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The Social Security Windfall Elimination Provision: Issues and Replacement Alternatives

by Glenn R. Springstead*

Congress established the Windfall Elimination Provision (WEP) in 1983 to improve the fairness of Social Security by reducing benefits for individuals who would otherwise receive a full benefit based on earnings in Social Security–covered employment as well as pension income from noncovered employment. Since then, critics have asserted that the WEP overcorrects the would-be windfall for affected beneficiaries and is difficult to administer effectively; in response, some members of Congress have called for modifying or repealing the WEP. This article considers two WEP replacement options that would modify the benefit calculation methodology. It compares the current WEP with the two options and discusses some of the possible effects of changing the current law.

Introduction

The Social Security Administration (SSA) pays retirement and disability benefits to insured workers and, in many instances, to workers' spouses or survivors. Two Social Security provisions reduce or eliminate the benefits of certain individuals who receive pension income from employment not covered by Social Security.[1] The Windfall Elimination Provision (WEP) applies to retired workers with fewer than 30 years of Social Security–covered employment and the Government Pension Offset (GPO) applies to benefits received by spouses and widow(er)s of covered workers.

Social Security retirement and disability benefits replace a share of the beneficiary's prior earnings in covered employment and are weighted to favor workers with lower lifetime earnings. The purpose of the WEP is to remove the advantage of weighting for workers whose earnings from noncovered employment would be excluded from the benefit calculation, which could therefore mask the level of their total lifetime earnings. The particulars of the WEP formula are described later.

The GPO has a similar objective related to spousal benefits. Unlike the progressive structure of primary (worker) benefits, however, Social Security spousal benefits are designed for individuals whose lack (or low level) of covered earnings indicate a financial dependence on the insured worker. The GPO reduces or eliminates benefits to spouses who have worked in noncovered employment to an extent that they are not financially dependent on the insured worker's benefits.

Approximately two-thirds of WEP and GPO cases involve former state or local government employees, who are required to report their noncovered pension income to SSA. Agency enforcement of the provisions is difficult if beneficiary reporting is inconsistent, which can result in benefit overpayments. Additionally, affected populations misunderstand the WEP and GPO or believe them to be unfair, in principle or in application. Further, policy experts have noted aspects

Selected Abbreviations

AIME	average indexed monthly earnings
AWI	average wage index
CER	covered-earnings ratio
GPO	Government Pension Offset
OCACT	Office of the Chief Actuary
PIA	primary insurance amount

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Selected Abbreviations—*Continued*

QC	quarter of coverage
REP	relative earning position
SSA	Social Security Administration
WEP	Windfall Elimination Provision
YOC	year of coverage

of the WEP that fall disproportionately on workers with lower lifetime earnings. To address these concerns, policymakers have proposed several possible remedies, such as mandating Social Security coverage for all newly hired state and local workers; providing the Internal Revenue Service or SSA with greater authority to obtain public pension data from employers or plan administrators; modifying the WEP or GPO formulas; or simply repealing the provisions.

This article considers modification of the WEP formula. Specifically, it compares and contrasts two alternatives to the existing WEP formula and suggests how each could affect workers with different earnings histories. One modification adapts the formula SSA uses to calculate benefits for workers who have accrued earnings in both the United States and a foreign country with which a bilateral totalization agreement is in force. Under a totalization agreement, the United States and its cosignatory allow periods of work in the host country to count toward establishing eligibility and calculating the amount of social security benefits in the worker's home country. The second modification adopts a formula contained in legislation proposed in 2016 to adjust the Social Security benefit by accounting for the worker's noncovered earnings. Because historical data on noncovered earnings for a sufficient number of newly eligible beneficiaries have recently become available to SSA, such an adjustment is now possible.

The article excludes the GPO to focus on the WEP. It discusses program rules and presents estimated benefit levels for stylized hypothetical retired workers. It does not consider the effects of the two WEP modifications on disabled workers or on auxiliary beneficiaries of retired and disabled workers. Under current law, the WEP reduces the auxiliary benefits paid from the retired or disabled worker's record during the worker's lifetime.[2] It does not reduce the amount paid to the survivors of such workers.

Background

This section is divided into three subsections. The first subsection describes the computation of Social Security standard retired-worker benefits under current law, including the calculation of average indexed monthly earnings (AIME) and the primary insurance amount (PIA). The second subsection outlines the key features of the WEP, explains in more detail the policy's motivation, and reviews criticisms of the provision. The third subsection summarizes totalization agreements and the SSA database of noncovered earnings, which provide the frameworks for the two WEP replacement options analyzed here.

Social Security's Standard Benefit

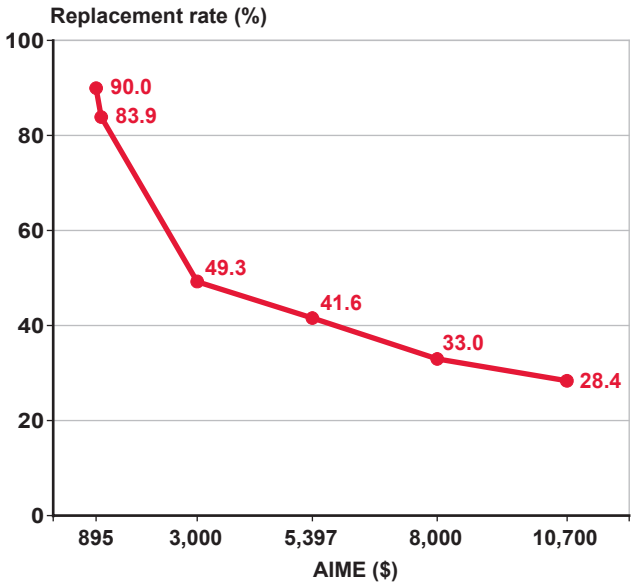
Social Security benefits replace a portion of an insured worker's average wages in covered employment, with those wages capped at a taxable maximum annual amount.[3] The benefit-to-earnings ratio, or replacement rate, is designed to be greater for lower lifetime earners than for higher lifetime earners.

To begin the benefit calculation, SSA converts a worker's lifetime earnings in covered employment to AIME, which are indexed to nationwide wage growth. SSA indexes the worker's earnings for each year worked until age 60.[4] Wage indexing keeps retirement benefits comparable to current average earnings levels. Next, SSA sums the indexed earnings in the 35 highest earning years.[5] Finally, SSA divides this sum by the number of months in the person's computation years to obtain the AIME. The number of computation years for retired workers is 35, so the number of months in the AIME denominator is 420.[6] To illustrate, a retired worker who earned $50,000 in wage-indexed dollars each year for 35 years would have AIME of $4,166.67, or 35 × $50,000 ÷ 420.

Next, SSA uses the PIA formula to convert AIME to a monthly benefit amount.[7] For workers who first became eligible for retirement or disability benefits in 2018, the PIA formula was 90 percent of the first $895 in AIME, plus 32 percent of the next $4,502 of AIME, plus 15 percent of AIME above $5,397. The key dollar amounts—$895 and $5,397—are the 2018 PIA *bend points.* Bend point amounts are indexed annually to the change in average wages. By contrast, the 90 percent, 32 percent, and 15 percent "bend point factors" are fixed by law; those percentages apply to every cohort of newly eligible beneficiaries.

By decreasing as AIME levels increase, the bend-point factors provide higher benefits relative to preretirement earnings for lower lifetime earners than for higher lifetime earners. Chart 1 shows that retirees with AIME of $895 in 2018 would have a benefit-to-earnings replacement rate of 90 percent. A worker with AIME of $3,000 would receive a benefit equal to 49 percent of preretirement earnings. The replacement rate for a worker with AIME at the second bend point, $5,397, would be lower still (42 percent), and so on.

Chart 1.
PIA-to-AIME replacement rates for selected AIME levels in 2018 (in percent)



SOURCE: Author's calculations using the Social Security PIA formula with 2018 bend points.

The WEP

Although the PIA formula under current law provides a higher replacement rate for low earners, it does not distinguish between workers whose lifetime countable earnings are low because they had periods of little or no earnings and those who had periods of noncovered employment. Table 1 presents three illustrative examples.

Workers A and B have the same lifetime covered earnings amounts and thus the same PIA, but their total lifetime earnings differ. Worker C differs from Worker A only in that all of her lifetime earnings were covered. Worker A's benefit provides a 54 percent replacement rate, but if all of his earnings had been in covered employment, his replacement rate would, like Worker C's, be 44 percent. Worker C's PIA is higher, but her replacement rate is lower.

The 10 percentage point advantage in replacement rate for the noncovered worker represents what policymakers call a "windfall" from the standard PIA formula. In 1983, Congress acted to negate the windfall by creating the WEP. The WEP adjusts the PIA based on the number of work years covered by Social Security and the amount of the beneficiary's pension income from noncovered employment.

For insured workers who also receive a monthly pension benefit from noncovered employment, SSA first reduces the PIA by scaling the first PIA-formula bend-point factor down from 90 percent. The amount by which SSA reduces the bend-point factor depends on the beneficiary's years of covered earnings (shortened to "years of coverage" or YOCs).[8] For workers

Table 1.
PIA-to-AIME replacement rates for three hypothetical workers born in 1956

Characteristic	Worker A	Worker B	Worker C
Years worked in—			
Covered employment	20	20	35
Noncovered employment	15	0	0
Indexed earnings ($)			
Annual average	50,000	50,000	50,000
Lifetime			
In covered employment	1,000,000	1,000,000	1,750,000
Total	1,750,000	1,000,000	1,750,000
AIME ($)	2,381	2,381	4,167
PIA ($)	1,281	1,281	1,852
PIA-to-AIME replacement rate (%)	54	54	44

SOURCE: Author's calculations using indexing and bend point factors for newly eligible workers in 2018.

with 20 or fewer YOCs, the first bend-point factor under the WEP is 40 percent (Table 2). The factor increases by 5 percentage points for each additional YOC, reaching 90 percent for workers with 30 or more YOCs. Thus, workers who had substantial covered earnings in 30 years (that is, in at least 75 percent of the 40 possible years of coverage) from ages 22 through 61 are exempt from the WEP.

The difference between the PIAs calculated with the standard and the WEP formulas is compared to one-half of the worker's monthly pension from noncovered employment and the lesser of the two values is deducted from the standard PIA. This step caps the amount that the WEP can reduce the standard PIA and is known as the WEP "guarantee." Table 3 shows the standard PIA formula results for two hypothetical workers as well as the step-by-step effects of applying the WEP formula to the affected worker.

In this example, Worker A's AIME calculation accounts for 10 years of covered work, as follows: 10 years × $50,000 = $500,000 ÷ 420 months = $1,190. The standard PIA would be 90 percent of $895, plus 32 percent of $295 (that is, $1,190 minus $895); thus, $805.50 + $94.40 = $899.90, which rounds to $900. The replacement rate would be $900 ÷ $1,190, or 76 percent. However, because Worker A has fewer than 20 YOCs, the WEP PIA calculation incorporates a 40 percent bend-point factor for the first $895 of AIME, plus 32 percent of $295 (as in the standard PIA); thus, $358.00 + $94.40 = $452.40, rounded to $452. The WEP formula reduction (standard PIA minus WEP PIA) is thus $900 minus $452, or $448.

I estimate Worker A's monthly pension amount from noncovered employment by assuming a 2 percent contribution-rate multiplier over 20 years with $50,000 in noncovered earnings (20 × $50,000 × .02 = $20,000) and dividing by 12 to generate a monthly amount of $1,667. Because the WEP guarantee prohibits reductions exceeding one-half of the monthly pension payment from noncovered employment, I divide this amount by two; the result rounds to $834. Because this amount exceeds the $448 reduction from the WEP formula, and the WEP guarantee reduces the affected worker's PIA by the smaller of the two possible reduction amounts, Worker A's WEP PIA is $452. The WEP thus reduces the replacement rate from 76 percent to 38 percent for Worker A.

For Worker B, all 30 work years are in covered employment, resulting in an AIME of $3,571 (30 × $50,000 ÷ 420). The PIA (after rounding) equals

Table 2.
PIA formula under the WEP: First bend-point factors, by YOCs

YOCs	First bend-point factor (%)
30 or more	90
29	85
28	80
27	75
26	70
25	65
24	60
23	55
22	50
21	45
20 or fewer	40

SOURCE: SSA.

Table 3.
PIA levels and PIA-to-AIME replacement rates under standard and WEP formulas: Two hypothetical workers

Characteristic	Worker A	Worker B
Years worked in—		
Covered employment	10	30
Noncovered employment	20	0
Indexed earnings ($)		
Annual average	50,000	50,000
Lifetime		
In covered employment	500,000	1,500,000
Total	1,500,000	1,500,000
Standard PIA formula		
AIME ($)	1,190	3,571
PIA ($)	900	1,662
Replacement rate (%)	76	47
WEP formula		
PIA with 40% factor [a] ($)	452	. . .
Resulting PIA reduction ($)	448	. . .
Alternative PIA reduction [b] ($)	834	. . .
WEP PIA [c] ($)	452	. . .
Replacement rate (%)	38	. . .

SOURCE: Author's calculations using indexing and bend point factors for newly eligible workers in 2018.

NOTE: . . . = not applicable.

a. Forty percent factor applies to first PIA bend point for workers with 20 or fewer YOCs (see Table 2).

b. One-half the monthly pension payment from noncovered employment.

c. Equals the standard PIA minus the lesser of the two potential reduction amounts.

$1,662 (90 percent of $895, plus 32 percent of [$3,571 minus $895]), or $805.50 + $856.32, resulting in a PIA-to-AIME replacement rate of 47 percent for the fully covered worker. With 30 YOCs, Worker B is not subject to the WEP.

Table 3 illustrates that the absence of the WEP would provide Worker A with a replacement-rate windfall of 76 percent, in contrast with Worker B's 47 percent replacement rate for 30 YOCs. However, Table 3 also indicates that in this case, the WEP overcorrects for Worker A's noncovered earnings by producing a replacement rate of 38 percent instead of 47 percent. With lifetime earnings, years worked, and all other factors equal, the hypothetical workers would ideally receive identical covered-earnings replacement rates from the respective PIA formulas.

Although Congress created the WEP to remove an unintended advantage for beneficiaries with significant periods of noncovered employment, affected beneficiaries and their advocates maintain that the reductions unfairly deprive workers of benefits that they have earned.[9] Some policy experts have highlighted the provision's adverse effects on low earners in particular. For example, Brown and Weisbenner (2012) identify two regressive aspects of the WEP. First, its reductions apply only to the first (lowest) portion of AIME, meaning that as a percentage of AIME, the WEP reduction decreases as average lifetime earnings increase. Second, low earners are less likely to meet the annual YOC earnings thresholds that can lower or eliminate the WEP reduction.

These and other concerns have led some beneficiaries and policymakers to call for WEP reform. To that end, the next subsection introduces two potential modifications of the existing WEP formula.

Alternative WEP Formulas: The Totalization Model and the Use of Noncovered Earnings Records

The first potential WEP reformulation would be based on an existing benefit-calculation methodology. Totalization agreements establish retirement-benefit eligibility for workers with substantial work earnings in both the United States and another country. The first totalization agreement went into effect in 1978; as of July 31, 2019, the United States has entered into 30 such agreements.

Like the WEP, the totalization formula prorates a worker's benefit to account for earnings accrued under different circumstances—in this case, in two countries. To qualify for a totalized benefit, a U.S. worker must have at least 6 and fewer than 40 quarters of coverage (QCs) under U.S. Social Security.[10]

To compute a totalized benefit, SSA first calculates how the worker's U.S. earnings compare with those of other workers in the American economy. It does this by computing a yearly ratio of the worker's annual covered earnings to that year's national average wage index (AWI) amount.[11] SSA then calculates the average of these ratios across all years with covered earnings; the result is called the relative earning position (REP). SSA multiplies the REP by the average earnings for all U.S. workers in each year beginning with that in which the worker attained age 22 and ending with that in which he or she attained age 61, and indexes the result for each year to the AWI. This produces the worker's theoretical indexed earnings record. SSA then applies the current-law AIME and PIA formulas to the theoretical earnings record to find the theoretical PIA. To prorate the benefit, SSA multiplies this theoretical PIA by the ratio of QCs earned (at least 6 but not more than 39) to the maximum number of QCs possible over 35 work years (140). For a person with 10 QCs, for example, the prorated percentage of the theoretical PIA would be 10 ÷ 140, or approximately 7 percent. Appendix A provides a detailed example of how SSA determines the U.S. portion of a totalization benefit. Jackson and Cash (2018) discuss totalization agreements in detail.

