiter invited the potential enrollee to attend a Recruitment Information Meeting (RIM), either immediately following the screener or at another time.

A total of 7402 of the denied applicants that spoke with a recruiter (55.3 percent) did not pass the initial screener (box 11). The most common reasons were that they were not interested in working or if working, in finding a better job (box 17;  $n=4143$ ), or that they moved outside of the catchment service area of the demonstration site (box 23;  $n=1108$ ). Another 2521 denied applicants did not attend the RIM because either the recruiter lost contact with them or they refused to participate (box 26); some of these denied applicants did not attend a RIM because recruiters later learned that they were ineligible for the study. The most common reason that recruiters found denied applicants to be ineligible at this stage was that they moved outside



SDR=Structured Data Repository; RIM=Recruitment Information Meeting; MIS=Management Information System

<sup>a</sup> Denied applicants provided by SSA include only those with an address in a SED site catchment area who were between the ages of 18-49 (inclusive) at the time of the earliest effective filing date with a primary, secondary, or alleged mental impairment.

<sup>b</sup> The team removed records for those who did not meet the eligibility requirements based on characteristics in the SSA data, those who had no contact information, and those who did not live in one of the catchment areas. In a small number of cases, the SSA records contained duplicate records (for example, if a denied applicant submitted more than one application). These duplicates were removed prior to loading records in to the MIS.

<sup>c</sup> In some cases, the team determined during the recruitment process that a denied applicant no longer resided in the catchment area for the site, either because the denied applicant moved to an address outside the catchment area, or the team restricted the initial catchment area for that site.

Fig. 1 Recruitment results among applicants denied disability

of the service area of the site (box 41;  $n = 156$ ); others no longer met the study eligibility criteria because they already received services from the site (box 36;  $n = 7$ ), they moved to a long-term care facility (box 42;  $n = 26$ ), or they started receiving disability payments (box 43;  $n = 24$ ). Others were deceased, or could not participate because they were not able to consent, or were not able to communicate in English or Spanish.

The RIM was an hour-long meeting in which the recruiter described the SED in more detail. The RIM also provided the opportunity for each potential enrollee to ask questions and consider their options. While 3452 applicants attended a RIM (box 25), 92 were subsequently found to be ineligible (typically because after their initial denial they either began receiving benefits, had moved out of their site's catchment area, or were not able to provide informed consent).<sup>4</sup> Of the remaining 3360 applicants who attended a RIM, 2960 (box 45; 88.1%) decided to enroll. These 2960 enrollees provided written informed consent, took part in an hour-long baseline interview, and afterward were randomized to one of the following study groups: Full-Service, Basic-Service, or Usual Services (Control).

Wrap-up activities included collecting the enrollees' insurance status information, assigning enrollees a reloadable study debit card, and providing them with other study-related materials. For enrollees assigned to either the Full-Service or Basic-Service treatment groups, the recruiter called the demonstration site Team Lead on the enrollees' behalf to make an introduction. In some cases, the recruiter arranged an in-person meeting to hand off the new enrollee to the demonstration site.

The bottom of Fig. 1 shows denied applicants ultimately classified as potential enrollees, possible potential enrollees, or not potential enrollees. Note that only potential enrollees and possibly potential enrollees had an opportunity to enroll in the study.

Individuals classified as *potential enrollees* ( $n = 11,307$ ) include people with records that evidence receipt of a personal contact (at least either a phone call or in-person meeting). Westat excluded people identified as ineligible during the recruitment process from this classification group.

Individuals classified as *possible potential enrollees* ( $n = 1551$ ) include targeted individuals whose contact information could not be verified and those for whom a personal contact could not be established (box 13;  $n = 1322$ ); and 229 people with whom Westat established a personal contact, but lost contact over time (box 12). While a relatively small

group of all people targeted for contact, possibly potential enrollees represent people with an unknown level of interest in the study. They might have enrolled in the study had they known more about it; or perhaps they purposely chose not to hear more about the study. In either case, Westat did not have a chance to ask them directly about their level of interest in the study.

Individuals classified as *not potential enrollees* ( $n = 60,654$ ) include people who did not have an opportunity to enroll in the study because they were ineligible, deceased, currently live outside of the catchment area, or not randomly selected for recruitment.

The overall enrollment rate among potential enrollees was 26.2 percent. Including the 1551 possible potential enrollees in the denominator reduced the enrollment rate to 23.0 percent, which can be viewed as a lower bound if one assumes that all 1551 were aware of the SED and were silent refusals.

## Data Sources

### Quantitative

Disability claimants apply by completing a Disability Report (SSA-3368-BK), where they provide age, highest level of education, job history, job training, medical conditions, and treatment history. The information is stored in SSA's Structured Data Repository (SDR), and SSA provided this information from the SDR for each of the 73,512 denied disability applicants who met the initial criteria for recruitment into the SED. This database also includes information pertaining to decisions about each application, including awards, denials, and appeals. This large data set allows comparisons between denied applicants selected for contact with those who were not; such comparisons allow us to test the generalizability of our analysis results to the larger pool of these 73,512 denied applicants.

Westat compiled data on the SED enrollment process for each denied applicant selected for contact in an integrated SED management information system (MIS). The primary data elements in the SED MIS relevant to this study included all information collected from or about potential enrollees until the point of randomization, as well as documentation of all contact attempts, scheduled appointments, and associated outcomes.

Besides the SDR and the SED MIS, four additional data sources inform the quantitative analyses: the SSA's Master Beneficiary Record (MBR), SSA's Supplemental Security Record (SSR), the American Community Survey (ACS), and the Quarterly Census of Employment and Wages (QCEW). The MBR maintains data on the current (and historical) beneficiary status, including denials, of individuals in the Old Age, Survivors and Disability Insurance program (OASDI).

<sup>4</sup> To each enrollee opting to participate in the study, the recruiter administered a competency screener to verify their mental capacity to provide informed consent; applicants failing to pass the screener were ineligible.



**Table 1** Focus group enrollees by Full-Service and Basic-Service

Enrollee group	Number
Basic-Service enrollees	89
Full-Service enrollees	93
Total	182

For our analyses, interest in the MBR concerns beneficiary status of denied applicants, specifically SSDI applicant status following the denial date until the end of recruitment at each SED demonstration site. The SSR maintains data on the current (and historical) status, including denials, of individuals who apply for the SSI program. The SSR data most relevant for this study pertain to SSI applicant status following the initial denial until the end of recruitment at each SED demonstration site.