A reformulated WEP calculation based on the totalization model would similarly project the worker's theoretical lifetime earnings (including years with noncovered earnings) based on his or her covered earnings record. The WEP PIA would then be calculated and prorated on that basis.

The second WEP reformulation option involves using noncovered earnings records. Public Law (P.L.) 94-202, enacted in January 1976, created a single annual wage-reporting system for Social Security and federal income tax purposes, replacing a cumbersome quarterly reporting system that required employers to submit different forms to SSA and the Internal Revenue Service (IRS). Beginning in 1978, employers could submit their wage reports to both agencies on IRS Form W-2 (SSA 1976; Committee on Finance, United States Senate 1977). This change not only simplified the wage-reporting process; the W-2 data that were now reported to SSA also included information previously submitted only to the IRS, such as earnings above the taxable maximum and any noncovered earnings (Olsen and

Hudson 2009). Although the wage-reporting requirements in P.L. 94-202 did not originally apply to state governments, SSA required states to submit annual rather than quarterly wage reports beginning in 1982 (Waldron 2006).

The law requiring employers to report noncovered earnings to SSA was probably not enacted to support WEP enforcement or reform, but the existence of such records now raises the possibility of their use for the latter purpose. SSA's records would, in theory, now cover all earnings after age 20 for newly eligible retired-worker beneficiaries in 2019. In practice, however, states did not consistently report their employees' total wages annually until 1982, and SSA does not consider the noncovered-earnings data from 1978 to 1981 reliable. Further, the reporting of such earnings remained incomplete into the mid-1990s. Finally, because SSA has not used the noncovered-earnings records for benefit computations, those data have not been subject to rigorous quality tests.

Because SSA's historical database of noncovered earnings records continues to increase in depth and completeness, policymakers may now assess a greater array of potential WEP reforms (or outright replacements). For example, the proposed Social Security Reform Act of 2016 (H.R. 6489) included a provision that would have replaced the current WEP formula with one that accounted for noncovered as well as covered earnings.[12] Their replacement formula included three elements: the current-law AIME, which is based on covered earnings only; a second earnings measure called "total AIME," which would account for both covered and noncovered earnings; and the "total PIA," which would be calculated based on total AIME rather than covered AIME. The replacement formula would use the three elements as follows:

WEP PIA =
total PIA × current-law (covered) AIME ÷ total AIME.

Unlike the totalization-model formula, which would project a worker's pattern of covered earnings over a working lifetime, this approach accounts for the worker's accrual of noncovered earnings. Because it measures the ratio of covered earnings to total covered and noncovered earnings, I refer to this as the covered-earnings ratio (CER) option.

The CER option would free beneficiaries from reporting their noncovered pension income, as required under the current WEP. Although that change would simplify the WEP, it would also remove the WEP guarantee and its protection of beneficiaries with relatively small noncovered pensions. However, including noncovered earnings in the formula would also eliminate the YOC-based thresholds from the benefit calculation.

Table 4 illustrates how the CER formula would affect the same two hypothetical earners from Table 3: Worker A, with 10 years of covered earnings and 20 years of noncovered earnings; and Worker B, with 30 years of covered earnings. Both earn $50,000 in wage-indexed dollars each year for 30 years, so they have equal lifetime earnings. Worker A has current-law AIME of $1,190 (10 × $50,000 ÷ 420) and total AIME, combining covered and noncovered earnings, of $3,571 ([10 × $50,000 + 20 × $50,000] ÷ 420). Based on total AIME, Worker A's total PIA is $1,662 (90 percent of $895, plus 32 percent of [$3,571 minus $895], or $805.50 + $856.32, which rounds to $1,662).

Using the CER formula, I multiply Worker A's total PIA ($1,662) by the ratio of current-law AIME ($1,190) to total AIME ($3,571), which is 0.3332; the result rounds to $554.

Table 4.
PIA levels and PIA-to-AIME replacement rates under standard and CER formulas: Two hypothetical workers

Characteristic	Worker A	Worker B
Years worked in—		
Covered employment	10	30
Noncovered employment	20	0
Indexed earnings ($)		
Annual average	50,000	50,000
Lifetime		
In covered employment	500,000	1,500,000
Total	1,500,000	1,500,000
Standard PIA formula		
AIME ($)	1,190	3,571
PIA ($)	900	1,662
Replacement rate (%)	76	47
CER formula		
Total AIME ($)	3,571	3,571
Total PIA ($)	1,662	1,662
Total-PIA replacement rate (%)	47	47
WEP PIA ($) using CER model	554	1,662

SOURCE: Author's calculations using indexing and bend point factors for newly eligible workers in 2018.

For Worker B, the CER formula multiplies total PIA ($1,662) by the ratio of current-law AIME ($3,571) to total AIME (also $3,571), which converts to $1,662 × 1, or simply $1,662. For both workers, the CER PIA replaces 47 percent of covered earnings.

Methods and Analytical Approach

This analysis compares the current-law standard and WEP PIAs with the totalization-model and CER WEP reformulations. The hypothetical workers described above differed only in their covered and noncovered work years. However, to better assess the distributional qualities of the four PIAs, this section introduces more complexity by increasing the number of worker types and varying the levels of annual and lifetime wages. It also increases the sensitivity of the analysis by considering the timing of covered and noncovered wages—that is, whether the covered earnings occurred in one period at the start, middle, or end of the working career; or occurred at two different times, at both the start and the end of the working career. Wage levels are categorized at three broad levels: low, medium, and high.

Stylized Workers

All stylized workers in this analysis are hypothetical retired-worker beneficiaries who were born in 1953. These workers first became eligible for retired-worker benefits in 2015, when they reached age 62. As such, their PIA calculations use the 2015 bend points of $826 and $4,980. The stylized workers reached age 65 in 2018, the year of analysis.

Scaled Earnings by Age. I use scaled factors developed by SSA's Office of the Chief Actuary (OCACT) to estimate lifetime earnings. These factors replicate actual earnings histories from SSA's Continuous Work History Sample, an administrative data file. OCACT's Clingman and Burkhalter (2018) updated the factors for the intermediate assumptions of the *2018 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds.* The OCACT authors explain the construction of the factors for four levels of lifetime earnings—very low, low, medium, and high. For each earnings level, they develop and apply a scaling factor to each earning age from 21 through 64. The scaling factor is a multiple of the AWI in that year. For example, for a medium-earning worker born in 1953, the scaling factor is 0.304 in 1974 for age 21, or 30.4 percent of the AWI. That is, the medium earner's wages at age 21 are 30.4 percent of the AWI in 1974. As the AWI in 1974 was $8,030.76, the medium earner's scaled annual wage was $2,441.35. The scaling factor for 20 years later, when this medium earner was 41 years old, is 1.062. So, his or her age-41 earnings are estimated to be 106.2 percent of the AWI in 1994 ($23,753.53), or $25,226.25. These earning levels are in nominal dollars and do not reflect the wage indexing used in calculating the worker's AIME. Regardless of earnings level, the general pattern of the scaling factors reflects earnings increases from lower levels in the first work years to a peak around age 50 and a slight decline thereafter. Appendix B presents a tabular list of the scaling factors.

Although OCACT created four earnings categories, this article omits the very-low category. Clingman and Burkhalter assumed an annual earnings amount for a stylized worker in each earnings level: 45 percent of the AWI for a low earner, 100 percent of the AWI for a medium earner, and 160 percent of the AWI for a high earner.[13]

Because the OCACT scaling factors assume a working career of 44 years, this analysis compares the two WEP replacement options for stylized workers with 44 years of earnings. I split the stylized workers' 44-year working careers into one of two combinations of covered and noncovered work years: either 10 covered and 34 noncovered years or 24 covered and 20 noncovered years.[14]

Timing of Covered and Noncovered Work. Because the annual-earnings scaling factors are weighted based on when in the life cycle they occur, I assume that the timing of covered and noncovered earnings will affect lifetime earnings and benefit estimates. For example, because the scaling factors increase as a percentage of the AWI in the later years of earnings, I expect covered earnings accrued in the middle or late phases of the worker's career to be higher than those accrued in the early phase. To account for this effect, I distribute the stylized workers into four career-phase patterns, or "profiles," for covered earnings.

Workers in the early-career profile accrued all lifetime covered earnings at the start of their careers. For the 10-year covered worker in this profile, all covered earnings occurred at ages 21–30 and all noncovered earnings occurred thereafter. For the 24-year covered worker, all covered earnings occurred at ages 21–44.

Workers in the mid-career profile accrued all lifetime covered earnings in the middle of the career, and noncovered work years occurred at the start and end of their careers. For the 10-year covered worker in this profile, all covered earnings occurred at ages 38–47,

and 17-year periods of noncovered work occurred at ages 21–37 and 48–64. For the 24-year covered worker, all covered earnings occurred at ages 31–54, and 10-year stretches of noncovered work occurred at ages 21–30 and 55–64.

Late-career workers accrued all lifetime covered earnings at the end of their careers. For the 10-year covered worker in this profile, all covered earnings occurred at ages 55–64 and all prior earnings were in noncovered employment. For the 24-year covered worker, all covered earnings occurred at ages 41–64.

Combined early/late career or "sandwich" workers accrued covered earnings in two periods of equal length at the start and the end of their careers. For the 10-year covered worker in this profile, 5 years of covered work occurred at ages 21–25 and again at ages 60–64. For the 24-year covered worker, 12 years of covered work occurred at ages 21–32 and again at ages 53–64.

PIA Estimates. Using the stylized-worker examples described above, this article compares current-law standard and WEP PIAs with the WEP PIAs that would result from the use of the two proposed reformulations: the totalization model and the CER. For all PIA estimates, I index annual earnings to age 60 and keep earnings at ages 61 through 64 in nominal terms (as under current law).[15] Likewise, all estimates use only the 35 highest earning years to calculate AIME.

Estimation of the current-law standard PIA follows the process described earlier. For the WEP PIA, I compare the worker's scaled nominal earnings to the YOC threshold in that year. In some cases, this means that not every year of covered earnings qualifies as a YOC for WEP purposes. I also assign an assumed value for the noncovered monthly pension amount by multiplying the average of the highest 5 annual noncovered earnings amounts by the number of noncovered work years and a 2 percent multiplier, then dividing the result by 12. To calculate the WEP PIA guarantee, I divide this amount by two. Using a 5-year average and a 2 percent multiplier is consistent with the pension computations commonly used by retirement systems for noncovered workers.[16]

Because the totalization PIA formula specifically applies to workers with less than 40 (but more than 6) QCs of U.S. coverage, it only applies to workers who are not insured under current law. For this article, however, I apply the totalization formula to stylized workers who are fully insured for U.S. benefits. For that reason, I refer to this formula as the *totalization model* to distinguish it from the current-law totalization program and formula. In all other respects, this analysis uses the statutory calculation procedure. Appendix C details the specific steps and components of the totalization-model PIA.

The CER PIA estimates use the current-law AIME and PIA calculations and add the total-AIME calculation, which constitutes the 35 highest earning years, whether in covered or noncovered employment. Covered and noncovered work is assumed to occur in separate (nonoverlapping) years.

Results

This section first summarizes some key findings across earnings levels. More detailed discussions of the results for high, medium, and low earners follow. A table accompanies the discussion for each earnings-level group. The table shows the current-law standard and WEP PIA, totalization-model PIA, and CER PIA in monthly benefit dollars for 2018. It also shows the replacement rate—that is, the PIA as a percentage of covered AIME. The table shows these estimated values by the number and timing of years of covered employment; that is, for each covered-earnings career-timing profile within both the 10-year and 24-year covered-earnings scenarios.

Please note that the dollar amounts and percentages do not predict the overall cost to the Social Security trust funds of a particular provision or replacement option. Furthermore, the comparisons below assume that the current-law WEP applies to each stylized worker. Readers should be aware that any WEP replacement legislated by Congress might affect beneficiaries who are not affected by the current-law WEP. For example, legislation implementing a new PIA based on SSA's record of noncovered earnings may change benefits for beneficiaries who do not receive, or who have not reported to SSA, income from noncovered pensions.

General Findings

Five broad-level observations emerge from the analysis:

- First, the totalization-model and CER PIA estimates are higher than the WEP PIA for the medium and low earners regardless of worker type. Only for some high earners is the WEP PIA higher than the totalization-model and CER estimates.
- Second, the totalization-model PIA is generally higher than the CER PIA, particularly for the

workers with early-career and combined early/late-career covered earnings. Even when the totalization-model PIA is less than the CER PIA, the difference is typically not large.

- Third, the CER PIA produces a consistent replacement rate for all workers within a given earnings level. Regardless of the number or timing of a worker's covered work years, the CER PIA will be the same percentage of AIME because the CER's total AIME makes no distinction between covered and noncovered earnings.
- Fourth, and in direct contrast to the third, the current-law standard and WEP PIAs and the totalization-model PIA are rather sensitive to the number and timing of covered work years.
- Finally, some workers are not credited with WEP YOCs for all years of covered work. For example, low earners with 24 years of covered work are credited with 20 or fewer YOCs. This leaves them with the same WEP bend-point factor (40 percent) as the low-earning 10-year covered worker.

High Earners

Table 5 shows the current-law standard and WEP PIAs and the totalization-model and CER PIAs in monthly dollars and as a percentage of AIME for a high earner (that is, one who earns 160 percent of the AWI). Regardless of the number and timing of covered work years, high earners received a YOC credit for each year of covered earnings. This is most significant for workers with 24 years of covered employment, because each YOC above 20 increases the WEP bend-point factor by 5 percent. As a result, high earners in all four career-timing profiles with 24 years of covered employment have a WEP bend-point factor of 60 percent.

The alternative WEP PIAs are lower than the current-law WEP PIA for some high earners. Among workers with 10 years of covered employment, the early-career and sandwich profiles have lower PIAs from the CER than they do from the current-law WEP. Among workers with 24 years of covered employment, every career profile has a lower PIA from the CER than that from the current-law WEP, while only the mid- and late-career profiles have a PIA from the

Table 5.
Estimated PIAs and PIA-to-AIME replacement rates for high earners under current-law and alternative WEP formulas, by duration and timing of covered employment: Workers born in 1953

		Current law				Alternative WEPs			
		Standard		WEP [a]		Totalization model		CER [b]	
Covered employment timing	AIME in covered employment ($)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)
	10 years in covered employment, 34 years in noncovered employment								
Early career	1,047	814	78	401	38	475	45	388	37
Middle career	1,830	1,065	58	652	36	656	36	678	37
Late career	1,579	984	62	571	36	612	39	585	37
Early and late career (sandwich)	1,118	837	75	424	38	485	43	414	37
	24 years in covered employment, 20 years in noncovered employment								
Early career	3,461	1,587	46	1,339	39	1,433	41	1,282	37
Middle career	4,285	1,850	43	1,603	37	1,557	36	1,588	37
Late career	4,185	1,818	43	1,571	38	1,536	37	1,551	37
Early and late career (sandwich)	3,304	1,536	47	1,289	39	1,382	42	1,224	37

SOURCE: Author's calculations using OCACT's earnings-by-age scaling factors.

NOTES: High earners are assumed to earn 160 percent of the AWI.

PIAs do not reflect cost-of-living adjustments.

a. The WEP guarantee does not apply to high earners because their WEP PIA reduction is less than one-half the amount of their monthly noncovered pension income in all scenarios.

b. The CER replacement rate is calculated using total AIME and total PIA. All high earners have total AIME of $6,011 and a total PIA of $2,227. The CER PIAs vary across scenarios because of the differing levels of covered AIME.

totalization model that is lower than that from the current-law WEP.

The current-law standard PIA formula can generate relatively high replacement rates for high earners when the duration of covered employment is short. For workers with 10 years in covered employment, the current-law WEP dramatically reduces replacement rates. The CER replacement rates are the same for all high earners irrespective of the length or timing of their covered employment because their total lifetime earnings are equal.

Medium Earners

Table 6 shows the current-law standard and WEP PIAs and the totalization-model and CER PIAs in monthly dollars and as a percentage of AIME for a medium earner (that is, one who earns 100 percent of the AWI). Regardless of the number and timing of covered work years, both of the alternative WEP PIAs are higher than the current WEP PIA—a contrast with many of the high-earner scenarios.

The totalization model produced a higher PIA than the CER in three of the career-timing profiles for workers with 10 years in covered employment. Only for workers with midcareer covered earnings was the CER PIA higher. For workers with 24 years of covered employment, the totalization-model PIA was greater than the CER PIA for the early-career and sandwich profiles only.

Among workers with 10 years of covered employment, those in the early-career and sandwich profiles receive the maximum replacement rates from the current-law standard and WEP PIAs, 90 percent and 40 percent, respectively. Because their AIME are lower than the first PIA bend point, all of these workers' AIME are subject to the first (and highest) percentage factor. By contrast, workers in the mid- and late-career profiles have AIME that exceed the first bend point, resulting in replacement rates lower than the 90 percent and 40 percent maximums (as applicable).

Among workers with 24 years of covered employment, the current-law WEP replacement rate is slightly

Table 6.
Estimated PIAs and PIA-to-AIME replacement rates for medium earners under current-law and alternative WEP formulas, by duration and timing of covered employment: Workers born in 1953

		Current law				Alternative WEPs			
		Standard		WEP [a]		Totalization model		CER [b]	
Covered employment timing	AIME in covered employment ($)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)
10 years in covered employment, 34 years in noncovered employment									
Early career	654	589	90	262	40	348	53	293	45
Middle career	1,144	845	74	432	38	506	44	512	45
Late career	987	795	81	382	39	447	45	442	45
Early and late career (sandwich)	699	629	90	280	40	354	51	313	45
24 years in covered employment, 20 years in noncovered employment									
Early career	2,163	1,172	54	[c] 841	[c] 39	1,027	47	968	45
Middle career	2,678	1,336	50	1,088	41	1,187	44	1,198	45
Late career	2,616	1,316	50	1,068	41	1,165	45	1,171	45
Early and late career (sandwich)	2,065	1,140	55	[c] 810	[c] 39	987	48	924	45

SOURCE: Author's calculations using OCACT's earnings-by-age scaling factors.

NOTES: Medium earners are assumed to earn 100 percent of the AWI.

PIAs do not reflect cost-of-living adjustments.

a. The WEP guarantee does not apply to medium earners because their WEP PIA reduction is less than one-half the amount of their monthly noncovered pension income in all scenarios.

b. The CER replacement rate is calculated using total AIME and total PIA. All medium earners have total AIME of $3,757 and a total PIA of $1,681. The CER PIAs vary across scenarios because of the differing levels of covered AIME.

c. Because medium earners in this profile are credited with only 22 YOCs, their WEP PIA factors are 50 percent rather than 60 percent.

lower than 40 percent for those in the early-career and sandwich profiles and slightly higher than 40 percent for those in the mid- and late-career profiles. The rate is lower than 40 percent for workers with 24 years of covered employment in the early-career and sandwich profiles for two reasons. First, their AIME exceed the first bend point because their covered work years and lifetime earnings are greater than those of workers in other profiles or with 10 years of covered employment. Second, because the scaling factors assume lower earnings in the early phase of a worker's career, their earnings did not met the YOC threshold in 2 of their 24 years of covered employment, and their WEP bend-point factor is 50 percent (for 22 YOCs) instead of 60 percent (for 24 YOCs; see Table 2). Specifically, AIME levels are $2,163 for the early-career profile and $2,065 for the sandwich profile, well more than the first bend point of $826 for 2015. The first $826 of AIME is replaced at 50 percent, but the portion above $826 is replaced at only 32 percent; in both of these profiles, this reduces the overall replacement rate to less than 40 percent.

The replacement rate is higher than 40 percent for workers with 24 years of covered employment in the mid- and late-career profiles because the scaled covered earnings for these workers surpass the WEP YOC threshold in all 24 years, allowing the first $826 in AIME to be replaced at 60 percent. Although AIME of more than $826 are replaced at 32 percent, the aggregate replacement rate exceeds 40 percent. As with high earners, the CER replacement rate is constant across all scenarios; for all medium earners, it is 45 percent.

For medium earners with 24 years of covered employment, WEP PIAs based on 24 YOCs instead of 22 YOCs would still not match either of the alternative WEP PIAs (not shown). For low earners, the implications of having years of annual covered earnings that do not meet the YOC thresholds are even more pronounced.

Low Earners

Table 7 shows the current-law standard and WEP PIAs and the totalization-model and CER PIAs in monthly dollars and as a percentage of AIME for a low earner (that is, one who earns 45 percent of the AWI). The two alternative WEP PIAs would be higher than the current WEP PIA for all eight covered-employment scenarios. Among workers with 10 years of covered employment, the totalization-model PIA would be higher than the CER PIA for all but those with midcareer covered earnings. Among workers with 24 years of covered employment, the totalization-model PIA would be higher than the CER PIA for those in the early-career and sandwich profiles and only slightly lower for those in the mid- and late-career profiles.

Unlike the stylized high earner, who earned a YOC for each year of covered earnings, the stylized low earner meets the YOC threshold for each year of covered earnings in only one of the eight earnings-history scenarios: the worker with 10 midcareer years of covered employment. The YOC threshold does not affect the current-law WEP PIA of low earners with 10 years of covered earnings in the early-, late-, and sandwich-career profiles, as the WEP bend-point factor is no lower than 40 percent in any case.

In contrast with low earners who have 10 years of covered employment, the YOC thresholds substantially affect those with 24 years of covered employment. A worker credited with 23 YOCs instead of 24 YOCs, for example, would have a WEP PIA factor of 55 percent; one who received only 22 YOCs would have a WEP PIA factor of 50 percent, and so on. In fact, none of the 24-year low earners in Table 7 is credited with more than 20 YOCs. As a result, their WEP formulas have the same 40 percent WEP PIA factor as the 10-year covered workers, instead of the 60 percent factor that would have applied if all 24 years of covered work met the YOC earnings thresholds.

Table 8 illustrates how the YOC earnings thresholds and the WEP guarantee affect the WEP PIA for low earners. If the WEP guarantee were not in place, the difference between being credited with a YOC for all 24 years worked in covered employment and in being credited with no more than 20 YOCs because of the YOC earnings threshold would amount to $165 or $166. The WEP guarantee raises the PIA for low earners with 20 or fewer YOCs—note that those values replicate the values from Table 7. Among low earners with 24 YOCs, the WEP guarantee increases the PIA only for those in the late-career profile.

Both of the alternative WEP PIAs would be higher than the current-law WEP PIA for a low earner, even with the WEP guarantee in place and assuming the worker were credited with 24 YOCs. Only for workers with late-career covered earnings do the two current-law WEP PIAs with the WEP guarantee come within $25 of the totalization-model or CER PIAs. In particular, the totalization-model PIA is about $100 greater than the current-law WEP PIA—even with its guarantee and assuming 24 YOCs— for the early-, mid-, and sandwich-career profiles.

Table 7.

Estimated PIAs and PIA-to-AIME replacement rates for low earners under current-law and alternative WEP formulas, by duration and timing of covered employment: Workers born in 1953

Covered employment timing	AIME in covered employment ($)	Current law				Alternative WEPs			
		Standard		WEP [a]		Totalization model		CER [b]	
		PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)	PIA ($)	PIA ÷ AIME (%)
10 years in covered employment, 34 years in noncovered employment									
Early career	294	265	90	118	40	232	79	177	60
Middle career	514	463	90	206	40	303	59	310	60
Late career	444	400	90	178	40	277	62	268	60
Early and late career (sandwich)	314	283	90	126	40	235	75	190	60
24 years in covered employment, 20 years in noncovered employment									
Early career	973	790	81	[c] 472	[c] 49	643	66	587	60
Middle career	1,205	865	72	[c] 550	[c] 46	718	60	727	60
Late career	1,177	856	73	[c] 688	[c] 58	705	60	710	60
Early and late career (sandwich)	929	776	84	[c] 491	[c] 53	625	67	561	60

SOURCE: Author's calculations using OCACT's earnings-by-age scaling factors.

NOTES: Low earners are assumed to earn 45 percent of the AWI.

PIAs do not reflect cost-of-living adjustments.

a. The WEP guarantee does not apply to low earners with 10 years in covered employment because their WEP PIA reduction is less than one-half the amount of their monthly noncovered pension income. However, the WEP guarantee limits the WEP PIA reduction for all low earners with 24 years in covered employment.

b. The CER replacement rate is calculated using total AIME and total PIA. All low earners have total AIME of $1,690 and a total PIA of $1,020. The CER PIAs vary across scenarios because of the differing levels of covered AIME.

c. Because low earners in this profile are credited with only 20 YOCs, their WEP PIA factors are 40 percent rather than 60 percent.

Table 8.

Estimated PIAs for low earners with 24 years of covered employment under current-law and alternative WEP formulas, with effects of WEP guarantee and different YOC levels: Workers born in 1953 (in dollars)

Covered employment timing	Current-law WEP PIA				Alternative WEP PIAs	
	Without WEP guarantee		With WEP guarantee			
	20 or fewer YOCs	24 YOCs	20 or fewer YOCs	24 YOCs	Totalization model	CER
Early career	377	543	472	543	643	587
Middle career	452	617	550	617	718	727
Late career	443	608	688	688	705	710
Early and late career (sandwich)	363	529	491	529	625	561

SOURCE: Author's calculations using OCACT's earnings-by-age scaling factors.

NOTES: Low earners are assumed to earn 45 percent of the AWI.

PIAs do not reflect cost-of-living adjustments.

Returning to Table 7, note that the replacement rates for workers with 10 years of covered employment reveal that the timing of covered work does not affect the current-law standard and WEP PIAs or the CER PIA. By contrast, the replacement rates for the totalization-model PIA vary considerably, ranging from a high of 79 percent for the early-career profile to a low of 59 percent for the mid-career profile. This range illustrates the varying effect of the timing of covered work, in that earnings tend to be lower in a worker's early career and higher at midcareer, leading to higher and lower replacement rates, respectively. For workers with 24 years of covered employment, replacement rates vary by career profile, except those for the CER PIA which, as noted earlier, has constant replacement rates irrespective of when covered work occurred.

Discussion

Brown and Weisbenner (2012) identified two features of the current-law WEP that can adversely affect low earners. First, low earners may not meet annual YOC earnings thresholds, which can lower the first WEP bend-point factor and thus the WEP PIA. Second, because the WEP PIA reduces only the first bend-point factor, the WEP reduction as a percentage of AIME decreases as earnings increase.

This analysis has shown how workers' earnings histories can interact with the YOC earnings thresholds to determine WEP PIAs. In particular, low earners with 24 years of covered employment often do not get YOC credit for all their covered work. As a result, they have lower WEP PIAs, relative to the number of years actually worked in covered employment, than high earners. Low earners with 24 years of covered employment in all four of the career-timing profiles were credited with only 20 YOCs for 24 covered work years, and thus were subject to a bend-point factor of 40 percent instead of 60 percent. This analysis has also shown that, although the WEP guarantee can offset part of this adverse effect, the current-law WEP PIA for low earners still falls short of the PIAs that the totalization-model and CER formulas would produce. Therefore, this analysis validates some of Brown and Weisbenner's key findings.

However, the foregoing analysis did not directly address the WEP PIA reductions as percentages of AIME, either under current law or for the alternative WEP options. Table 9 shows the effect of the current-law WEP and the two alternative WEP proposals on PIAs as percentages of AIME by the number and timing of covered work years and by lifetime earnings level. The percentage of AIME by which the current-law WEP reduces PIA for workers with 10 years of covered employment increases or remains unchanged as the lifetime earnings level decreases. (Medium earners in the early- and sandwich-career profiles and all low earners are subject to the maximum 50 percent reduction that can occur under the WEP PIA.) By contrast, the PIA reduction as a percentage of AIME for the WEP alternatives is generally greater for medium earners than for high earners and less for low earners than for all others. The two exceptions are slight: The reduction for low earners was 1 percentage point higher than that for medium earners in the midcareer profile for both alternatives.

For workers with 24 years of covered employment, the PIA reduction as a percentage of AIME increases under the current-law WEP from high to low earners for all career profiles. The pattern for the totalization-model and CER WEPs for workers with 24 years of covered employment differs from that for workers with 10 years of covered employment. The 14 additional covered years render the totalization-model PIA more similar to the current-law WEP PIA for the early- and sandwich-career profiles, in that the PIA reduction as a percentage of AIME increases as the earnings level decreases. For the mid- and late-career profiles, the totalization model reduces the PIA as a percentage of AIME slightly more for high earners than for medium earners, and reduces the PIA considerably more for low earners. The pattern for the CER is similar to that of the totalization model: The reduction percentage remains mostly flat between high and medium earners, but increases sharply from medium to low earners.

Conclusion

This article summarizes Social Security's WEP, explains its computation, and explores its implications for workers with various types of covered earnings histories. In addition, it outlines two possible replacement options, one adapted from an existing formula used in calculating benefits for workers with some foreign earnings, and the other drawn from a recent congressional proposal to calculate benefits using the ratio of covered earnings to total earnings. The article illustrates the variety of potential PIA outcomes for workers with different lifetime earnings levels and covered-work patterns and discusses some reasons for the differing outcomes generated by each alternative.

Two findings stand out. First, for low and medium earners, the totalization-model and CER PIAs are

Table 9.
Effects of current-law and alternative WEP formulas on PIA expressed as a percentage of AIME in covered earnings, by lifetime earnings level and duration and timing of covered employment: Workers born in 1953

Covered employment timing	High earner	Medium earner	Low earner
10 years in covered employment, 34 years in noncovered employment			
Current-law WEP			
Early career	-40	-50	-50
Middle career	-23	-36	-50
Late career	-26	-42	-50
Early and late career (sandwich)	-37	-50	-50
Totalization model			
Early career	-32	-37	-11
Middle career	-22	-30	-31
Late career	-24	-35	-28
Early and late career (sandwich)	-32	-39	-15
CER			
Early career	-41	-45	-30
Middle career	-21	-29	-30
Late career	-25	-36	-30
Early and late career (sandwich)	-38	-45	-30
24 years in covered employment, 20 years in noncovered employment			
Current-law WEP			
Early career	-7	-15	-33
Middle career	-6	-9	-26
Late career	-6	-10	-14
Early and late career (sandwich)	-8	-16	-31
Totalization model			
Early career	-4	-7	-15
Middle career	-7	-6	-12
Late career	-7	-6	-13
Early and late career (sandwich)	-5	-7	-16
CER			
Early career	-9	-9	-21
Middle career	-6	-5	-11
Late career	-6	-6	-12
Early and late career (sandwich)	-10	-11	-23

SOURCE: Author's calculations using OCACT's earnings-by-age scaling factors.

NOTE: High earners are assumed to earn 160 percent of the AWI, medium earners are assumed to earn 100 percent of the AWI, and low earners are assumed to earn 45 percent of the AWI.

higher than the current-law WEP PIAs. (Some high earners would have lower PIAs under the alternatives.) Second, the totalization-model PIAs are higher than the CER PIAs for most of the stylized workers analyzed.

Although this analysis is restricted to stylized workers, microsimulation analysis based on survey data and administrative earnings records may further highlight the potential advantages or liabilities of these alternatives. In particular, actual monthly noncovered pension values may differ from those projected here, meaning that the current-law WEP's reduction in benefits might be lower or higher than these estimates.

Another area for further work is the GPO. Beneficiaries affected by the WEP and the GPO could be affected differently by either of the alternative formulas. Leaving the GPO in place while replacing the WEP with a more proportional calculation could lead to unintended consequences for beneficiaries who are subject to both provisions.

Appendix A: Calculating a Totalization-Agreement Benefit

To calculate a Social Security benefit under totalization, SSA first identifies the worker's years of covered earnings and determines the average annual ratio of those earnings to the national AWI. This ratio is called the REP. Table A-1 shows an illustrative REP calculation for a worker who was born in 1953 and who had covered earnings from 1975 through 1980.

For each year of covered earnings, SSA divides the worker's nominal covered earnings by the national AWI that year. In 1975, when the AWI was $8,631, the worker's nominal covered earnings were $10,000, or slightly more than the AWI (a ratio of 1.16). In 1976, the worker's nominal covered earnings remained the same, but the AWI increased to $9,226, a ratio of 1.08; and so on. SSA sums the six annual ratios and then divides that sum by six to provide the REP (1.16).

Table A-1.
REP calculation for a hypothetical worker

Year	Actual earnings (nominal $)	National AWI ($)	Ratio
1975	10,000	8,631	1.16
1976	10,000	9,226	1.08
1977	12,000	9,779	1.23
1978	13,000	10,556	1.23
1979	13,000	11,479	1.13
1980	14,000	12,513	1.12
REP (6-year average)	. . .	. . .	1.16

SOURCES: Author's calculations and https://www.ssa.gov/OACT/COLA/AWI.html.

NOTE: . . . = not applicable.