Westat used data from the ACS 2014–2018 5-year file, which provides census tract level estimates on population socio-demographic and economic characteristics. The ACS census tract level information was matched to denied disability applicant home (contact) addresses to derive variables used in this analysis. The QCEW provides quarterly and annual county-level counts of employment and wages reported by employers of all jobs. These quarterly data were linked to denied applicants using their county of residence, date of the denial decision, and date when they became available for recruitment.<sup>5</sup>

## Qualitative

Six months after the beginning of SED service delivery, Westat conducted four-day site visits to each of the 30 demonstration sites as part of a process evaluation of service delivery. During each site visit, we conducted focus groups with denied applicants who enrolled in the SED and in-depth interviews with denied applicants who chose not to enroll in the SED.

We held two focus groups with SED enrollees at each site; one for Basic-Service enrollees and one for Full-Service enrollees. Topics included reasons why people decided to enroll in the SED, but also asked detailed questions about enrollees' experiences with SED services. Site visitors randomly selected focus group participants from among enrollees at each site and treatment arm and invited them by phone to the focus group. Once 10 enrollees agreed to participate in each focus group, site visitors stopped recruitment for the group at that site. Across all 60 focus groups, attendance ranged from one to seven enrollees, with an average of three

SED enrollees per group. Table 1 provides the number of focus group participants by treatment arm.

For site visits in 2018 and 2019, we conducted in-depth interviews with up to two eligible individuals who declined to enroll in the SED. Interviews included discussion of employment history, health, applications for disability income, and goals for the future. In 2018, we randomly selected up to two interviewees who were eligible but chose not to enroll after their initial screener or after the Recruitment Information Meeting. The goal of interviews in 2019 was to speak with as many of the same individuals as possible from the 2018 site visit. However, we were not able to reach all former interviewees, but no interviewee with whom we made contact from 2018 declined a second interview. In total, site visitors interviewed 31 unique individuals who chose not to enroll in 2018 and 20 additional individuals who chose not to enroll in 2019.

## Characteristics of Denied Applicants Who Passed the Programmatic Screener by Potential for Enrollment Classifications

Table 2 shows the characteristics of the 21,003 denied applicants randomly selected for contact by recruiters, and the 25,518 denied applicants not selected for contact. The table also shows the characteristics of six subgroups based on outcomes of contact efforts among the 21,003 applicants selected for contact. The six subgroups include the following:

- Not potential enrollees who were not locatable due to incorrect or outdated contact information (non-locatable);
- Not potential enrollees who were ineligible (denied applicants who did not have an opportunity to enroll in the study because they did not meet the study eligibility criteria, deceased, or outside of the catchment area);
- Possible potential enrollees (with whom Westat was unable to document clear evidence of a personal contact);
- Potential enrollees not interested in work or in finding a better job;
- Potential enrollees who did not enroll for reasons other than no interest in work; and
- Enrollees.

Characteristics of the combined 21,003 selected for contact and the 25,518 not randomly selected for contact appear in the last two columns of the table.

The ages and formal education of the groups are similar across the selected and non-selected groups. Among the

<sup>5</sup> The latter date accounted for the lag between denial date and initial contact attempt.

**Table 2** Characteristics of applicants denied disability benefits by recruitment outcome, among those who passed the programmatic screening

Variable	(a) Not potential enrollees: Non-locatable (5911)	(b) Not potential enrollees: Ineligible (2234)	(c) Possible potential enrollees (1551)	(d) Potential enrollees not interested in work or finding a better job (4149)	(e) Potential enrollees who did not enroll for other reasons (4198)	(f) Eligible enrollees <sup>a</sup> (2960)	All selected for contact (21,003)	Not selected for contact (25,518)
Age (Years)	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Mean	35.3	35.2	35.4	36.3	35.8	35.4	35.6	35.7
Age Group	%	%	%	%	%	%	%	%
18–34	45.3	47.5	44.4	41.2	42.7	45.0	44.1	44.0
35 and above	54.7	52.5	55.6	58.8	57.4	55.0	55.9	56.0
Gender	%	%	%	%	%	%	%	%
Male	46.7	50.5	44.0	38.9	40.1	43.3	43.5	44.1
Female	53.3	49.5	56.0	61.2	59.9	56.7	56.5	55.9
Education	%	%	%	%	%	%	%	%
Less than HS	24.2	25.1	22.3	21.0	22.5	20.4	22.7	23.0
HS / GED	46.6	47.1	47.9	45.8	44.2	46.8	46.1	46.4
Some college	8.6	8.3	8.5	8.5	8.8	9.0	8.6	8.2
College degree	20.3	19.3	21.1	24.2	24.2	23.6	22.3	22.1
Missing	0.4	0.3	0.3	0.5	0.3	0.3	0.4	0.3
Jobs held <sup>a</sup>	%	%	%	%	%	%	%	%
0	7.2	7.7	6.7	5.2	5.5	6.3	6.4	6.3
1	16.6	17.0	16.6	16.8	16.0	14.4	16.3	16.0
2–5	60.2	58.4	60.6	62.0	63.1	62.6	61.3	62.1
6 or more	15.6	16.6	15.8	15.6	15.1	16.4	15.7	15.2
Not answered	0.4	0.4	0.3	0.5	0.3	0.2	0.4	0.4
Weekly pay <sup>b</sup>	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Mean	\$393	\$403	\$409	\$434	\$434	\$382	\$410	\$416
Applicant alleged a mental impairment	%	%	%	%	%	%	%	%
Yes	90.7	90.8	91.5	89.4	89.3	89.1	90.0	89.6
No	9.3	9.2	8.5	10.6	10.7	10.9	10.0	10.4
Step reached in disability determination process <sup>b</sup>	%	%	%	%	%	%	%	%
Step 1	2.1	1.7	2.4	2.9	2.2	1.6	2.1	2.1
Step 2	13.1	15.5	12.2	13.6	12.2	13.9	13.3	13.0
Step 4	1.5	1.3	1.5	2.7	1.9	2.0	1.9	2.3
Step 5	52.2	56.0	58.0	65.8	67.4	67.0	60.9	61.2
Other <sup>c</sup>	31.1	25.4	25.9	15.0	16.3	15.6	21.8	21.3
Previously denied for same type of claim	%	%	%	%	%	%	%	%
Yes	11.1	11.5	14.3	11.7	8.9	11.9	11.2	15.4
No	88.9	88.5	85.8	88.3	91.1	88.1	88.8	84.6

<sup>a</sup>The SED enrolled 3,000 participants. After enrollment, a subsequent review of SSA records revealed that 40 enrollees were ineligible to participate in the demonstration because they were receiving disability payments prior to recruitment start, or they participated in a previous SSA demonstration. The “eligible enrollees” includes only participants who enrolled in the SED and were eligible to participate

<sup>b</sup>Excludes applicant records with a missing value for the step reached in the determination process (n=28). Those missing a step are missing a regulation basis code in the SDR database

<sup>c</sup>The step may have a code of “other” if the regulation basis code did not fit into one of the defined steps. Examples of denied applicants coded as “other” include those denied for technical or administrative reasons, such as failure to follow a prescribed treatment, failure to submit to consultative exam, and the applicant does not want to continue claim development

set of denied applicants selected for contact ( $n = 21,003$ ), a substantial portion (22.7%) have less than a high school education, and almost half (46.1%) have no more than a high school education (diploma or GED). About one in five (22.3%) have an Associate's Degree or higher. The majority (61.3%) held between two and five jobs in the past fifteen years. Only 6.4 percent indicated they did not hold a job in the past 15 years. The average weekly pay among those selected for contact was \$410. Among the groups defined by recruitment outcome, the eligible enrollees reported the lowest average weekly pay of \$382. Potential enrollees who decided not to enroll in the SED reported the highest average weekly pay on their applications (\$434).

We performed bivariate statistical comparisons (chi-squared tests) between the groups randomly selected for contact ( $n = 21,003$ ) and not selected for contact ( $n = 25,518$ ). All tests showed no significant difference between the two groups with the exception of two: the step reached in the disability determination process and previous denial for the same type of claim. A slightly higher percentage in the group selected for contact received denials from SSA at Step 2 in the determination process (13.3%) than the non-selected group (13.0%). Receiving a denial at Step 2 indicates that SSA determined the applicant's impairment was not severe enough to receive an approval or the impairment did not have a sufficient duration. A higher percentage in the non-selected group reached Step 4 (2.3%) compared to the group selected for contact (1.9%). Receiving a denial at Step 4 indicates that SSA determined that the applicant was capable of working a prior job. For both groups (those selected and those not selected for contact), just over 60 percent received a denial after reaching Step 5 in the determination process. Receiving a denial decision at Step 5 indicates that SSA determined that the applicant has the capacity to earn SGA in a job available in the national economy, but not necessarily work that the applicant performed in the past (Wixon & Strand, 2013). The SSA data also indicate whether the applicant received a denial previously for the same type of claim. A higher percentage in the group not selected for contact (15.4%) received a denial previously for the same type of claim compared to the group selected for contact (11.2%).

### Comparison of Contacted vs. Non-Contacted Applicants Selected for Contact

Among the 21,003 people randomly selected for contact were 13,375 cases in which recruiters made a personal contact, and 7628 cases where no such contact occurred. Comparisons between these two groups are important for understanding the generalizability of our findings. We present descriptive comparisons between these two groups in Section II of the Online Appendix. While the comparisons

showed that the two groups were very similar in many respects, we note here two areas of substantial differences between them. First, people with whom recruiters made contact were more likely to be female than were members of the non-contacted group (58.0% vs. 53.7%).

Second, several differences relating to past and likely future earnings ability were also clear. Contacted applicants were slightly more likely to have reported at least one job held in the past 15 years (93.7% vs. 92.6%). In addition, those who reported positive weekly wages had higher mean wages in their most recent job (\$417.14 vs. \$397.80). Virtually all the difference in mean wages result from differences in wages above the 60th percentile between the two groups. Finally, differences in earnings ability as determined by the disability evaluations were even more pronounced, with contacted applicants much more likely to be judged capable of earning above the SGA level at a job available in the national economy (65.3% vs. 53.2%).

### Regression Methods

We applied logistic regression to estimate a model that linked characteristics of potential enrollees, and of the geographic areas in which they resided, that significantly related to their decision to enroll in the SED. As noted above, we attempted to contact 21,003 denied applicants but only spoke with 13,375 of them. From among those recruiters spoke to, 2068 cases were not eligible for the study, leaving 11,307 people who we designated as potential enrollees. Since, as explained above, we did not have a basis for assuming the 1551 possibly potential enrollees were not aware of the SED and the enrollment opportunity, these applicants were also included in some of our regression analyses. Comparing results with or without this latter group served as a check on the sensitivity of our results to either (1) assuming all applicants in this group were not silent refusals or (2) all in this group were silent refusals. Hence, the regression analyses presented here include 12,858 cases in all: 11,307 potential enrollees and 1551 possibly potential enrollees.

### Statistical Methods

The large number of different characteristics in the data sources described above that were potentially relevant to the enrollment decision, and the absence of literature on similar randomized trial interventions for applicants denied disability benefits, necessitated an exploratory approach to the analysis. To implement this exploratory approach while avoiding an elevated risk of Type I errors (resulting from estimating numerous regressions on a single data set), we used a split sample approach. Thus, we ran numerous exploratory regressions on our binary enrollment outcome



(enrolled; did not enroll) with a test sample, and based estimates and hypothesis tests for our final model only on the validation sample.

We randomly split the 12,858 cases into a test sample of roughly one-third ( $n=4321$ ) and a validation sample of roughly two-thirds ( $n=8537$ ). In the test sample, exploratory analyses involved estimation of logit multiple regression models of enrollment probability with a variety of explanatory variables and functional forms. Separate regressions were estimated with all 4321 test cases as well as on the sub-set of these test cases ( $n=3793$ ) designated as potential enrollees only. We applied three different maximum likelihood or pseudo-maximum likelihood estimation methods that varied only in their specification of the properties of the regression disturbances: (1) models with errors assumed correlated across people in the same site (using the Stata command “vce (cluster site)”); (2) errors that contained a site-specific Gaussian random intercept error (the “random effects estimator”); and (3) errors that contained a site-specific fixed error component (the “fixed-effects” estimator).

We tested a variety of explanatory variables in the exploratory regressions. In most cases, we entered these variables in linear form, but we did also test some potential explanatory variables in non-linear form (either quadratic or logarithmic). Our principal criterion for inclusion of a variable in the final exploratory models, which we replicated in the validation analyses, was the 2-tailed  $p$ -value test on the null hypothesis associated with each continuous or categorical variable. Given occasional instability in our results across specifications of the test sample regressions, and the fact that the validation sample is twice as large as the test sample, we used a relatively lax criterion (2-tailed  $p$ -value  $\leq 0.3$ ) for allowing specific variables to remain in our test models. Because we did not view a priori considerations about regression coefficient signs as clearly indicating directions of effects on probability of study enrollment, we gave no consideration to one-tailed hypothesis tests.

### Explanatory Variables Tested

In our exploratory regressions, specific variables pertained to the following categories:

1. **Timing Variables:** These included: the date when each person became available for recruitment, the date when recruitment efforts ended for each demonstration site, the number of days between the available recruitment for each applicant and the date when recruitment activities ended for their respective site, and the number of days from the date of the denial decision to the date on which the person became available for recruitment. (Because records for some eligible applicants included multiple decision dates, we chose the decision date closest to, but

not after, the date-available-for-recruitment date to use in our analyses).