Next, SSA multiplies the average national earnings in each year from when the worker attained age 22 through the year in which she or he reached age 61 by the REP.[17] For our hypothetical worker, SSA would multiply the AWI by the REP of 1.16 for each year from 1975 through 2014 to obtain this worker's theoretical earnings record. SSA then wage-indexes each year of theoretical earnings to the year 2013 (when the worker reached age 60), as under current law. The 40-year sum of these years of projected indexed earnings is $2,084,659.

SSA next calculates the worker's theoretical AIME using the standard AIME computation procedure described in this article's Background section. The lowest 5 years of indexed earnings are dropped from the lifetime total, leaving a sum of $1,824,308. SSA then divides this sum by 420, the number of months in 35 years, which results in a theoretical AIME of $4,344.

SSA then applies the standard PIA formula to the theoretical AIME. The result is the theoretical PIA, or the benefit to which the worker would have been entitled if he or she worked a full career under U.S. Social Security at a constant level of earnings relative to all other workers. In 2015, when a worker born in 1953 reached age 62 and became eligible for a retired-worker benefit, the PIA-formula bend points were $826 and $4,980. Thus, for our hypothetical worker with a theoretical AIME of $4,344, the theoretical PIA equation is 90 percent of $826, plus 32 percent of ($4,344 minus $826); or $743 + $1,126, or $1,869.

Finally, SSA prorates the theoretical PIA based on the share of lifetime QCs that were accrued under U.S. Social Security coverage. A standard PIA calculation assumes 4 QCs in each of 35 computation years, or 140 lifetime QCs. Our hypothetical worker had 6 years of Social Security coverage, in which she or he earned 24 QCs. The ratio of covered QCs to total QCs (24 ÷ 140) is 0.17143. The theoretical PIA of $1,869 is multiplied by 0.17143, resulting in a prorated totalized PIA benefit of $320.40.[18]

Appendix B: Earnings Scaling Factors

Table B-1 shows OCACT's yearly scaling factors for low, medium, and high earners born in 1953. The scaling factors are multiplied by the AWI to obtain the nominal earnings for that year.

Table B-1.
Annual earnings scaling factors (percentage of AWI), by earnings level: Workers born in 1953

Year	Age	Low earner	Medium earner	High earner
1974	21	0.137	0.304	0.486
1975	22	0.165	0.367	0.586
1976	23	0.206	0.458	0.732
1977	24	0.244	0.542	0.868
1978	25	0.275	0.611	0.977
1979	26	0.302	0.671	1.074
1980	27	0.327	0.726	1.161
1981	28	0.349	0.775	1.240
1982	29	0.368	0.818	1.308
1983	30	0.385	0.855	1.368
1984	31	0.399	0.887	1.419
1985	32	0.412	0.915	1.464
1986	33	0.423	0.940	1.504
1987	34	0.433	0.962	1.540
1988	35	0.442	0.982	1.572
1989	36	0.450	1.000	1.599
1990	37	0.457	1.015	1.624
1991	38	0.462	1.028	1.644
1992	39	0.468	1.040	1.664
1993	40	0.473	1.052	1.682
1994	41	0.478	1.062	1.700
1995	42	0.482	1.072	1.714
1996	43	0.486	1.079	1.727
1997	44	0.489	1.086	1.738
1998	45	0.491	1.092	1.746
1999	46	0.493	1.096	1.754
2000	47	0.495	1.099	1.759
2001	48	0.496	1.102	1.763
2002	49	0.496	1.103	1.764
2003	50	0.496	1.102	1.762
2004	51	0.494	1.098	1.757
2005	52	0.492	1.092	1.748
2006	53	0.488	1.084	1.734
2007	54	0.482	1.072	1.715
2008	55	0.475	1.056	1.689
2009	56	0.463	1.028	1.645
2010	57	0.449	0.999	1.598
2011	58	0.435	0.967	1.547
2012	59	0.419	0.931	1.490
2013	60	0.399	0.886	1.417
2014	61	0.373	0.829	1.326
2015	62	0.359	0.798	1.277
2016	63	0.346	0.769	1.231
2017	64	0.333	0.741	1.186

SOURCE: Clingman and Burkhalter (2018).

Appendix C: Components of the Totalization-Model PIA Calculation

Table C-1 presents the data underlying the totalization-model PIA estimates in Tables 5–9. See Appendix A for a description of how REP and theoretical AIME and PIA are calculated. As noted in Appendix A, the theoretical PIA is prorated using the ratio of covered QCs to total lifetime QCs to determine the totalization-model PIA. Thus, for a worker with 10 years of covered employment, the QC ratio is 0.2857. For a worker with 24 years of covered employment, the QC ratio is 0.6857.

Table C-1.
Factors underlying the totalization-model PIA estimates in Tables 5–9, by duration and timing of covered employment and earnings level: Workers born in 1953

Covered employment timing	REP	Theoretical AIME ($)	Theoretical PIA ($)	Totalization-model PIA ($)
	10 years in covered employment, 34 years in noncovered employment [a]			
		High earner		
Early career	0.98	3,697	1,662	475
Middle career	1.71	6,462	2,295	656
Late career	1.44	5,435	2,141	612
Early and late career (sandwich)	1.01	3,805	1,697	485
		Medium earner		
Early career	0.61	2,311	1,219	348
Middle career	1.07	4,039	1,772	506
Late career	0.90	3,397	1,566	447
Early and late career (sandwich)	0.63	2,380	1,241	354
		Low earner		
Early career	0.28	1,040	812	232
Middle career	0.48	1,817	1,061	303
Late career	0.41	1,528	968	277
Early and late career (sandwich)	0.28	1,070	821	235
	24 years in covered employment, 20 years in noncovered employment [b]			
		High earner		
Early career	1.35	5,092	2,089	1,433
Middle career	1.67	6,303	2,271	1,557
Late career	1.62	6,097	2,240	1,536
Early and late career (sandwich)	1.27	4,799	2,015	1,382
		Medium earner		
Early career	0.84	3,183	1,498	1,027
Middle career	1.04	3,914	1,732	1,187
Late career	1.01	3,811	1,699	1,165
Early and late career (sandwich)	0.80	2,999	1,439	987
		Low earner		
Early career	0.38	1,432	937	643
Middle career	0.47	1,773	1,046	718
Late career	0.45	1,714	1,028	705
Early and late career (sandwich)	0.36	1,350	911	625

SOURCE: Author's calculations using OCACT's earnings-by-age scaling factors.

NOTES: High earners are assumed to earn 160 percent of the AWI, medium earners are assumed to earn 100 percent of the AWI, and low earners are assumed to earn 45 percent of the AWI.

The totalization agreement formula is restricted to workers who are not fully insured (that is, with fewer than 40 QCs) for U.S. Social Security. These calculations apply the totalization formula hypothetically to fully insured workers.

a. The ratio of covered QCs to total lifetime QCs is 0.2857 (40 ÷ 140).

b. The ratio of covered QCs to total lifetime QCs is 0.6857 (96 ÷ 140).

Notes

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[1] Workers in noncovered employment are exempt from Social Security payroll taxes. In retirement, they receive pension income in lieu of Social Security benefits.

[2] In December 2018, SSA applied the WEP to 1,863,084 beneficiaries, of whom 93.8 percent (1,747,212) were retired workers. An additional 0.7 percent of affected beneficiaries were disabled (13,345) and 5.5 percent (102,527) were spouses and children (Li 2019).

[3] The taxable maximum caps the amount of annual earnings subject to Old-Age, Survivors, and Disability Insurance (OASDI) taxes but it also limits the earnings level on which monthly benefits are computed. SSA adjusts the taxable maximum each year to reflect changes in the national average wage. In 2019, the taxable maximum is $132,900. For more information, see https://www.ssa.gov/oact/cola/cbb.html.

[4] For example, for a worker born in 1953 (first eligible for retired-worker benefits at age 62 in 2015), nominal age-21 earnings in 1974 are multiplied by a wage-indexing factor of 5.59, which is the ratio of the national average wage in 2013, when the worker reached age 60 ($44,888), to the average wage in 1974 ($8,030). The wage-indexing factor for this worker's age-22 earnings in 1975 is 5.20 ($44,888 ÷ $8,630) and decreases with each successive year of earnings (except 2009, when the national average wage dipped slightly) until reaching 1.00 for earnings at age 60 and afterward.

[5] Zero-earning years are included in the computation for eligible workers with fewer than 35 years of covered earnings.

[6] Social Security reduces the number of computation years for disabled and retired-disabled beneficiaries to reflect a working career shortened by disability.

[7] The PIA equals the monthly benefit for a worker who claims retirement benefits in the month of attaining full retirement age. Benefit amounts are reduced for early claiming or increased for delayed claiming.

[8] A worker's covered earnings must meet a threshold to qualify as a YOC. In 2018, the YOC threshold was $23,850. For earnings in 1978 and later, SSA calculates the annual YOC threshold using a base that is indexed to wage growth. For a full description, see https://www.ssa.gov/oact/cola/yoc.html.

[9] The National Education Association is one prominent example of a proponent of WEP repeal (see http://www.nea.org/home/16491.htm).

[10] QCs measure accrued earnings. QC values are indexed annually to wage growth. In 2018, a QC was equal to $1,320. Covered workers may earn up to four QCs per calendar year. For more information, see https://www.ssa.gov/oact/COLA/QC.html.

[11] The AWI is expressed as a dollar amount rather than an index value. For a description of how SSA uses the AWI, and a tabular list of the AWI values from 1951 forward, see https://www.ssa.gov/oact/cola/AWI.html.

[12] The formula proposed in H.R. 6489 is mathematically identical to one put forth 1 year earlier in Social Security Advisory Board (2015). Similarly, the Bipartisan Policy Center would replace both the WEP and GPO formulas with ones that include data on noncovered earnings (Akabas and Ritz 2016).

[13] The AWI for 2016 ($48,642.15) was the most recent available to Clingman and Burkhalter. Thus, for 2016, the medium earner had average annual earnings (not scaled for age) equal to $48,642. The low and high earners averaged $21,889 and $77,827, respectively.

[14] Ten years is the minimum needed to be eligible for a retired-worker benefit. I chose the 24-year alternative to represent a worker with a current-law WEP bend-point factor ranging between 40 percent and 90 percent and to facilitate the construction of covered-work career-timing profiles.

[15] Clingman and Burkhalter (2018) indexed workers' annual earnings through age 64 and assumed benefit take-up at age 65.

[16] A 2013 report of the Wisconsin Legislative Council indicated that 45 percent of public retirement systems (39 of a nationwide sample of 87) used a 5-year average of final employee earnings to compute pension amounts. That report also found that the average multiplier for the 17 plans for employees not covered by Social Security was 2.1 percent. In Congressional testimony, the Government Accountability Office (2007) gave, as an example of a public retirement plan, a pension computation formula using a 3-year final earnings average and a 2 percent multiplier. The Wisconsin study noted that 20 public retirement plans increased their final-year averaging between 2010 and 2012, and that the general trend was toward lower multipliers in the benefit formula (Schmidt 2013).

[17] For the totalization-model PIAs computed in this analysis, I applied the REP to earnings accrued at ages 21–64. The formula was therefore comparable to the OCACT scaling-factor methodology and the same as that used to compute the current-law standard and WEP PIAs and the CER PIA. This methodology differs slightly from SSA's actual totalized benefit calculation.

[18] In 2017, 232,910 beneficiaries were receiving totalized Social Security benefits, and the average totalized benefit amount was $241.85 (SSA 2019, Table 5.M1). Totalization benefits are generally modest because of prorating.

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Social Security Disability Insurance and Supplemental Security Income Beneficiaries with Multiple Impairments

by Elisa Walker and Emily Roessel*

We use data from the Social Security Administration's National Beneficiary Survey and agency administrative records to estimate the number and examine the characteristics of adult disability-program beneficiaries with multiple impairments. We find that most beneficiaries report conditions in more than one impairment category, and that beneficiaries with multiple impairments tend to have more activity limitations and poorer health than those reporting one impairment. Beneficiaries with multiple self-reported impairments also tend to be older and to have higher household incomes than those with one impairment, and are less likely to have work-related goals and expectations. Administrative data record fewer impairments per beneficiary and do not necessarily reflect the condition(s) that the beneficiary considers most limiting. Although the administrative data are complete for their purpose, we find that they may underrepresent the totality of disability that beneficiaries experience, and thus may be less predictive of employment and other outcomes than survey data.

Introduction

To receive Social Security Disability Insurance (DI) or Supplemental Security Income (SSI) benefits, applicants must prove that they have a significant and long-lasting disability that makes them unable to work. Using its own administrative data, the Social Security Administration (SSA) publishes statistics on beneficiaries' disabling impairments in several publications, including the *Annual Statistical Report on the Social Security Disability Insurance Program* and the *SSI Annual Statistical Report*. However, although many beneficiaries have multiple disabilities, the agency's administrative records capture information on no more than two impairments per beneficiary. Further, even when administrative records include both a primary and a secondary impairment, SSA's statistical publications typically report only the primary impairment.

By contrast, a survey of beneficiaries allows respondents to report any number of disabilities or conditions that limit the work they can do. Using data from SSA's National Beneficiary Survey (NBS), a nationally representative sample of adult DI and SSI beneficiaries, we estimate the number and explore the characteristics of beneficiaries with multiple impairments. We also examine the concurrence, or overlap, between the impairments reported in the survey and those recorded in administrative data. This analysis builds on an extensive literature on the prevalence of multiple chronic conditions (MCC) among the general population by examining a similar concept among SSA disability-program beneficiaries.

Selected Abbreviations

ADL	activity of daily living
DI	Disability Insurance
eCAT	Electronic Case Analysis Tool
HHS	Department of Health and Human Services
IADL	instrumental activity of daily living
MCC	multiple chronic conditions

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Selected Abbreviations—*Continued*

NBS	National Beneficiary Survey
SSA	Social Security Administration
SSI	Supplemental Security Income

We find that most NBS respondents report more than one impairment, and that beneficiaries with multiple impairments tend to have more activity limitations and poorer health than those reporting one impairment (or none at all—a circumstance we explain later). They also tend to be older and to have higher household incomes, and they are less likely to have work-related goals and expectations. These results are consistent with the large body of literature finding that multiple impairments are associated with poorer health, employment, and economic outcomes. Because administrative data may provide an incomplete picture of beneficiaries' impairments, they may be less predictive of outcomes than are survey results.

Throughout this article, we use "conditions" to mean specific diagnoses or health conditions, and "impairment categories" to mean groupings of those conditions by body system or diagnosis type. For instance, depression and schizophrenia are specific conditions that both fall within the "mental disorder" impairment category. We use the term "beneficiaries" to refer to both DI beneficiaries and SSI recipients.

Literature Review

A brief review of the literature on multimorbidity (the simultaneous presence of multiple medical ailments in the same individual) and MCC provides context for this analysis. The definition of MCC may vary between studies. The Department of Health and Human Services (HHS) suggests a broadly applicable working definition of MCC as two or more conditions "that last a year or more and require ongoing medical attention and/or limit activities of daily living" (HHS 2010). Not all of these chronic conditions are severe enough or cause enough work limitation to lead to a benefit allowance under SSA's strict disability criteria. Many of the most common chronic conditions cited in the health literature—such as diabetes, obesity, chronic heart conditions, and arthritis—may be present for many years before causing functional or work limitations.

In the large and growing body of research on the prevalence and patterns of MCC, studies generally find that MCC affects a significant share of the U.S. population and drives a disproportionately large share of health care spending. As expected, multimorbidity and MCC are associated with poorer outcomes in health, disability, and employment. The few studies that focus on multimorbidity and MCC among SSA's disability-program beneficiaries find high prevalence of multimorbidity and mixed evidence about its effects on allowance rates.

Health-Related Research

Studies agree that living with MCC is common—the prevalence is generally estimated at around one-quarter to one-third of the U.S. population (HHS 2010; Ward and Schiller 2013; Gerteis and others 2014; Violan and others 2014). Using the 2010 Medical Expenditure Panel Survey, Gerteis and others (2014) found that nearly one-third of Americans (32 percent) had two or more chronic conditions, and 14 percent had four or more. The National Comorbidity Survey Replication found comorbidity to be "the norm for both mental and physical disorders," with three-quarters or more of respondents who have any given condition reporting at least one additional condition (Gadermann and others 2012). Because people with MCC require complex and costly health care, they are of interest to researchers in many health-related fields of study.

The prevalence of MCC increases significantly with age: It affects less than 7 percent of all children younger than 18, 18 percent of individuals aged 18–44, 49 percent of those aged 45–64, and 80 percent of those aged 65 or older (Gerteis and others 2014). Overall, the trend in prevalence appears to be increasing, partly because of the rising median age of the population (Ward and Schiller 2013; Gerteis and others 2014). Prevalence also tends to be higher for certain subpopulations with complex health needs, such as Medicare beneficiaries and those who are dually eligible for Medicare and Medicaid coverage (Centers for Medicare & Medicaid Services 2012, 2015).

People with MCC require far more health care than others do and, as a result, they account for a disproportionate amount of health care spending. The 32 percent of Americans with MCC account for 71 percent of health care spending, as well as 83 percent of prescriptions (Gerteis and others 2014). Similarly, in traditional (that is, fee-for-service) Medicare, the 15 percent of beneficiaries with six or more conditions accounted for 51 percent of fee-for-service spending and 77 percent of 30-day hospital readmissions (Centers for Medicare & Medicaid Services 2015). Lee and Anderson (2005) found that the presence of MCC was a strong indicator of sustained high Medicare costs.

MCC is associated with various types of poor health outcomes, such as mortality, nonresponse to treatment, and low health-related quality of life (Bair and others 2003; Arnow and others 2006; Charlson and others 1987; Lee and others 2007). HHS (2010) called for a "paradigm shift" in addressing MCC, with treatment changes such as holistic or person-centered care and better coordination across medical specialty areas.

Occupational Rehabilitation and Disability Research

Studies on occupational rehabilitation and disability tend to find that the presence of multiple conditions is associated with higher rates of functional or activity limitation and lower rates of employment or labor force participation.

In a seminal study, Verbrugge, Lepkowski, and Imanaka (1989) found that the prevalence of disability increased sharply as an individual's number of chronic diseases rose. More recent studies also found that certain combinations of conditions have stronger effects on work and disability than would be expected of simply adding the two conditions' effects. For example, Kessler and others (2001) used data from a nationally representative sample to examine how chronic conditions affect work impairment (measured in days of work loss or cutback) and found that certain comorbidities were "associated with higher impairments than expected on the basis of an additive model." In addition, a cross-national study using data from the World Mental Health Surveys found that physical and mental comorbidity had "modest synergistic effects" on the probability of experiencing severe disability (Scott and others 2009).

In a broad literature review, McAlpine and Warner (2002) found that people with both physical and mental disorders have "consistently lower employment rates" than those with only one type of condition (that is, either physical or mental). Specifically, they report that "across national surveys approximately 20% fewer of individuals with both physical and mental conditions report being employed than individuals with a physical condition." Using data on people with severe psychiatric conditions in a randomized supported employment trial, Cook (2016) and Cook and others (2007) found that the presence of co-occurring conditions negatively affects labor force participation. Having an additional condition, especially a mental one, was associated with poorer employment outcomes including lower earnings, fewer hours worked, and less likelihood of competitive employment.

Research on SSA Disability-Program Beneficiaries

Although relatively few studies have examined multiple disabling conditions among SSA disability-program beneficiaries, those few have revealed some recurring patterns. For instance, studies using different data sources have found similarly high rates of multimorbidity. Using administrative data from SSA, Meseguer (2018) found that 71 percent of applicants filing an initial DI claim in 2009 had a secondary impairment, an increase from 56 percent in 1997. Since at least 2007, periodic studies using NBS data have consistently found that more than 60 percent of beneficiaries report two or more limiting health conditions; the rate for 2015 was 67 percent (SSA 2018). The General Accounting Office (2003) studied administrative law judge (ALJ) award decisions during 1997–2000 and found that 36 percent of claimants had one or two impairments, 39 percent had three or four impairments, and 25 percent had five or more impairments. Further, 13 percent of claimants were found to have three or more "severe" impairments (that is, impairments considered to meet medical criteria contained in SSA's Listing of Impairments at step 3 of the five-step disability determination process).[1] In some studies, prevalence varied among certain beneficiary groups. For example, employed beneficiaries reported multiple conditions in the 2015 NBS at much lower rates than unemployed beneficiaries did, and rates differed slightly between SSI and DI beneficiaries (SSA 2018).

Evidence is mixed as to whether disability-benefit claims filed by people with multiple impairments are more likely to be allowed benefits, with some indications that results may differ by level of the disability determination process. Cook (2016) found that the presence of comorbidities among people with psychiatric disorders was not correlated with different rates of DI or SSI enrollment. However, Rupp (2012) found that the presence of a secondary impairment in SSA records had a small but statistically significant *negative* effect on initial-level allowance rates for adults.[2] Similarly, an unpublished internal SSA analysis found that initial-level DI claimants are more likely to be allowed with only a primary impairment; however, that pattern was reversed at the ALJ level. Godtland and others (2007) also found that claimants with multiple impairments, especially multiple severe impairments, are more likely to be allowed at the ALJ level. These results suggest that the presence of multiple impairments may affect determination outcomes

differently across decision levels. A relatively greater prevalence of allowances at the initial adjudication level for claimants with no recorded secondary diagnosis may indicate that primary diagnoses allowed at this level tend toward greater severity and reflect the absence of further case development (which stops as soon as a case can be allowed). For instance, higher percentages of cancers and certain other conditions may clearly meet or equal the medical criteria in SSA's Listing of Impairments. By contrast, for allowances at the ALJ level, the presence of multiple impairments may signal greater severity. Because cases allowed at this level were initially denied, the evidence for allowance is less likely to be straightforward. Moreover, enough time may have elapsed for the claimant's health to deteriorate further or for the claimant to reach an age threshold that affects his or her classification for purposes of disability determination. Thus, it may be more necessary to develop and document the claimant's full range of impairments.

In analyzing patterns in the primary and secondary impairments recorded in administrative data for DI disabled-worker claimants filing initial claims in 2009, Meseguer (2018) found that mental impairments tend to have a "positive correlation with related mental impairments," and that mental and musculoskeletal impairments are negatively correlated, perhaps partly because they peak at different ages.[3] Another study found that nearly one-third of beneficiaries with intellectual disability had a nonintellectual disability as a primary or secondary impairment—most often, a psychiatric condition (Livermore, Bardos, and Katz 2017).

In this article, we add to the current literature by using NBS data to comprehensively examine the numbers and types of multiple self-reported disabling impairments and the characteristics of the adult disability-program beneficiaries who report them. Using matched administrative data, we also estimate the extent to which the impairments recorded in the survey and administrative data concur. Our findings shed light on the relative advantages of each data source and suggest that the survey data allow a fuller understanding of the beneficiary's experience of living with disabilities.

Data and Methodology

In describing our data sources, we discuss the survey data first, then the administrative data. We then describe our study methodology, focusing on how we classify impairment types.

Survey Data

We used the 2015 NBS Restricted Access File to look at the self-reported disabling impairments and other characteristics of SSA disability-program beneficiaries.[4] The 2015 NBS collected data from 4,062 DI beneficiaries and SSI recipients aged 18 to full retirement age. Respondents included DI disabled-worker, disabled adult child, and disabled-widow(er) beneficiaries; and SSI recipients who were blind and/or disabled. The respondents represented beneficiaries from all 50 states and the District of Columbia who were in current-pay status as of June 2014. Data collection began in February 2015 and ended in October 2015. Statistics based on NBS results are weighted to represent the target population.

Each NBS respondent[5] was asked to list the primary and secondary physical or mental conditions that limited the type or amount of work or daily activities that he or she could perform. Specifically, respondents were first asked whether "a physical or mental condition limit[s] the kind or amount of work or other daily activities you can do," and if so, "What physical or mental condition is the main reason you are limited?" Approximately 87 percent of respondents listed a primary limiting condition in response to the latter question. Although the question referred to a singular "main" condition, many respondents listed more than one. (In compiling the survey results, administrators recorded all such multiple responses as primary conditions in the order in which the respondent listed them.) The next question asked the respondent to list "any other physical or mental conditions" that limited the type or amount of work or daily activities he or she could do.[6] Administrators recorded these responses as secondary conditions. In this analysis, we do not distinguish between conditions recorded as primary and those recorded as secondary, because many respondents listed multiple conditions in each of those groups. Respondents' answers to these open-ended questions were coded as particular diagnoses based on the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) coding scheme, using "the highest level of specificity possible" (Wright and others 2017). The ICD-9-CM codes were then arranged by diagnosis group.[7]

Administrative Data

The NBS data file includes some administrative records from SSA in addition to the survey results. We use that information to identify the primary and

secondary diagnoses that were recorded in the SSA data at the time of the survey sampling.

SSA diagnosis codes were recorded during the disability determination process or during a medical redetermination. They reflect the specific condition(s) for which each beneficiary was considered disabled under SSA's standards. The Social Security Disability Benefits Reform Act of 1984 requires SSA to consider "the combined effect of all of the individual's impairments" for both DI and SSI disability determinations, and SSA's policy instructions in the Program Operations Manual System (POMS) instruct disability examiners to "evaluate all of the medical evidence in the file" (SSA 2017b). However, no more than two diagnoses—one primary and one secondary—may be recorded in the applicant's file. The instructions specify that the primary diagnosis code should reflect "the basic condition that rendered the person disabled," and the secondary diagnosis code should reflect "the most significant diagnosis following the primary diagnosis in severity" (SSA 2017b).[8]

In practice, additional operational considerations may affect whether certain condition(s) are recorded as a beneficiary's primary or secondary diagnosis in the administrative data. As noted earlier, case development generally stops once there is sufficient evidence for a benefit allowance, so a secondary diagnosis may not be recorded if a case is allowed based on the primary diagnosis. Thus, the primary impairment recorded in the administrative data may be the one that is easiest to document as a condition that meets or equals medical criteria in SSA's Listing of Impairments—and the lack of a secondary diagnosis in the administrative data does not necessarily mean that the claimant had no other conditions. Particularly in a time of constrained agency resources, it may not be realistic to expect examiners to document additional limitations when one is sufficient to justify disability benefits. In addition, the coding of impairments as primary and secondary depends in part on the judgment of the individual disability examiner, and examiners' views on what constitutes the main disabling condition may differ (Hemmeter 2012). Further, case development depends heavily on the quality and quantity of the evidence provided by the applicant, and some individuals may not sufficiently document a condition that SSA might otherwise code into the record. Finally, disabled adult children typically did not have diagnoses recorded in the administrative data until 1984 (SSA 2017a), and many current beneficiaries were entitled before that date.

Impairment Categories

Although both the survey results and the administrative data designate beneficiaries' conditions as either primary or secondary, we chose to disregard that distinction and simply include all conditions that were present for each respondent. This was mainly because many survey respondents listed multiple conditions in each of those groups and because policy considerations and examiners' discretion may affect primary or secondary designations in the administrative data. Moreover, our goal in this analysis was to capture the totality of beneficiaries' multiple and overlapping disability burdens, recognizing that they may not be cleanly separable into a single "primary" and a single "secondary" condition. Including all conditions together offered the best avenue toward a holistic analysis.

As described above, the survey data and the administrative data each contain specific diagnoses, which we call *conditions*. For this analysis, we grouped the specific conditions into broad *impairment categories,* based on body system and diagnosis type—such as musculoskeletal disorders, mental disorders, circulatory system diseases, and neoplasms. Box 1 presents the list of impairment categories we use. Note that we consider intellectual disability a separate category rather than a subgroup of the mental disorders category, acknowledging the widespread recognition of its unique nature among the mental disorders.

To illustrate our distinction between specific conditions and broader impairment categories, consider an individual who reports schizophrenia and depression in the NBS, or whose administrative data show a primary impairment of schizophrenia and a secondary impairment of depression. We consider this person to have two conditions (schizophrenia and depression) within the single impairment category of mental disorders. Another person might also have two conditions, such as hearing loss and ischemic heart disease; however, those conditions would fall under two different impairment categories (sensory disorder and circulatory system disease, respectively).

Distinguishing between specific conditions and broader impairment categories serves several purposes. First, the broader impairment categories allow for a more meaningful analysis of the very large range of possible medical conditions, with clearer patterns observable among the more limited number of categories. Second, this distinction helps one to

Box 1.
Impairment categories used in this analysis

Blood or blood-forming organs disease
Circulatory system disease
Congenital anomaly
Digestive system disease
Endocrine or nutritional disorder

Genitourinary system disease
Infectious or parasitic disease
Injury or poisoning
Intellectual disability
Mental disorder

Musculoskeletal disorder
Neoplasm
Nervous system disease
Respiratory system disease
Sensory disorder
Skin or subcutaneous tissue disease
Other[a]

SOURCE: Authors' definitions based on Wright and others (2017).

a. Includes other and unspecified infectious and parasitic disease; alcohol dependence syndrome and drug dependence; learning disorders and developmental speech or language disorders; complications of pregnancy, childbirth, and the puerperium; conditions in the perinatal period; symptoms, signs, and ill-defined conditions; complications of medical care not elsewhere classified; and physical problems not elsewhere classified.

understand the implications of multiple impairments, as some of the literature suggests that outcomes may be associated with the presence of multiple conditions in ways that differ from the outcomes associated with multiple impairment categories. For instance, McAlpine and Warner (2002) noted consistently lower employment rates for people with both physical and mental disorders than those for people with only physical or only mental disorders. Finally, analyzing at a category level may increase the dependability of the survey data, given the challenges of coding very specific conditions from open-ended survey answers and the small sample sizes for certain individual conditions.

Results

In this section, we present the numbers and characteristics of beneficiaries with multiple impairments, based on NBS and administrative data. We also examine whether and how beneficiary characteristics vary by the number of impairment categories their reported limiting conditions represent.

Impairment Categories and Beneficiaries with Multiple Impairments

We first examine the frequency with which beneficiaries reported specific limiting conditions, shown in Table 1 at the broad impairment-category level. Because respondents could report multiple conditions, the percentages in Table 1 add to more than 100 percent.

The most commonly self-reported impairment categories were musculoskeletal disorders and mental disorders, reported by 42 percent and 35 percent of all beneficiaries, respectively. Circulatory and nervous system diseases and endocrine or nutritional disorders were also reported by more than 15 percent of all beneficiaries.

For more than half of the impairment categories, the differences in percentages across programs were statistically significant. DI-only beneficiaries were more likely to report musculoskeletal disorders (49 percent) than were recipients of concurrent benefits (about 39 percent) and SSI-only recipients (about 30 percent). By contrast, recipients of SSI (alone and concurrent with DI) were more likely to report mental disorders and intellectual disability. Forty-two percent of SSI-only recipients reported a mental disorder and almost 8 percent reported an intellectual disability, compared with 30 percent and 3 percent, respectively, for DI-only beneficiaries. This is consistent with the fact that DI-only beneficiaries tend to be older than SSI-only and concurrent DI/SSI beneficiaries, and that musculoskeletal disorders are more prevalent at older ages while mental impairments are more common among younger beneficiaries (SSA 2018).

Table 2 shows the distribution of beneficiaries by the number of impairment categories that appear in their administrative files and the NBS. Slightly more than half of all beneficiaries had a single impairment category recorded in the administrative data, meaning that nearly half had two impairment categories recorded.[9] Concurrent DI/SSI beneficiaries were less likely to have diagnoses in two impairment categories. In the survey data, the shares of beneficiaries with multiple impairment categories were substantially higher, as expected. About one-quarter of beneficiaries reported one or more conditions in one impairment category. Two-thirds of all beneficiaries reported conditions reflecting multiple impairment categories, including almost 15 percent who reported conditions in four or more impairment categories. On average, beneficiaries reported having conditions in slightly more than two impairment categories.

Table 1.
Disability-program beneficiaries reporting selected conditions in the NBS, by impairment category and program type, 2015 (in percent)

Impairment category	All beneficiaries	DI only	SSI only	Concurrent DI and SSI
Musculoskeletal disorder [a]	42.1	49.2	29.5	38.5
Mental disorder [a]	35.4	30.0	42.0	43.4
Circulatory system disease [a]	20.6	24.1	15.4	17.1
Nervous system disease [a]	17.0	19.1	13.0	16.3
Endocrine or nutritional disorder	15.8	15.8	14.7	18.3
Injury or poisoning [a]	14.9	16.6	11.4	14.9
Respiratory system disease	11.1	10.6	12.7	10.5
Sensory disorder	8.1	7.9	8.1	9.0
Infectious or parasitic disease	6.9	6.9	7.5	6.1
Digestive system disease	6.3	6.3	6.0	7.1
Neoplasm [a]	5.2	6.6	3.2	4.0
Intellectual disability [a]	5.2	2.6	7.5	10.7
Congenital anomaly [a]	3.6	2.7	4.8	4.5
Genitourinary system disease	3.1	2.8	2.8	4.8
Blood or blood-forming organs disease	1.4	1.2	1.4	2.3
Skin or subcutaneous tissue disease	0.9	1.0	0.9	0.6
Other [a]	16.8	14.5	19.3	20.6
Number				
Unweighted	4,062	1,666	1,563	833
Weighted	12,896,735	7,347,758	3,604,355	1,944,622

SOURCE: Authors' calculations based on 2015 NBS.