2. **Variables Based on the Census Tract Characteristics for the Denied Applicant's Residence:** Data were obtained from the 2014–2018 ACS 5-year file. Variables included the percent of people below 100 percent of poverty, percent of people below 200 percent of poverty, percent commuting to work by auto, and percent of residents with no health insurance coverage. We also tested a 0–1 indicator for denied applicants residing in Medicaid expansion states.
3. **Socio-Demographic Characteristics of Each Denied Applicant:** These included age, gender, and level of education.<sup>6</sup> Besides the highest grade completed, other education variables tested included 0–1 indicators for college graduation and for completing less than 9 grades of schooling. We also included a 0–1 variable indicating whether or not the denied applicant had English-language deficits in speaking, in writing, or reading.
4. **Local Labor-Market Characteristics:** County-level variables included the average weekly wage in the denied applicant's residence county for the year and quarter of the denial decision date, and the average change per day in this average weekly wage from the decision date to the date available for recruitment. Data for these items were taken from the QCEW of the Bureau of Labor Statistics. We also included a census-tract-level measure from the ACS of the percent of the labor force unemployed.
5. **Health Related Variables:** Tested variables included the following items from the applicants Disability Report submitted to SSA: the number of ER visits in the past 3 years, the number of hospital inpatient admissions in the past 3 years, and a 0–1 indicator of a mental impairment (non-intellectual) alleged by the applicant. We also included 0–1 indicators from the disability examiner of both the applicant having a primary mental impairment, and those having a secondary mental impairment. In addition, some test regressions included self-reported height and weight information from the submitted disability application.
6. **Self-Reported Job History Variables from the Denied Applicant's Application (Disability Report):** These included the number of jobs held in the last 15 years; duration of time since the last job held; number of years tenure in the last reported job; weekly earnings in the

<sup>6</sup> We did not include race and ethnicity because SSA does not collect reliable administrative data on race and ethnicity information for all disability applicants (Martin, 2016). Therefore, it would not be possible to measure reliably the race and ethnicity of the broader group of potential and possibly potential enrollees who did not enroll in the study.

**Table 3** Explanatory variable names, definitions, and sources

Variable name	Definition	Source*
Explanatory variables identified by final test regressions		
Recruitlag	7 + gap in days from the decision date closest to the date-available-for-recruitment date <sup>a</sup> . The 7 days were added to allow for the time involved in making the first initial letter and contact attempt with the denied applicant	SDR, MIS
Recruitlag <sup>b</sup>	= the square of <b>recruitlag</b>	SDR, MIS
FEM	The 0–1 indicator of gender; = 1 for female denied applicants, 0 for males	SDR
SSIinRecruit	Variable = 1 if the denied applicant received an approval for SSI benefits within 210 days <b>after</b> the date the applicant was available for recruitment; = 0 otherwise <sup>b</sup>	SSR
SSDIinRecruit	Variable = 1 if the denied applicant received an approval for SSDI benefits within 210 days after the date the applicant was available for recruitment; = 0 otherwise <sup>c</sup>	MBR
CountyWageGrowth	Variable = {[average weekly wage in the denied applicant's residence county (from QCEW data) for the year and quarter of their date available for recruitment] – [the analogous average weekly wage for the year and quarter of their decision date]} / [ <b>recruitlag</b> minus 7] <sup>d</sup>	QCEW
WorkPotential	Variable = 1 if any of the denial decision basis codes in the denied applicant's record = N32, 0 otherwise	SDR
MissingBasisCodes	Variable = 1 if no data on denial decision basis codes are in the denied applicant's record, 0 otherwise**	SDR
HighestSchoolGrade	The highest grade level completed for the denied applicant, coded for the variable HEDULVL_CD in the SDR data. ("GED" recoded as completed 11 grades, "K" and missing data recoded as completed 0 grades)	SDR
PctUnempl	The unemployment rate in the denied applicant's residence census tract from the 5-year ACS census tract file	ACS
ALLGN_IMP_MNTL	Variable = 1 if the applicant alleged a mental impairment on the application; 0 otherwise	SDR
WEEKLY_PAY1	Variable = weekly rate of pay from last job; coded as = 0 for all cases with missing data	SDR
weeklypaymiss	Variable = 1 if weekly pay data is missing; 0 otherwise	SDR
lastjobtenmiss	Variable = 1 if data on tenure in years on last job held is missing; = 0 if otherwise	SDR
Additional explanatory variables included in sensitivity analyses		
SSIinLateRecruit	Variable = 1 if the denied applicant received an approval for SSI benefits <b>more than 210 days</b> after as of October 2019; = 0 otherwise	SSR
SSDIinLateRecruit	Variable = 1 if the denied applicant received an approval for SSI benefits more than 365 days after the date available for recruitment; = 0 otherwise	MBR
Laterecruit	Variable = 1 for all cases whose date available for recruitment was less than 210 days before the date on which the SSA benefit receipt flags were pulled (October 2019). <sup>a</sup> For cases where laterecruit = 1, there were less than 210 days of "exposure" to the possibility that a benefit receipt could be reported by SSA	MIS
LAST_JOB_TNR_YRS	= tenure in years on last job held; missing values recoded to zero	SDR

\*SDR Structured Data Repository; ACS U.S. Census American Community Survey (2013–2017 5-year estimates), QCEW Quarterly Census of Employment and Wages (Bureau of Labor Statistics), MIS Management Information System (SED recruitment data recorded by recruiters), MBR Master Beneficiary Record, SSR Supplemental Security Record

\*\*This code indicates the SSA finding that, relevant past work aside, the applicant was not currently earning SGA but did have the capacity to do a job in the national economy

<sup>a</sup>Note that in 2138 cases of potential or possible potential enrollees, more than 1 decision date was recorded in the data supplied by SSA. In these cases, the value of recruitlag was calculated based on the decision date that was closest to, but not after, the date the applicant was available for recruitment

<sup>b</sup>Note that denied applicants who were approved for benefits prior to their date available for recruitment were deemed ineligible for the study. 210 days was the minimum length of time in our data between the individual's date available for recruitment and the date on which updated benefit receipt information was extracted from the SSA's administrative data files on benefit receipt

<sup>c</sup>The exclusion in note 4 above also applies to SSDI benefits

<sup>d</sup>This is just the increase in dollars per day in the average wage over the [**recruitlag** minus 7] period of days. This per day increase measure was used to avoid confounding the wage rate increase variation with the variation in **recruitlag**

last job; and measures of weeks and hours of work at the last job.