NOTE: Respondents can report multiple impairments.

a. Cross-program differences are statistically significant at the 5 percent level (chi-square test).

Notably, 8 percent of all beneficiaries reported no limiting conditions—that is, no physical or mental conditions that limit the type or amount of work or daily activities that they perform. This could indicate that their condition(s) had improved since benefit allowance or the latest medical redetermination, or that mental or other impairments were underreported in the survey (Bharadwaj, Pai, and Suziedelyte 2015). Moreover, some individuals with disabilities may consider society—and not their condition(s)—to be limiting or disabling (Oliver 2004; Goering 2015). In a short video produced by the British disability charity Scope, a participant declares, "I'm disabled by the world around me, and if the world was more accessible, I would be less disabled" (Scope 2014). Under this view, known as the social model of disability, individuals may attribute their work limitations not to their impairment, as the NBS question asks, but rather to society's lack of inclusiveness. Later, we will discuss what the administrative data show about the NBS respondents reporting no limitations.

In general, DI-only beneficiaries and concurrent DI/SSI beneficiaries were somewhat more likely to report conditions in multiple impairment categories (69 percent and 68 percent, respectively) than were SSI-only beneficiaries (61 percent). SSI-only and concurrent DI/SSI beneficiaries were also more likely to report having no conditions (13 percent and 10 percent, respectively) than were DI-only beneficiaries (6 percent), consistent with the relatively high prevalence of mental disorders and intellectual disability among the SSI-only and concurrent DI/SSI population.

Table 3 shows the percentage of NBS beneficiaries who reported multiple limiting conditions within each impairment category. For instance, a report of schizophrenia and depression would be counted here as two or more conditions within the mental disorder category, whether or not that person also reported any conditions in other impairment categories.

The highest rates of within-category multiple conditions occurred in musculoskeletal and mental

Table 2.
Number of impairment categories indicated in administrative and survey data for disability-program beneficiaries, by program type, 2015 (in percent)

Source and number	All beneficiaries	DI only	SSI only	Concurrent DI and SSI
Administrative data				
1	50.9	49.3	49.8	58.8
2	48.5	50.4	48.7	40.9
Diagnosis code(s) missing	0.7	0.3	1.5	0.3
Survey data				
0	8.2	5.5	12.9	9.7
1	25.3	25.6	26.4	21.9
2 or more	66.6	68.9	60.7	68.4
2	32.4	34.4	30.7	28.1
3	19.4	20.0	16.4	22.7
4 or more	14.8	14.6	13.7	17.6
Average	2.1	2.2	[a] 2.0	2.3

SOURCE: Authors' calculations based on 2015 NBS and matched administrative records from SSA.

NOTES: All cross-program differences in number of impairment categories are statistically significant at the 5 percent level (chi-square test).

Rounded components of percentage distributions do not necessarily sum to 100.0.

a. Difference from the value for DI-only beneficiaries is statistically significant at the 5 percent level (two-tailed test).

Table 3.
Disability-program beneficiaries reporting one or multiple conditions within each impairment category, 2015 (in percent)

Impairment category	Total	One condition	Multiple conditions
Musculoskeletal disorder	100.0	58.7	41.3
Mental disorder	100.0	61.8	38.2
Circulatory system disease	100.0	74.0	26.0
Injury or poisoning	100.0	76.5	23.5
Sensory disorder	100.0	78.3	21.7
Respiratory system disease	100.0	83.8	16.2
Endocrine or nutritional disorder	100.0	84.6	15.4
Nervous system disease	100.0	86.3	13.7
Digestive system disease	100.0	86.6	13.4
Neoplasm	100.0	91.1	8.9
Congenital anomaly	100.0	92.0	8.0
Infectious or parasitic disease	100.0	93.4	6.6
Genitourinary system disease	100.0	98.1	1.9
Intellectual disability	100.0	99.6	0.4
Blood or blood-forming organs disease	100.0	100.0	0.0
Other	100.0	82.7	17.3

SOURCE: Authors' calculations based on 2015 NBS.

NOTE: Skin or subcutaneous tissue disease is omitted because of small sample size.

disorders. Forty-one percent of beneficiaries with any musculoskeletal condition reported two or more such conditions; the corresponding rate for mental disorders was only slightly lower, at 38 percent. The rate varied widely among impairment categories; at the other extreme, no one reported multiple conditions within the category of blood or blood-forming organs disease.

Table 4 shows, for each impairment category, the percentages of beneficiaries who report one or more conditions within only that category and those who also report one or more conditions in at least one other category. For example, nearly everyone reporting an endocrine or nutritional disorder (98 percent) reported conditions representing two or more impairment categories; in other words, they also reported at least one other condition that fell outside the endocrine or nutritional disorder category. The percentages of beneficiaries reporting conditions in two or more impairment categories range from 78 percent to 98 percent, with most of the percentages exceeding 85 percent. This is consistent with the findings, noted earlier, of Gadermann and others (2012).

At first glance, this table might appear to contradict Table 2, which showed that 25 percent of beneficiaries reported one impairment category (and 8 percent reported no impairments). The difference is explained by how individual beneficiaries are represented in the tables' populations. In Table 2, the rows are mutually exclusive, and each person is represented once. In Table 4, the rows are not mutually exclusive because each row represents everyone who reported conditions in that category, and each person may be represented in multiple categories. For example, a person with one or more conditions within a single impairment category is represented only once in Table 4's percentages, in the row for that impairment category. However, people with conditions in multiple impairment categories can be represented from two to nine times in the percentages (no beneficiaries reported conditions reflecting more than nine impairment categories). This is why the percentages of beneficiaries reporting conditions within a single category in Table 4—*in each row*—are lower than the overall percentage of people who report one impairment category in Table 2. (Table 4 omits people who reported no limiting conditions.)

This type of analysis is most useful for examining particular impairment categories. For example, among beneficiaries with a musculoskeletal disorder, 14 percent reported only musculoskeletal conditions (but they could have reported multiple conditions, such as low back pain combined with osteoporosis). The other 86 percent of beneficiaries with a musculoskeletal disorder reported one or more musculoskeletal conditions *and* one or more conditions within at least

Table 4.
Disability-program beneficiaries reporting conditions in one or multiple impairment categories, by category of reference condition, 2015 (in percent)

Impairment category	Total	One category	Multiple categories
Endocrine or nutritional disorder	100.0	1.6	98.4
Genitourinary system disease	100.0	3.6	96.4
Infectious or parasitic disease	100.0	3.6	96.5
Digestive system disease	100.0	4.1	95.9
Blood or blood-forming organs disease	100.0	7.8	92.3
Sensory disorder	100.0	9.0	91.0
Respiratory system disease	100.0	10.0	90.0
Neoplasm	100.0	10.5	89.5
Circulatory system disease	100.0	11.2	88.8
Injury or poisoning	100.0	12.4	87.6
Musculoskeletal disorder	100.0	13.9	86.1
Nervous system disease	100.0	15.1	84.9
Mental disorder	100.0	19.2	80.8
Intellectual disability	100.0	19.8	80.2
Congenital anomaly	100.0	21.8	78.2
Other	100.0	4.4	95.6

SOURCE: Authors' calculations based on 2015 NBS.

NOTES: Skin or subcutaneous tissue disease is omitted because of small sample size.

Rounded components of percentage distributions do not necessarily sum to 100.0.

one other impairment category, such as a mental or a sensory disorder. Among beneficiaries with a mental disorder, 81 percent also reported at least one condition in another impairment category.

As we have seen, people reporting a condition within a particular impairment category can have multiple conditions within that category, as well as conditions in other impairment categories. Taken together, Tables 3 and 4 show that of all beneficiaries who reported at least one musculoskeletal condition, 41 percent reported two or more specific musculoskeletal conditions, and 86 percent reported at least one additional condition in a different impairment category. For beneficiaries reporting a mental disorder, 38 percent reported more than one mental condition and 81 percent reported having at least one additional condition in another impairment category. However, some impairment categories show markedly different patterns. For instance, nearly all beneficiaries reporting any intellectual disability reported only one condition in that category, yet 80 percent reported that they had at least one additional condition in another impairment category. Among beneficiaries with an endocrine or nutritional disorder, 15 percent reported more than one condition in that category and 98 percent reported at least one additional condition in a different category. These findings likely reflect differences in the nature of certain impairment categories. For instance, an intellectual disability is unlikely to coincide with another condition within that category, while some endocrine disorders such as diabetes may lead to complications that affect other body systems, resulting in high incidence of comorbid conditions in other impairment categories.

Comparing Administrative and Survey Data

We next examine the concurrence of data on beneficiaries' disabling conditions between the administrative records and the survey responses.[10] Administrative records and self-reported survey results may not match for a number of reasons. As noted earlier, the primary diagnosis recorded in the administrative data depends on SSA's use of the Listing of Impairments and other regulatory requirements, as well as practical considerations such as the ease of documenting different conditions. Thus, the primary diagnosis in the SSA records may not be the one the beneficiary considers to be his or her main condition, and a secondary diagnosis may not be recorded even when the beneficiary presents with multiple conditions.

By contrast, survey respondents can report an unlimited number of conditions. Moreover, a condition that is recorded in a beneficiary's administrative records may improve by the time of the survey interview, such that the respondent no longer considers it to be limiting. Conversely, the respondent may have developed new conditions, or a condition that was not considered disabling by SSA's standards may have worsened. In addition, beneficiaries may not perceive certain conditions to be limiting even though SSA considers them to be disabling. In particular, some types of mental disorders and intellectual disabilities are frequently underreported in surveys. Respondents may wish to avoid possible stigmatization; or, they may not think of themselves as having a disability (given the nature of certain mental disorders), or not understand the question or how to respond, or not report such conditions for other reasons (Bharadwaj, Pai, and Suziedelyte 2015). Finally, the survey data also depend on "the degree to which survey respondents were able to describe their health conditions accurately and the degree to which survey interviewers were able to interpret and code the responses appropriately" (Stapleton and others 2008).

Table 5 shows that conditions in all of the physical impairment categories appeared more frequently in the survey responses than in the administrative records. For example, 32 percent of beneficiaries had a musculoskeletal disorder in the administrative data, while 42 percent reported a musculoskeletal disorder in the survey. The reverse is true for mental impairments: The percentage of beneficiaries who had a mental disorder or intellectual disability recorded in the administrative data was substantially higher than the percentage reporting such conditions in the survey data. The overall concurrence rate, or the share of beneficiaries who had a primary or secondary diagnosis recorded in the administrative data that matched the impairment category of one of their self-reported conditions, was 72 percent. (We calculate concurrence at the impairment-category level, not for specific conditions.) However, the specific concurrence of administrative records with survey reports varied widely among individual categories; it was highest for musculoskeletal disorder, at 79 percent, and lowest for intellectual disability, at 29 percent. Other impairment categories with concurrence rates lower than 50 percent include skin or subcutaneous tissue disease, injury or poisoning, and digestive system disease. Respiratory system disease, neoplasm, and

Table 5.
Disability-program beneficiaries with disabling conditions recorded in the administrative and survey data, by impairment category, 2015 (in percent)

	Administrative data		Survey data	
Impairment category	Among all beneficiaries	With concurring survey data (concurrence rate) [a]	Among all beneficiaries	With concurring administrative data (reverse concurrence rate) [b]
Musculoskeletal disorder	31.8	78.6	42.1	59.5
Respiratory system disease	4.8	78.2	11.1	33.6
Neoplasm	2.7	74.9	5.2	38.3
Congenital anomaly	0.6	72.3	3.6	11.6
Blood or blood-forming organs disease	0.7	68.1	1.4	32.8
Circulatory system disease	11.0	65.7	20.6	35.1
Nervous system disease	8.1	63.0	17.0	30.0
Mental disorder	41.9	61.7	35.4	73.1
Genitourinary system disease	1.9	57.6	3.1	36.3
Infectious or parasitic disease	1.8	55.7	6.9	14.6
Sensory disorder	3.6	52.8	8.1	23.7
Endocrine or nutritional disorder	9.2	52.1	15.9	30.3
Skin or subcutaneous tissue disease	0.2	49.7	0.9	9.8
Injury or poisoning	4.7	46.9	14.9	14.7
Digestive system disease	2.0	43.2	6.3	13.4
Intellectual disability	11.2	28.8	5.2	62.4
Overall	. . .	71.8	. . .	71.8

SOURCE: Authors' calculations based on 2015 NBS and matched administrative records from SSA.

NOTES: Survey data include all self-reported conditions. Administrative data include only primary and (if any) secondary diagnoses.

"Other" impairment category omitted because of small sample sizes and diversity of individual conditions.

. . . = not applicable.

a. Percentage of beneficiaries with a primary or secondary diagnosis in the administrative data who reported a condition in the same impairment category in the survey.

b. Percentage of beneficiaries reporting a condition in the survey who had a primary or secondary diagnosis in the same impairment category in the administrative data.

congenital anomaly had high concurrence rates (more than 70 percent).

Table 5 also shows rates of concurrence of the survey results with administrative records—that is, the share of beneficiaries reporting conditions in the survey that matched the impairment category of their primary or secondary diagnosis. These "reverse concurrence" rates were generally far lower, as would be expected, because many respondents reported conditions in the survey that would not be present in their administrative records. Mental disorder and intellectual disability were notable exceptions, with reverse concurrence rates of 73 and 62 percent, respectively—higher than the corresponding rates of concurrence of their administrative records with their survey responses. Musculoskeletal disorder also had a high reverse concurrence rate (60 percent), indicating that most people who reported this category of impairment also had it reflected in their administrative record. Skin or subcutaneous tissue disease had the lowest reverse concurrence rate, at 10 percent, indicating that the vast majority of people who report this impairment category have another impairment category or categories listed in their administrative records.

Table 6 expands the presentation of concurrence rates by directly comparing each of 13 impairment categories represented in the survey against each of the same categories represented in the administrative data. For beneficiaries reporting each impairment category in the NBS, it shows the distribution of impairment categories that are recorded in the administrative data as either primary or secondary. (The stepped figures in bold font match the reverse concurrence rates shown in Table 5.)

Table 6.

Concurrence of impairment categories recorded in the administrative data with categories of survey-reported conditions for disability-program beneficiaries in 2015 (in percent)

Survey-reported impairment category	Impairment category recorded in administrative data													
	Musculo-skeletal disorder	Mental disorder	Circulatory system disease	Endocrine or nutri-tional disease	Nervous system disease	Injury or poison-ing	Respiratory system disease	Sensory disorder	Intellectual disability	Infectious or parasitic disease	Neo-plasm	Digestive system disease	Other	Un-known [a]
Musculoskeletal disorder	**59.5**	38.7	8.7	11.3	6.6	4.3	3.8	1.8	4.4	1.5	2.8	1.8	1.5	6.1
Mental disorder	27.4	**73.1**	4.4	4.5	3.2	2.7	2.3	1.2	8.9	1.0	0.4	1.1	3.1	7.2
Circulatory system disease	32.6	35.7	**35.1**	12.4	6.4	4.0	6.6	2.1	5.1	1.1	1.4	1.6	0.9	9.0
Endocrine or nutritional disorder	31.3	33.5	19.8	**30.3**	4.1	3.2	6.5	3.3	9.2	0.8	1.6	3.6	1.4	4.7
Nervous system disease	29.8	34.5	7.2	8.3	**30.0**	6.7	2.3	3.6	9.0	1.9	3.1	3.2	2.3	8.3
Injury or poisoning	46.6	44.4	6.2	8.5	6.7	**14.7**	2.2	2.1	4.4	0.7	2.0	1.0	2.3	7.6
Respiratory system disease	26.9	40.0	18.4	15.1	2.5	1.5	**33.6**	1.4	5.2	1.7	2.8	2.8	1.5	7.3
Sensory disorder	23.6	32.1	12.5	13.4	5.5	6.2	2.1	**23.7**	11.3	(X)	1.2	3.0	4.0	7.1
Intellectual disability	7.7	36.2	1.6	1.0	9.4	0.0	0.7	2.4	**62.4**	(X)	0.0	(X)	6.1	7.6
Infectious or parasitic disease	27.1	43.6	5.9	9.3	5.9	8.3	2.8	0.8	9.0	**14.6**	2.8	3.7	3.6	11.1
Neoplasm	27.6	22.5	6.3	10.0	6.7	(X)	6.2	3.5	5.6	3.2	**38.3**	3.3	0.6	12.3
Digestive system disease	24.7	46.7	7.4	11.9	7.6	2.8	5.2	2.1	5.8	2.8	(X)	**13.4**	2.7	15.3
Other	29.8	42.2	9.6	7.6	8.8	3.2	3.9	1.7	13.8	3.3	4.0	1.0	**3.1**	8.6
No limitation	10.8	40.0	6.2	6.4	4.7	4.4	1.1	10.4	26.1	2.0	0.8	0.7	4.9	13.3

SOURCE: Authors' calculations based on 2015 NBS and matched administrative records from SSA.

NOTES: Survey data include all self-reported conditions. Administrative data include only primary and (if any) secondary diagnoses.

Four impairment categories (congenital anomaly and diseases of the blood or blood-forming organs, genitourinary system, and skin or subcutaneous tissue) are omitted.

(X) = suppressed to avoid disclosing information about particular individuals.

a. Category consists of primary or secondary diagnosis codes that do not match any known impairment codes, possibly because of data entry errors.

Among survey respondents reporting a musculoskeletal disorder, for instance, the administrative record shows a primary or secondary impairment of that same category for the majority of beneficiaries (60 percent), and a primary or secondary mental disorder for 39 percent.

Table 6 includes the 8 percent of beneficiaries who reported no limiting impairments. In administrative data for that group, 40 percent had a mental disorder, 26 percent had an intellectual disability, and 13 percent had unknown impairments.[11] Notably, musculoskeletal and sensory disorders were also relatively prevalent in the administrative records for this group (11 percent and 10 percent, respectively).

Characteristics of Beneficiaries with Multiple Impairments

Table 7 highlights the characteristics of beneficiaries who reported conditions in multiple impairment categories. For simplicity, we call this group "beneficiaries with multiple impairments." The table presents the percentage distributions of beneficiaries by sex, age at interview, age at disability onset, race, ethnicity, education, marital status, and income relative to poverty level, all broken down by the number of impairment categories. As prior research has suggested, beneficiaries reporting more impairments tend to be older than those who report fewer impairments. One-third of beneficiaries reporting three or more impairments were aged 60 or older, compared with less than one-quarter of those reporting either zero or one impairment. Conversely, 12 percent of beneficiaries reporting no impairments were aged 18–24, while that age group accounted for only 2 percent of beneficiaries reporting three or more impairments.

Similar patterns emerge by age at disability onset: Beneficiaries reporting multiple impairments were more likely to have first experienced work or other daily activity limitations in their 40s and 50s. Conversely, 43 percent of beneficiaries reporting no limitations had disability onset before reaching age 18, consistent with the high rates of mental disorders and intellectual disabilities among that group.

Compared with beneficiaries reporting one impairment or no impairments, those reporting multiple impairments were more likely to be women and to have higher income, and were less likely to be African American and never-married. Differences by education were not statistically significant.

Disability and health, though often related, are separate concepts (HHS 2005; Centers for Disease Control and Prevention 2018). People who do not often feel sick or need acute medical attention are likely to regard themselves as in good health, independent of any long-lasting disabilities such as paralysis or intellectual disability (Goering 2015). Still, self-assessed health condition understandably varies by number of impairments, with beneficiaries who report multiple impairments also generally reporting poorer health (Table 8). Eighty-five percent of beneficiaries reporting three or more impairments rated their general health as fair or worse, compared with only 36 percent of people reporting no impairments and 59 percent of people reporting one impairment. Thirty-four percent of people reporting no impairments said their health is excellent or very good. Similar trends appear for respondents comparing their current health with that of the prior year. More than half of beneficiaries reporting three or more impairments, and only 12 percent of beneficiaries reporting no impairments, said their current health was worse than it had been in the previous year.

Many beneficiaries report difficulties with activities of daily living (ADLs), instrumental activities of daily living (IADLs), and other functional activities, and these limitations appear to relate strongly with reported number of impairments (Table 9). Among beneficiaries reporting three or more impairments, nearly two-thirds also reported at least two ADL or IADL difficulties. Among beneficiaries reporting no impairments, less than one-quarter reported two or more ADL or IADL difficulties, while 63 percent of them reported no such difficulties.

Table 10 presents indicators of the relationship between the number of self-reported impairments and beneficiaries' program-participation characteristics. Beneficiaries reporting no impairments generally had lower SSA program benefit amounts, which is consistent with members of that group generally being younger, having an earlier age of disability onset, and being more likely to receive SSI-only or concurrent benefits. Beneficiaries reporting no impairments also had been receiving disability-program benefits for a longer time since initial award—an average of 17 years, compared with 12 years for those reporting three or more impairments. Many of the no-impairments group had received SSI as children (35 percent), compared with 11 percent of beneficiaries reporting three or more impairments. Finally, the no-impairments group was also significantly more likely to have income from earnings in the month before the survey interview.

Table 7.
Selected sociodemographic characteristics of disability-program beneficiaries, by number of self-reported impairment categories, 2015 (in percent)

Characteristic	All beneficiaries	Beneficiaries with self-reported impairments in—			
		0 categories	1 category	2 categories	3 or more categories
Sex [a]					
Men	50.0	50.5	55.0	50.4	45.8
Women	50.0	49.5	45.0	49.6	54.2
Age at interview [a]					
18–24	4.7	12.3	6.6	4.1	2.2
25–29	4.7	11.5	6.8	3.7	2.3
30–34	4.9	9.4	6.2	3.8	3.8
35–39	5.6	7.4	7.5	5.1	4.3
40–44	6.2	4.4	7.5	6.4	5.5
45–49	9.5	8.7	9.4	9.5	9.9
50–54	15.0	11.1	14.1	14.8	16.8
55–59	20.3	11.3	19.5	21.8	21.6
60 or older	29.1	23.9	22.4	30.8	33.6
Average (years) [b]	50.6	44.7	48.2	51.6	53.0
Age at disability onset [a]					
Younger than 18	21.1	42.9	26.1	18.4	14.9
18–24	9.5	14.9	10.6	8.5	8.4
25–39	23.1	15.9	22.9	22.1	26.0
40–54	34.5	16.4	28.3	38.8	39.4
55 or older	11.7	9.8	12.2	12.1	11.3
Race [a]					
White only	69.0	57.9	66.7	71.3	71.1
Black or African American only	23.8	34.8	25.5	23.3	20.5
Other	7.2	7.3	7.7	5.4	8.4
Ethnicity					
Hispanic or Latino	9.8	15.4	9.4	8.5	10.0
Not Hispanic or Latino	90.2	84.6	90.6	91.5	90.0
Educational attainment					
Did not finish high school	28.3	29.7	27.6	29.4	27.4
High school or equivalent	42.6	51.5	44.3	43.2	38.9
Diploma	30.8	38.3	32.9	31.3	27.1
General Educational Development (GED) certificate	7.7	7.2	7.1	8.0	8.1
Special education certificate	4.1	6.0	4.3	3.9	3.7
Some college or postsecondary vocational education	13.7	6.7	12.2	13.5	16.7
Associate's or vocational degree	7.5	6.4	7.0	7.7	8.0
Bachelor's degree	4.9	3.8	5.6	3.6	6.0
Some graduate study or graduate or professional degree	2.9	2.0	3.3	2.7	3.0

(Continued)

Table 7.
Selected sociodemographic characteristics of disability-program beneficiaries, by number of self-reported impairment categories, 2015 (in percent)—*Continued*

Characteristic	All beneficiaries	Beneficiaries with self-reported impairments in—			
		0 categories	1 category	2 categories	3 or more categories
Marital status [a]					
Married	29.5	19.3	27.8	28.9	33.7
Divorced	24.2	14.0	20.6	27.9	25.8
Separated	5.1	6.5	3.0	4.3	7.1
Widowed	6.1	4.3	5.6	6.1	7.0
Never married	35.0	56.0	43.1	32.7	26.4
Household income relative to federal poverty level [a] (%)					
Less than 100	47.6	60.9	43.6	48.9	46.1
100–299	39.7	29.9	42.3	38.8	40.9
300 or more	12.8	9.2	14.1	12.3	13.0
Number					
Unweighted	4,062	479	1,199	1,242	1,142
Weighted	12,896,735	1,055,032	3,257,704	4,162,382	4,421,617
Weighted percentage distribution	100.0	8.2	25.3	32.3	34.3

SOURCE: Authors' calculations based on 2015 NBS.

NOTE: Rounded components of percentage distributions do not necessarily sum to 100.0.

a. Differences in percentages across number-of-impairment categories are statistically significant at the 5 percent level (chi-square test).

b. Difference between percentage of beneficiaries with 3 or more impairment categories and percentages of beneficiaries in other number-of-impairment categories is statistically significant at the 5 percent level (two-tailed test).

Table 8.
Selected health condition indicators of disability-program beneficiaries, by number of self-reported impairment categories, 2015 (in percent)

Indicator	All beneficiaries	Beneficiaries with self-reported impairments in—			
		0 categories	1 category	2 categories	3 or more categories
Those who—					
Died by the end of 2015	2.0	0.4	1.8	1.5	3.0
Reported drug or alcohol abuse in the past 12 months	7.0	4.1	8.3	6.1	7.4
Health condition—					
In general [a]					
Excellent	4.0	15.0	6.2	2.3	1.3
Very good	6.1	19.1	9.4	4.4	2.1
Good	17.7	29.9	25.2	15.3	11.6
Fair	31.8	22.7	31.8	34.6	31.4
Poor	28.6	8.9	19.9	31.5	37.0
Very poor	11.8	4.4	7.4	11.9	16.7
Compared with last year [a]					
Much better	4.2	16.4	5.3	2.5	2.2
Somewhat better	11.5	22.5	11.4	12.0	8.4
About the same	43.4	49.4	52.8	41.3	37.0
Somewhat worse	28.2	7.6	20.7	30.7	36.4
Much worse	12.7	4.1	9.9	13.6	16.0
Body mass index [a]					
Less than 18.5% (underweight)	2.3	1.4	3.2	2.0	2.0
18.5% to 24.9% (normal weight)	21.8	24.6	26.8	21.0	18.3
25.0% to 29.9% (overweight)	27.8	33.8	28.1	27.1	26.7
30.0% or more (obese)	48.1	40.2	41.9	49.9	52.9
Number					
Unweighted	4,062	479	1,199	1,242	1,142
Weighted	12,896,735	1,055,032	3,257,704	4,162,382	4,421,617
Weighted percentage distribution	100.0	8.2	25.3	32.3	34.3

SOURCE: Authors' calculations based on 2015 NBS and matched administrative records from SSA.

NOTE: Rounded components of percentage distributions do not necessarily sum to 100.0.

a. Differences in percentages across number-of-impairment categories are statistically significant at the 5 percent level (chi-square test).

Table 9.
Difficulty with selected activities among disability-program beneficiaries, by number of self-reported impairment categories, 2015 (in percent)

Activity	All beneficiaries	Beneficiaries with self-reported impairments in—			
		0 categories	1 category	2 categories	3 or more categories
ADL					
Getting into or out of bed	35.7	10.9	25.6	36.9	47.9
Bathing or dressing	28.0	7.0	22.5	30.5	34.7
Getting around inside the house	20.7	4.4	10.8	23.9	28.9
Eating	14.8	2.3	13.9	13.7	19.6
None of the above	46.4	83.1	57.9	44.7	30.8
IADL					
Getting around outside of the home	52.3	22.9	49.3	52.9	61.0
Shopping for personal items	33.0	17.0	29.9	35.5	36.7
Preparing meals	35.0	16.6	33.1	38.4	37.6
None of the above	39.2	67.6	43.1	37.6	31.2
Functional activity					
Walking or climbing stairs, standing for 1 hour, stooping, crouching, and/or kneeling	83.7	49.1	70.7	90.5	95.2
Grasping, reaching, and/or lifting 10 pounds	71.4	34.4	55.2	78.3	85.9
Speaking, hearing, and/or seeing	45.6	36.1	39.1	45.2	52.9
Coping with stress	56.7	30.9	45.7	59.9	68.0
Concentrating	67.3	44.7	58.2	72.7	74.3
Getting along with others	29.3	22.6	23.7	29.6	34.6
Number of ADL or IADL difficulties reported					
0	24.5	63.3	30.9	21.9	13.1
1	21.1	12.0	22.2	20.6	23.0
2	16.2	13.2	16.2	16.2	16.9
3	12.3	6.1	10.1	14.2	13.6
4	11.0	3.0	10.2	10.2	14.3
5	6.4	(X)	4.6	8.2	7.1
6	6.0	(X)	3.8	6.5	8.3
7	2.5	0.0	1.9	2.2	3.8
Number					
Unweighted	4,062	479	1,199	1,242	1,142
Weighted	12,896,735	1,055,032	3,257,704	4,162,382	4,421,617
Weighted percentage distribution	100.0	8.2	25.3	32.3	34.3

SOURCE: Authors' calculations based on 2015 NBS.

NOTES: Respondents may report difficulty with multiple ADLs, IADLs, or functional activities.

Differences in percentages across number-of-impairment categories are all statistically significant at the 5 percent level (chi-square test).

(X) = suppressed to avoid disclosing information about particular individuals.

Table 10.
Selected program-participation characteristics of disability-program beneficiaries, by number of self-reported impairment categories, 2015 (in percent)

Characteristic	All beneficiaries	Beneficiaries with self-reported impairments in— 0 categories	1 category	2 categories	3 or more categories
Program type (at sampling time) [a]					
DI only	57.0	38.1	57.7	60.3	57.8
SSI only	27.9	44.0	29.2	26.6	24.5
Concurrent DI and SSI	15.1	17.9	13.1	13.1	17.8
Received SSI as a child (among those who ever received SSI) [a]					
Yes	17.0	35.4	20.4	15.0	10.5
No	83.0	64.6	79.6	85.0	89.5
SSA program benefit amount in month before interview [a]					
Less than $500	7.7	15.4	8.3	7.5	5.8
$500–$1,000	49.7	60.5	48.5	46.8	50.6
$1,001 or more	42.6	24.1	43.2	45.7	43.6
Average ($)	1,065.62	[b] 858.83	1,054.53	1,102.09	1,088.81
Receipt of income or assistance [c] in month before interview from—					
SSA disability program benefit [a]	95.4	91.9	94.8	97.2	95.0
Supplemental Nutrition Assistance Program	35.5	33.4	35.8	34.0	37.4
Earnings [a]	6.6	15.6	5.7	5.8	5.9
Pension	7.4	3.1	7.2	8.9	7.1
Veterans' benefits	3.4	1.3	2.0	3.5	4.7
Private disability insurance	3.0	2.2	4.3	1.6	3.5
Public cash assistance or welfare	2.1	2.7	2.2	2.1	2.0
Workers' compensation	0.9	0.6	1.1	0.9	0.8
Unemployment Insurance	0.2	0.8	0.2	(X)	(X)
Other	2.5	1.4	3.0	3.0	2.1
Non-SSA disability benefit income or assistance in month before interview [a]					
None	57.0	63.7	59.3	57.9	52.9
$1–$199	25.1	21.2	25.6	26.3	24.4
$200–$499	6.9	8.4	4.5	6.8	8.5
$500 or more	11.0	6.7	10.6	9.0	14.2
Average ($)	210.94	[b] 134.60	233.13	[b] 164.79	256.23
Months since initial SSA disability award [a]					
Fewer than 24	4.1	3.9	4.7	4.8	3.0
24–59	19.7	11.8	20.2	21.0	19.9
60–119	26.9	17.0	24.5	28.9	29.3
120 or more	49.0	67.2	50.2	45.2	47.2
Average (months)	150.3	[b] 204.0	153.6	140.3	144.3
Number					
Unweighted	4,062	479	1,199	1,242	1,142
Weighted	12,896,735	1,055,032	3,257,704	4,162,382	4,421,617
Weighted percentage distribution	100.0	8.2	25.3	32.3	34.3

SOURCE: Authors' calculations based on 2015 NBS and matched administrative records from SSA.

NOTE: (X) = suppressed to avoid disclosing information about particular individuals.

a. Differences in percentages across number-of-impairment categories are statistically significant at the 5 percent level (chi-square test).

b. Difference from the value for beneficiaries with 3 or more impairments is statistically significant at the 5 percent level (two-tailed test).

c. Respondents may report multiple income or assistance sources.

It is not surprising, then, that beneficiaries reporting no limitations were significantly more likely to be working at the time of interview (21 percent) than those reporting at least one impairment (about 7 percent for each category), and that similar patterns emerge for having worked in the past year and having looked for work recently (Table 11). Beneficiaries reporting no impairments were also more likely to be "work-oriented," as indicated by having personal goals that included getting a job, advancing in a job, or learning new job skills; or by seeing themselves working for pay within 2-year or 5-year horizons. Forty-five percent of all beneficiaries were work-oriented, and the percentages declined as the number of reported impairments increased. Among beneficiaries reporting no limitations, nearly two-thirds were work-oriented; that rate declined to 40 percent for beneficiaries reporting three or more impairments.