- Measures Relating to SSA Determinations Based on Benefit Applications. We tested variables that included: a 0–1 indicator of prior denial of benefits (based on

a previous application), a 0–1 indicator of denial due to earnings in excess of SGA amount, a 0–1 indicator that the applicant's disability did not preclude gainful employment, 0–1 indicators of SSI benefit receipt, 0–1 indicators of SSDI benefit receipt, and a 0–1 indicator of

**Table 4** Sample descriptive statistics for regression variables

Variable name	Potential and possible potential enrollees (n = 12,858)		Potential enrollees only (n = 11,307)		Possible potential enrollees (n = 1551)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Enrolled	0.230	0.421	0.262	0.440	0.000	0.000
Recruitlag	69.546	48.499	67.842	49.500	81.972	38.246
FEM	0.591	0.492	0.595	0.491	0.560	0.497
SSIinRecruit	0.009	0.094	0.009	0.094	0.008	0.091
SSDIinRecruit	0.016	0.126	0.017	0.129	0.010	0.101
SSIinLateRecruit	0.027	0.163	0.028	0.164	0.025	0.157
SSDIinLateRecruit	0.036	0.187	0.036	0.187	0.035	0.185
laterecruit	0.162	0.368	0.179	0.383	0.039	0.194
CountyWageGrowth	0.216	1.505	0.196	1.541	0.366	1.201
WorkPotential	0.370	0.483	0.373	0.484	0.346	0.476
MISSINGBASISCODES	0.131	0.337	0.133	0.340	0.114	0.318
HighestSchoolGrade	12.108	2.174	12.121	2.187	12.008	2.072
PctUnempl	7.572	4.912	7.613	4.948	7.270	4.635
ALLGN_IMP_MNTL	0.895	0.306	0.893	0.309	0.915	0.279
WEEKLY_PAY1 <sup>a</sup>	370.236	411.742	371.526	405.108	360.829	457.245
weeklypaymiss	0.117	0.321	0.116	0.321	0.119	0.323
LAST_JOB_TNR_YRS <sup>b</sup>	2.719	4.750	2.728	4.741	2.650	4.816
lastjobtenmiss	0.116	0.320	0.116	0.320	0.112	0.315

<sup>a,b</sup> Missing values recoded to 0

SSDI benefit termination. (To be consistent with study eligibility rules, we defined the indicators relating to benefit receipt or termination for the period after the date when the denied applicant became available for recruitment.)

### Explanatory Variables Included in Final Test Regressions

Table 3 lists the 13 explanatory variables identified for inclusion in our final test regressions and four additional variables included in sensitivity analyses. Note that data on some items were missing due to skip patterns in the application form (Disability Report), skip patterns in the evaluation and/or reporting procedures of the disability examiners, or omissions by the applicant. Because the fraction of cases with missing data on these items was non-negligible (i.e., 10 percent or more of the denied applicants under study), we coded these items as equal to zero when missing and included a 0–1 dummy variable in our exploratory regressions when the item was missing for a particular applicant. Thus, for each variable with non-negligible numbers of missing values, we initially included both the variable itself (with the 0 recodes) along with the missing data dummy for that variable in our exploratory regressions. In cases where only one of these two variables had p-values that consistently satisfied our

inclusion rules, we excluded the other variable of the pair from our final test regressions.

Descriptive statistics for our dependent and explanatory variables for the combined total sample (n = 12,858) are presented in Table 4. We see only a few clear differences between the potential enrollees and the possible potential enrollees in mean explanatory variable values.<sup>7</sup> Differences in labor market trends indicate the average increase per day in average wages was twice as large for possible potential enrollees. To some extent, this finding reflects the economy-wide slowdown in wage growth for workers that became more pronounced over the 2017–19 period (Salkever, 2020), along with the fact that the mean beginning date of recruitment for potential enrollees was somewhat later than that for possible potential enrollees. Potential enrollees also resided in census tracts with slightly higher unemployment rates, though it is also noteworthy that the average census tract unemployment rate for all denied applicants in our regressions, 7.57 percent, was relatively high compared to the 2019 national U.S. rate of 3.6 percent.

<sup>7</sup> The first line of Table 3 shows the means for enrollment rates, which = 0 for possible potential enrollees.

**Table 5** Validation sample logistic regression estimates of marginal effects on probability of enrollment—potential enrollees

Variable name	Clustered (n = 7514) Model 1		Clustered alt (n = 7514) Model 1-a		Fixed effects (n = 7514) Model 2	
	dy/dx	P < z	dy/dx	P < z	dy/dx	P < z
Recruitlag	3.5E-04	0.050	3.4E-04	0.054	2.8E-04	0.155
FEM	− 0.034	0.007	− 0.034	0.007	− 0.041	0.002
SSlinRecruit	− 0.157	0.053	− 0.156	0.053	− 0.167	0.057
SSDlinRecruit	− 0.055	0.152	− 0.055	0.147	− 0.061	0.273
CountyWageGrowth	0.008	0.002	0.008	0.002	0.011	0.010
WORKPOTENTIAL	0.027	0.053	0.026	0.054	0.034	0.014
MISSINGBASISCODES	0.007	0.649	—	—	0.006	0.761
HighestSchoolGrade	0.005	0.011	0.005	0.014	0.007	0.022
PctUnempl	0.003	0.020	0.003	0.020	0.003	0.022
WEEKLY_PAY1	− 7.8E− 05	<0.001	− 7.9E− 05	<0.001	− 9.7E− 05	<0.001
Weeklypaymiss	− 0.052	0.020	− 0.052	0.019	− 0.066	0.006
Lastjobtenmiss	0.040	0.007	0.040	0.006	0.051	0.022

### Approach to Validation Regressions

After estimation and selection of our final set of variables from the test regressions, we re-estimated these same regressions, with the same estimation techniques, using the data from our validation sample (see the Online Appendix, Sections III–V). Because a few of the explanatory variables had significant coefficient estimates in our final test regressions but had non-significant coefficients in our validation regressions, we also re-estimated the validation regression with these few variables deleted as a sensitivity test on the coefficient estimates for the remaining significant variables in our validation regressions. We also ran several other selected sensitivity tests of alternative regressions on our validation data (see the Online Appendix, Section VIII and IX). We included the four additional explanatory variables listed in Table 3 above in one or more of these sensitivity analyses.

We present all validation regression analyses in the online appendix along with results for the final test regressions (see Online Appendix Sections III–IX). Also note that we ran all regressions—test, validation, and sensitivity analyses—twice, once with potential enrollees only and once with potential plus possible potential enrollees.

The validation regressions focus on the results of two of the three estimation approaches we applied, namely, (1) logistic regression with standard errors based on the assumption of clustering of error within each of the 30 demonstration sites; and (2) logistic regression with site-level fixed effects. We estimated these regressions in Stata with the “logit, vce (cluster site)” and “xtlogit, fe” commands. The Online Appendix presents coefficient estimates using these approaches, as well as coefficient results for our third estimation approach, random effects regression using the Stata “xtlogit, re” command. Results from all three estimation

methods were similar for both qualitative and quantitative estimates of coefficients and marginal effects for almost all explanatory variables.

We implemented the Stata “margins” commands to obtain estimated marginal effects, averaged across all observations, of a 1-unit change in each of our explanatory variables on the probability that a denied applicant would enroll. The marginal effect estimate for each variable holds all other explanatory variables at the values observed for each applicant. This procedure also provides us estimated standard errors and 2-tailed p-values, for each variable, for the null hypothesis the average marginal effect of that variable is zero. Note that in logistic regression and other non-linear models, the marginal effect of a 1-unit change in any variable on the probability of enrollment for any one individual differ across individuals. By contrast, if we had estimated enrollment probabilities using a linear probability model (LPM), the marginal effect of any variable for any individual would simply equal the estimated coefficients of that variable and would be the same for all individuals. Note also that when an explanatory variable enters either a linear or logistic model in both linear and quadratic forms (i.e.,  $x$  and  $x^2$ ), the marginal effect of a 1-unit change in that variable on the probability of enrollment will vary with the value of that variable. This point is relevant for our analysis given one of our variables, recruitlag, also enters our final test and validation regressions as recruitlag<sup>2</sup>. The reason for this specification is that this variable has a small number of large observed values that occurred in the first batch of denied applicants submitted for inclusion in our analysis. We specifically wanted to allow for the possibility that this long delay would have a large negative effect on probability of enrollment.

**Table 6** Validation sample logistic regression estimates of marginal effects on probability of enrollment—potential + possible potential enrollees

Variable name	Clustered (n = 8537) Model 1		Clustered alt (n = 8537) Model 1-a		Fixed effects (n = 8537) Model 2	
	dy/dx	P < z	dy/dx	P < z	dy/dx	P < z
Recruitlag	– 1.1E– 04	0.478	– 1.2E– 04	0.450	– 4.3E– 04	0.031
FEM	– 0.026	0.019	– 0.026	0.017	– 0.036	0.007
SSIinRecruit	– 0.135	0.070	– 0.134	0.073	– 0.165	0.064
SSDIinRecruit	– 0.035	0.341	– 0.035	0.334	– 0.039	0.493
CountyWageGrowth	0.005	0.022	0.005	0.022	0.009	0.044
WORKPOTENTIAL	0.029	0.029	0.027	0.031	0.040	0.005
MISSINGBASISCODES	0.008	0.572	–	–	0.010	0.629
HighestSchoolGrade	0.005	0.004	0.005	0.006	0.007	0.020
PctUnempl	0.003	0.019	0.003	0.019	0.003	0.024
ALLGN_IMP_MNTL	– 0.004	0.769	–	–	– 0.001	0.953
WEEKLY_PAY1	– 6.4E– 05	0.001	– 6.4E– 05	<0.001	– 9.1E– 05	<0.001
Weeklypaymiss	– 0.046	0.032	– 0.046	0.030	– 0.066	0.007
Lastjobtenmiss	0.033	0.011	0.033	0.010	0.043	0.062

## Regression Results

Estimates of the marginal effects of specific explanatory variables on the probability of enrollment appear in Table 5 for potential enrollees only and Table 6 for potential plus possible potential enrollees. The two sets of test sample models differ slightly between the two tables due to the fact that one explanatory variable, ALLGN\_IMP\_MNTL (alleged a mental impairment on the application), met our p-value criterion for inclusion in the test regressions with both potential and possible potential enrollees but not in our test regressions that included potential enrollees only.

Considering first the results in Table 5, we see that the two sets of results for the test regressions are very similar to one another in terms of significance, direction, and magnitude for each of the estimated average marginal effects. The same findings result from the validation regressions for “Clustered Model 1” vs. “Fixed Effects Model 2.” Thus, the estimation methods (i.e., clustered robust vs. site-specific fixed effects) appear to yield substantially equivalent results.

In terms of direction and significance for specific variables in the validation regressions, we note that the marginal effect of recruitlag (the recruitment delay variable) is actually positive, indicating that longer delays increase the probability of enrollment. This finding is somewhat misleading, however, given we entered this variable in both linear and squared forms, so one should recognize that the marginal effect of a 1-day increase in delay will vary depending upon the length of delay. Marginal effect estimates for the fixed effects model are significantly negative in all three validation regressions and the size of the estimates indicate that women have an enrollment probability, *ceteris paribus*, that is about 0.03 less than that for men. The estimates for the benefit

receipt dummies (SSIinRecruit and SSDIinRecruit) are borderline significant and less-than-borderline significant respectively based on their 2-tailed p-values in all three validation models. The magnitudes of these estimated effects, however, are large relative to the overall enrollment rate suggesting that the small minority of denied applicants who were approved for benefits within 210 days of initial recruitment were much less likely to enroll. Given that none of these people were receiving benefits prior to attempted recruitment, a plausible explanation for the strong negative marginal effects is that these denied applicants had appealed their denials and had at least some expectation of receiving benefits in the near future. However, data on pending appeals of the denied applicants in the study were not available as of the date of this report.

Other results in Table 5 indicate that applicants from areas where unemployment (PctUnempl) was higher but average wages were increasing (CountyWageGrowth) were significantly more likely to enroll, as were people who completed more grades of schooling (HighestSchoolGrade). The average effect of higher weekly wages in the applicant's last job, however, was significantly negative. It is also interesting that denied applicants eliminated at the fifth step of the disability determination process, because they were deemed able to earn wages above the SSA SGA limit at a job they had not held in the past despite having a severe impairment (i.e., WORKPOTENTIAL = 1), were significantly more likely to enroll in the SED (*ceteris paribus*). The missing value indicators, lastjobtenmiss (last job tenure data missing) and weeklypaymiss (weekly pay data missing), were significant. In general, the positive effect of lastjobtenmiss can be viewed as representing a composite of multiple characteristics, meaning that those



**Table 7** Marginal effects x standard deviations for continuous variables and validation samples

Variable name	Potential enrollees			Potential + possible potential enrollees		
	Std.Dev	Clustered model 1	Fixed eff. model 2	Std.Dev	Clustered model 1	Fixed eff. model 2
		MExSD	MExSD		MExSD	MExSD
Recruitlag	49.500	0.017	0.014	48.499	− 0.005	− 0.021
CountyWageGrowth	1.541	0.012	0.017	1.505	0.008	0.013
HighestSchoolGrade	2.187	0.012	0.016	2.174	0.011	0.016
PctUnempl	4.948	0.014	0.016	4.912	0.013	0.016
WEEKLY_PAY1	405.108	− 0.032	− 0.039	411.742	− 0.026	− 0.038

with younger age, shorter work history, and fewer years following most recent job experience (for those with any prior jobs) were more likely to enroll compared to other denied applicants. Section VIII of the Online Appendix discusses the results for the weeklypaymiss and lastjobtenmiss dummy variables in more detail.

The validation results with possibly potential plus potential enrollees (Table 6) show at least a few interesting differences from the analyses using only the potential enrollees (Table 5). First, the estimated average marginal effect for the post-denial recruitment delay (recruitlag) now becomes negative. This difference in results between the two tables perhaps relates to the fact that the mean of recruitlag for possible potential enrollees (82 days) is considerably longer than for potential enrollees (68 days). Second, we observe different results between the clustered versus the fixed effect models for recruitlag, with a fairly large and more significant negative estimate from the fixed effects model. Third, we see slightly smaller but still significant average marginal effects for the county wage trend variable (CountyWageGrowth) in Table 6 compared to Table 5.

In general, the magnitudes of the average marginal effects seem small, but should be viewed in relation to the observed enrollment probability, which was only approximately 0.25. For example, the average marginal effect for FEM (females) is only about − 0.035, but this implies a substantial relative reduction in the probability of enrollment from the mean of 0.25 to 0.215. Bear in mind that the marginal effects pertain to a 1-unit change in each explanatory variable in comparing magnitudes of estimated marginal effects across variables within the same model. A 1-unit change for each binary variable is a change from 0 to 1; but in the case of the continuous variables (recruitlag, CountyWageGrowth, HighestSchoolGrade, PctUnempl, and WEEKLY\_PAY1), a 1-unit change may signify a quite small or large change relative to the mean value of the variable in question. For example, a 1-unit change in the value of CountyWageGrowth is a substantial change relative to the mean value of that variable (i.e., approximately 0.2 in Table 3 above); by contrast, a 1-unit change in WEEKLY\_PAY1 is quite small relative to

its mean value of approximately \$370. Results in Table 7 provide comparisons of relative magnitudes for estimated marginal effects of continuous variables. Each column labeled “MExSD” is the product of the average marginal effect and of a 1-unit change in the relevant variable and the sample standard deviation of that variable. This could be interpreted as the estimated average marginal effect of a one standard deviation change in that variable on the probability of enrollment. For example, the MExSD value for HighestSchoolGrade in the fixed effects models indicates that the difference in enrollment probability between a denied applicant with a value of 8 for HighestSchoolGrade and one with a value of 16 is approximately  $4 \times 0.016 = 0.064$ .

## Qualitative Analysis

In addition to the regression analyses, interviews we conducted retrospectively with enrollees and non-enrollees during the first years of study implementation provide more insight into enrollment decisions. Qualitative data consisted of transcriptions of focus groups with enrollees, and transcriptions of in-depth interviews with denied applicants who chose not to enroll. To facilitate the organization of data for analysis, we imported the transcripts into NVivo, a computer-assisted qualitative data analysis program. Our analytic approach combined the grounded theory technique of allowing themes to emerge inductively during close reading (Charmaz, 2011), and an interpretive approach sensitized to ethnographic contexts (Luhmann, 2015), including physical environments, interpersonal supports, cultural models (Quinn, 1996) and local economies and industries.

The first pass at coding transcripts involved extracting all text relating to discussions of the decision about enrolling in SED, and to applicants’ initial impressions of the study during recruitment. After extracting all the pertinent text, we endeavored to identify patterns and themes. We identified a number of differences between denied applicants who enrolled and those who chose not to enroll. Enrollees expressed openness to receiving help and hopefulness that

they could be helped. Interviews of those not enrolling indicated three main explanations:

- They believed that their impairments and other barriers precluded employment;
- They did not make a considered decision during recruitment; or
- They were satisfied with their current work.

A common reaction of both enrollees and non-enrollees to the recruiter's initial phone call was to question whether it was real. Applicants reported that their first thought was that the phone call was "a hoax," "a junk phone call" or "a scam." Enrollees ultimately learned of the legitimacy of the SED in various ways, including their independent online research or noting the recruiter had personal information about them from SSA. Others received multiple phone calls and came to trust that the recruiter was describing a legitimate service. The common initial impression that the demonstration was a scam likely reduced enrollment rates, since applicants who felt that way may not have allowed the recruiter a second chance to explain the reality and value of the SED.

In fact, the most common reason for not enrolling seems to relate to not giving much thought to the decision. Because some denied applicants thought the demonstration sounded like a scam, they did not give the recruiter any time to explain. When site visitors called to interview other non-enrollees, some explained that they did not remember ever receiving a call from the recruiter, even though our records showed we had contacted them and they declined enrollment. Their failure to recall suggests they had not given their decision much consideration.

Many SED enrollees who we interviewed explained that they enrolled because they hoped the offer of help might make a difference in their lives. However, note that the financial incentives attached to completing research interviews were also very attractive to enrollees, with some indicating they enrolled in the study for the money offered to complete the periodic interviews. For individuals with little money, many of whom face dire circumstances such as homelessness or lack of stable housing, food insecurity, and inability to meet medical needs, the extra income can be a strong incentive. Social desirability bias may have led other enrollees to under-report the influence of the cash incentives and over-report their desire to seek employment when speaking about their enrollment decisions.

Finally, the interviews with non-enrollees revealed three general reasons for not enrolling in the study. The largest group of non-enrollees told the recruiter that they were not interested in finding a job, per their MIS record. Among non-enrollees participating in the qualitative interviews, the most common reason for not enrolling was due to their belief

they could not work because of their health or impairments. Other non-enrollees admitted that they probably failed to make a considered decision about enrolling into the study. Finally, as one might expect, there were candidates who already had work and said they were happy with their current work situation.

## Discussion

SSA sent 73,512 denied applicant cases to Westat that met the following criteria: the applicant was between the ages of 18 and 49, alleged a mental impairment, and their address of record fell within one of 30 catchment areas designated by the demonstration sites. Of this group, 26,505 cases failed the programmatic screener eligibility criteria for reasons including, but not limited to: did not speak English or Spanish, alleged or diagnosed with an intellectual impairment, and residing in a residential mental health treatment facility or jail. This process left 47,007 cases to potentially contact for recruitment. Westat selected a random sample of 21,003 cases from this pool.

The study enrolled between 23.0 and 26.2 percent of the eligible target population, depending upon the denominator used to calculate the rate. Potential enrollees knew about the study and that they were eligible to enroll. Possible potential enrollees may have known about the study, but there is no evidence to indicate that they did or did not know about it. If we combine the potential with the possible potential enrollees, the enrollment rate is 23.0 percent. Among only those for whom we have verification that they actually learned about the study, the enrollment rate is 26.2 percent. These figures provide lower and upper bounds on enrollment rates based on the circumstances of the study. The SED enrollment rate was also well above that of other SSA recruitment efforts for randomized trials, including Project NetWork (4.5 percent) and the New York WORKS project (2.4 percent) (Burststein et al., 1999; Ruiz-Quintanilla et al., 2006).

## Discussion of Quantitative Results

The application of a split-sample design in our regression analysis allowed us to obtain valid statistical tests of a number of factors related to the probability that a denied applicant would enroll in the SED. Almost all of the factors identified in the test regression phase were significant in the validation phase and the magnitudes and directions of their effects on the validation phase were generally quite similar to the analogous results from our final test regressions.

These significant factors included a number of self-reported items collected by SSA in the initial benefit application form (Disability Report) relating to gender, education, and work history. Specific results for these factors suggested

that males, people with more limited prior work experience or earnings, and people with greater educational attainment were more likely to enroll in the program. The specific results on gender and educational attainment are consistent with the findings from the general labor-market literature on gender and educational differences in employment and market labor supply.

Among the data from SSA administrative records available to the study, the denial of the application due to evidence the applicant could find alternative work in the national economy was strongly and positively predictive of enrollment. Several local area (i.e., census tract and county) labor market indicators were also significant, suggesting that denied applicants were more likely to enroll if their local unemployment rate was high and if average wages in their county were rising rapidly.

Finally, an important qualification to our analysis is that we have focused here on more than 13,000 denied applicants who passed the SED programmatic screening inclusion criteria and who spoke with the study recruiters. As explained earlier, recruiters were unable to contact more than 7,000 denied applicants. We do not know the reasons these denied applicants were not locatable; therefore, one should exercise caution in generalizing our findings beyond those we contacted.

## Discussion of Qualitative Results

Qualitative analysis suggests that more intangible factors, such as denied applicants' hopefulness about their future, and an openness to seeking help, may separate denied applicants who enrolled from those who did not enroll. Individuals who declined enrollment thought they could not improve their health and find a job even with support. We do not know if this difference is due to trait or state differences between enrollees and non-enrollees (Stevens et al., 2014); that is, is enrollees' hopefulness due to a stable personal characteristic (trait), or is it mutable in times of greater stress (state)? Similarly, is the pessimism of non-enrollees a stable characteristic or does it decrease under more favorable circumstances? The present data do not allow us to answer these questions.

## Implications

Based on the data from our sample, we predict that enrollment rates in future replications of the SED could differ from those reported here. The characteristics of the denied applicants in these replications will influence observed recruitment outcomes. The regression results from the analysis of potential and possible potential enrollees suggest that using data from the Disability Report and local economic

conditions may also help to identify those more likely to enroll into a similar program in future replications.

Knowing the degree to which enrollees mirror the larger eligible population is critical to understanding the extent to which we can say with confidence that the study results would most likely have been the same for any sample of eligible denied applicant candidates. Comparisons between the sample selected for contact and the sample not selected for contact revealed the two groups were largely identical. The comparisons of general characteristics—age, gender, education level, number of jobs held in the past 15 years, and weekly pay (at most recent job)—revealed no differences between the group randomly selected for contact versus those not selected for contact. This finding is a good sign that the denied applicants selected for contact reflect the same characteristics as members of the non-selected sample.

We did find differences for two factors between those denied applicants selected for contact and those not selected for contact: (1) previous denial for a similar claim and (2) the adjudication level of the 5-step decision process for which the claim was denied. Among denied applicants with a previous similar claim type, the selected-for-contact group included fewer cases (4.5%) than the not-selected-for-contact group. While the overall percentage of cases having a previous claim denial is small (about 13 percent of the overall target population), the finding is worth noting. We do not find the first difference to be anything more than a Type I statistical error, as we cannot articulate a good reason to be concerned over the difference. It may be true that potential enrollees that have a prior denial are more likely to “give up” and move on, but it is not clear that they would be more likely to enroll. In fact our modeling results suggest they were not. The second difference concerned at which level in the 5-step disability determination process each case received a denial. More cases in the selected-for-contact group received their denial at Step 5. Over 60 percent of all cases in both groups received denials at Step 5, by far the largest group in the overall target population.

One final issue concerns the large percentage (more than a third) of candidate enrollees that we failed to locate. Homelessness and telephone access are major issues, suggesting that this population is transient. Preliminary analysis of our enrollment data suggest that there may be important differences between this group and the group of locatable candidates. Future research should address this issue in detail.

The findings also suggest that, among the population of denied applicants targeted by the SED, those participants that we expected to benefit the most from the intervention were likely to enroll. Specifically, those participants deemed capable of finding work in the national economy who lived in regions of high unemployment and rising wages were most likely to enroll. However, a limitation of this study is

that consistent evidence of the severity and types of mental illnesses present among the entire population eligible for the SED is not available; therefore, we cannot say with certainty if the participants with the mental illnesses (schizophrenia, bipolar disorder, major depression, etc.,) for whom IPS was originally developed, were more or less likely to enroll than others.

The qualitative evidence also collected in the study suggest that those participants who enrolled were open to seeking help. While some non-enrollees with whom we spoke did not express openness to seeking help, the perception that the phone call introducing the project was a hoax probably precluded the enrollment of other individuals who might have been open to help. Recruitment efforts for future studies of similar populations may need to consider ways to improve trust and gain credibility among potential enrollees.

## Conclusion

The SED recruitment achieved higher recruitment rates than comparable SSA demonstrations. Analyses of recruitment efforts using quantitative and qualitative data provide useful evidence of the likelihood and reasons for enrollment among denied disability applicants. Future studies that seek to recruit disability applicants with mental impairments should expect challenges in locating and contacting potential enrollees. Characteristics of enrollees and non-enrollees suggest that the local economy, work history, and other demographic characteristics relate to the likelihood of enrollment. Those judged by SSA as capable of alternative work available in the national economy were more likely to enroll in the demonstration. Comparisons between the sample selected for contact and the larger set of denied applicants from the catchment areas indicated that these groups were largely identical, suggesting that the findings would generalize to broader groups of denied applicants with mental impairments.

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**Author Contributions** All authors contributed to the study conception and design. Quantitative data analyses were performed by David S. Salkever and Jeffrey A. Taylor. Qualitative data analyses were performed by Jocelyn Marrow. All authors commented on previous versions of the manuscript and read and approved the final manuscript.

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## Declarations

**Conflicts of interest** The authors have no conflicts of interest to declare that are relevant to the content of this article.

**Ethical Approval** All procedures performed involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Westat Institutional Review Board reviewed and approved this study (IRB approval FWA 00005551).

**Consent to Participate** Informed consent was obtained from all qualitative interview participants. Quantitative data for the population of denied applicants were obtained from existing administrative databases and personally identifiable information were removed prior to analysis.

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