Nonworking beneficiaries cited multiple reasons for not working, primarily that their physical or mental condition prevented work (Table 12). As expected, beneficiaries who reported no impairments were less likely to say that their condition prevented work, and beneficiaries reporting multiple impairments were more likely to cite this reason. Patterns were similar (though less extreme) for reasons such as being discouraged by previous work attempts, others' perceptions, and workplace inaccessibility.

Table 11.
Selected employment-related behaviors of disability-program beneficiaries, by number of self-reported impairment categories, 2015 (in percent)

Behavior	All beneficiaries	Beneficiaries with self-reported impairments in—			
		0 categories	1 category	2 categories	3 or more categories
Employment					
Worked—					
At time of interview	8.3	20.8	7.3	7.1	7.0
Any time in 2014	10.6	21.1	10.4	9.0	9.9
Looked for work in last 4 weeks	5.7	11.7	6.7	4.4	4.8
Any of these	16.4	36.2	16.4	13.5	14.5
Employment support services					
Waiting to finish school or training program before working	2.8	3.2	3.6	2.5	2.5
Used a support service in 2014—					
Specific to employment	8.8	9.8	8.7	6.2	11.0
To get a job or increase income	2.9	5.3	3.6	1.9	2.8
Any of these	11.4	12.3	12.5	8.7	12.8
Work-oriented goals or expectations					
Get a job, new skills, or career advancement	37.2	55.7	42.1	34.0	32.3
Envisioning paid work in next—					
2 years	25.3	48.2	28.8	21.1	21.3
5 years	28.1	50.7	32.9	23.9	23.1
Envisioning work sufficient to discontinue disability benefits in next—					
2 years	11.2	31.6	12.5	8.3	7.9
5 years	16.7	32.3	20.7	14.3	12.4
Any of these	45.2	64.6	50.1	42.1	39.8
Any of all the items listed above	48.8	66.3	52.3	45.8	44.9
Number					
Unweighted	4,062	479	1,199	1,242	1,142
Weighted	12,896,735	1,055,032	3,257,704	4,162,382	4,421,617
Weighted percentage distribution	100.0	8.2	25.3	32.3	34.3

SOURCE: Authors' calculations based on 2015 NBS.

NOTE: Differences in percentages across number-of-impairment categories are all statistically significant at the 5 percent level (chi-square test).

Table 12.
Selected reasons for not working among disability-program beneficiaries, by number of self-reported impairment categories, 2015 (in percent)

Reason	All nonworking beneficiaries	Beneficiaries with self-reported impairments in—			
		0 categories	1 category	2 categories	3 or more categories
Physical or mental condition prevents work	90.0	64.4	88.5	93.2	93.4
Workplace inaccessibility	26.3	21.3	25.8	26.0	28.1
Discouraged by previous work attempts	26.0	19.5	25.1	26.5	27.6
Cannot find job for which I qualify	23.3	22.6	24.0	22.3	23.9
Others think I cannot work	23.2	19.7	22.1	23.0	25.0
No reliable transportation	17.0	18.0	16.9	19.2	14.9
Employer will not give me a chance	16.0	17.4	17.0	14.9	15.9
Fear of losing cash or health insurance benefits	12.5	19.8	13.2	12.7	10.2
Cannot find job I want	10.0	13.2	10.0	10.8	8.5
Caring for someone else	7.5	12.8	7.6	7.5	6.3
Waiting to finish school or training program	3.1	4.0	3.8	2.7	2.7
Other	5.3	2.9	3.2	6.9	5.7
Number					
Unweighted	3,617	374	1,065	1,121	1,057
Weighted	11,832,671	835,478	3,020,408	3,865,176	4,111,609
Weighted percentage	91.7	79.2	92.7	92.9	93.0

SOURCE: Authors' calculations based on 2015 NBS.

NOTES: Respondents may report multiple reasons for not working.

Differences in percentages across number-of-impairment categories are all statistically significant at the 5 percent level (chi-square test).

However, beneficiaries reporting more impairments were *less* likely to cite as reasons for not working caring for someone else, not wanting to lose benefits, inability to find a job they want, and waiting to finish educational programs.

Discussion and Conclusion

Survey results add depth and nuance to our understanding of beneficiaries' experiences of living with disability. In particular, beneficiaries' ability to report any number or type of limiting impairments presents a picture of disability rather different from the one we see based on only the primary and (sometimes) secondary diagnoses recorded by SSA's disability examiners. Although two-thirds of beneficiaries reported multiple impairments, 8 percent reported no limiting impairments.

This outlier group—beneficiaries reporting no limitations—is of potential interest to policymakers. These beneficiaries tend to be younger, often have mental disorders or intellectual disabilities, and are more likely to be SSI-only recipients. Compared with beneficiaries who report limitations, they are also less likely to be white, more likely to have been diagnosed at a younger age, and more likely to report recent improvements in health. They are interested in work (nearly two-thirds are work-oriented), but are more afraid of losing benefits and health insurance than are other beneficiaries. In other words, many beneficiaries within this group want to work and some may be healthy enough to leave the benefit rolls for a longer time, if they have enough support. However, awareness of the Ticket to Work program and other SSA-sponsored work supports is relatively low, especially among SSI-only recipients (SSA 2018, Table 35). In addition, even within this group, 64 percent of those who are not working said their physical or mental condition prevented work—a surprising finding, given that these respondents had originally declined to list any "physical or mental conditions that limit the type or amount of work or daily activities that [they perform]." However, this is consistent with the perspective of the social model of disability, which considers society to be the limiting factor rather than the individual's medical condition(s). In sum, although the self-reported no-limitations group may be somewhat more likely than other beneficiaries to be able to work, they still have significant impairments that may prevent many of them from working.

Overall, the survey and administrative data presented in this article demonstrate the high prevalence of multiple impairments among SSA's disability-program beneficiaries, as well as the wide variation in beneficiary characteristics and impairment combinations. The majority of beneficiaries report conditions in multiple impairment categories, and often report multiple conditions within a category. Despite key conceptual differences between the impairment data in administrative records and in survey reports, we find a 72 percent concurrence of the impairment data in the two sources.

Beneficiaries who report multiple impairments tend to have more activity limitations and poorer health, although they are less likely to have household incomes below the federal poverty level than are beneficiaries reporting no impairments. Although beneficiaries with multiple impairments are also less likely to have work-related goals and expectations, a substantial proportion of them (40 percent) are work-oriented. These findings seem to be related at least in part to demographic differences, as older beneficiaries tend to have more impairments than younger ones and are more likely to receive DI benefits than SSI payments (SSA 2018). We hope these findings will inform policy discussions about SSA's disability programs by painting a more detailed picture of beneficiaries and their impairments.

This analysis has implications for both policy and research. Most importantly, researchers, policymakers, and practitioners should recognize that the administrative data on impairments have limitations. Even when both the primary and secondary diagnosis fields are coded in an individual's administrative record, they frequently do not represent all of the impairments that the beneficiary considers limiting, and may not align with what the beneficiary considers the most limiting condition(s). Because the purpose of the administrative record is to document the medical reason(s) for a benefit allowance decision, it tends to include the minimum information necessary to support a decision. The administrative data, although complete for that purpose, thus understate the presence of individual impairments as well as the total number and burden of beneficiaries' disabling impairments. The survey data, collected with the explicit purpose of studying beneficiaries, provide a fuller accounting of the totality of disability that they experience.

To provide comprehensive information on disability-program beneficiaries, SSA could include data on both the primary and the secondary diagnoses in its statistical reports. Similarly, SSA's disability demonstration studies often use the primary impairment categories for subgroup analysis and/or as control variables (for instance, Gubits and others 2018a, 2018b; and Fraker and others 2014); future studies could include both primary and secondary impairments. Additionally, demonstrations designed to target beneficiaries with a diagnosis in a specific impairment category may need to account for the many participants who will likely have multiple conditions that fall into multiple impairment categories.

Multiple impairments are generally associated with poorer outcomes in a number of areas, including functioning, work, and health. Thus, our results imply that the administrative data on impairments may be a somewhat weak—or at best, incomplete—predictor of outcomes. As a result, employment-support service providers such as vocational rehabilitation agencies and employment networks may find the administrative data to be of limited use because those data underreport impairments and may not identify the most salient limitations an individual faces. By supplementing the administrative data with beneficiary interviews, or perhaps making further use of data on alleged impairments in beneficiaries' disability-benefit applications, service providers may better understand the totality of a beneficiary's impairments and customize the supports they provide.

Future research on multiple impairments among SSA disability-program beneficiaries could build on this study by analyzing additional data sources, such as the applicant's claim documentation (noted above) and the Electronic Case Analysis Tool (eCAT), which disability examiners use to analyze and document claim decisions. Although SSA Form 831, the Disability Determination and Transmittal form, allows a maximum of two impairments per individual, examiners can document an unlimited number of impairments in eCAT.[12] Data from these sources could be compared with NBS results to track whether a beneficiary's impairments have changed since application.

In combination with additional future research, these findings on multiple impairments may inform SSA policies on disability adjudication and redetermination, work incentives, and employment supports. For instance, do particular combinations of impairments suggest medical severity equal to the criteria in the Listing? A better understanding of the reasons behind differences in the administrative and survey data on impairments might help examiners reviewing claimants' alleged impairments on disability applications.

Could impairment data from surveys, applications, or eCAT help predict who might be more likely to return to work, and thus help target employment supports more effectively?

All of this would require further analysis, including studies linking the number of impairments (or impairment categories) to outcomes such as work activity, employment-support service use, or mortality. For example, an association of higher numbers of conditions (or impairment categories) with higher rates of premature death would suggest that higher numbers of conditions (or categories) may be a proxy for more severe disabilities. Multivariate analysis examining benefit type (DI only, SSI only, or concurrent), age, and outcomes would also yield helpful information. In particular, it would be useful to explore which data types and sources are more accurate in predicting outcomes. Are administrative data more predictive than survey data for outcomes within program types and age groups? Can data on the number of individual conditions tell us more than data on the number of broad impairment categories?

In addition, future research might further explore the relationship between the number of self-reported impairments and allowance rates at different adjudicative levels or at different stages of the five-step disability determination process. Qualitative research, such as detailed beneficiary interviews, could probe reasons for the impairment-category differences between administrative and survey data (such as whether an impairment worsened over time or whether SSA simply considered a different impairment to be "primary"), how beneficiaries perceive their condition(s), and reasons why some respondents do not report any impairments. Data from applications and from eCAT may also be useful for exploring those questions, as well as for targeting employment supports. Future research could also explore changes in the number and characteristics of beneficiaries with multiple impairments, to better understand whether demographic patterns among beneficiaries remain consistent or change over time.

Notes

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[1] For an explanation of the five-step disability determination process, see Wixon and Strand (2013).

[2] By contrast, the presence of a secondary impairment had a positive and significant effect on childhood SSI initial allowances. Among initial SSI determinations for children in 1993–2008, 38 percent had a secondary impairment (Rupp 2012).

[3] Despite the negative correlation, the share of cases with both a mental and a musculoskeletal impairment is relatively large because those impairment types are by far the most common.

[4] Each round of the NBS has a Restricted Access File, which contains the full set of survey data; and a Public Use File, which, to minimize the likelihood of identifying a sample member from the data, has undergone extensive masking and has fewer variables available. For more information about the NBS, including links to the documentation and Public Use File, see https://www.ssa.gov/disabilityresearch/nbs.html.

[5] Proxy respondents are used for individuals whose impairments prevent them from completing the survey for themselves. In the 2015 NBS, proxies provided 19 percent of the completed interviews (Wright and others 2017).

[6] Respondents who did not indicate that a physical or mental condition limited their ability to work or conduct daily activities were then asked for the "physical or mental condition [that] is the main reason" they either were currently or formerly eligible for benefits or were limited when they first started receiving disability benefits. We did not use these variables in the analysis.

[7] For a complete description of the health-condition survey questions and coding summarized here, see Wright and others (2017, Section V.C.1). For complete documentation and questions for the 2015 NBS, see https://www.ssa.gov/disabilityresearch/nbs_round_5.html.

[8] There are specific exceptions for drug addiction and alcoholism, statutory blindness, and symptomatic human immunodeficiency virus (HIV) infections; for each of those, the policy instructions prescribe whether it must be recorded as a primary or secondary impairment (SSA 2017b). Policy changes, such as revisions to the Listing of Impairments, can also affect primary and secondary designation. For instance, the 1999 removal of obesity as a separate listing in the endocrine disorders body system "shifted the recording of obesity from predominantly in the primary impairment field to the secondary impairment field, [and] shifted the body system category of applicants with obesity recorded as an impairment" (Stahl, Schimmel Hyde, and Singh 2016).

[9] These numbers differ from figures reported in Meseguer (2018) and O'Leary, Walker, and Roessel (2015) because in Table 2, we count the number of beneficiaries with more than one impairment category, not the number with any secondary diagnosis recorded. Looking at the specific primary and secondary diagnoses instead of broad impairment categories, we find that 69 percent of beneficiaries had a secondary diagnosis, 30 percent had a primary diagnosis only, and less than 1 percent had missing diagnosis data.

[10] This analysis updates and expands Stapleton and others (2008), which found similar results (see, in particular, that report's Table II.4).

[11] The "unknown" category consists of primary or secondary diagnosis codes that do not match any known impairment codes, possibly because of data entry errors.

[12] The primary and secondary impairments from eCAT propagate Form SSA-831. The use of eCAT has been mandatory for initial disability claims since 2013.

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The Time Between Disability Onset and Application for Benefits: How Variation Among Disabled Workers May Inform Early Intervention Policies

by Matt Messel and Alexander Strand*

This study contributes to literature that examines how much time typically passes between disability onset and application for disability-program benefits. It addresses two questions: How long after onset do people wait to apply? How might variation in time between onset and application help to identify potential target groups for early intervention? Using Social Security administrative data from the Adult Disability Report, we find that the median period from onset to application is 7.6 months. Younger applicants tend to have waited longer, particularly those diagnosed with back impairments or arthritis. Among both younger and older applicants, individuals diagnosed with intellectual disability or other mental disorders are potential targets for early intervention programs because those groups wait the longest to apply and are the most likely to continue working in the interim.

Introduction

The Social Security Disability Insurance (DI) program provides benefits to individuals who have developed a medical condition that prevents substantial work activity. Applicants must have work histories of sufficient length and recentness to qualify for benefits. Once they enter the DI program, few beneficiaries find employment and exit the rolls (Liu and Stapleton 2010; Raut 2017; SSA 2017).[1] Policymakers and researchers have tested numerous interventions that aim to reduce dependence on DI benefits by helping disabled workers remain in the labor market—or return if they have left. Yet interventions targeted to disabled workers *before* they apply for DI benefits may achieve greater success. For instance, the Demonstration to Maintain Independence and Employment, which provided wrap-around services to disabled workers, significantly reduced federal disability-benefit awards among participants in some demonstration states (Whalen and others 2012).

Selecting a target population is an important first step in designing an intervention. Policymakers and practitioners may use previous research and expertise to select target populations and to tailor interventions to those groups. For such interventions, administrative data from the Social Security Administration (SSA) provide useful information on potential target groups. For instance, Costa (2017) matches administrative records on earnings and disability claims from SSA's Disability Research File to show how long DI applicants experience an earnings decline before filing. Certain applicant subgroups tend to experience long periods of slow earnings decline, while decline is rapid for others. These contrasting experiences, according to

Selected Abbreviations

DI	Disability Insurance
EAO	early adult onset
EDCS	Electronic Disability Collect System
LAO	late adult onset
SSA	Social Security Administration
VR	vocational rehabilitation

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Costa, suggest that interventions may be designed to suit certain applicant types (for example, brief interventions for groups with rapid earnings decline).

This study uses another administrative data source: the Adult Disability Report. In that report, DI applicants identify the date that their disability began as well as the date that they stopped working. Because it also records the application filing date, this data source shows the amount of time that elapsed between disability onset and DI application, which we refer to as *filing time*.

Research suggests that early interventions have the greatest success when they are implemented shortly after disability onset (Christian, Wickizer, and Burton 2016; Shaw and others 2013; Wickizer and others 2011). Because the first days and weeks after onset represent a critical period for initiating an intervention, information on filing times may shed light on how long the window of opportunity for intervention lasts. Estimating this window may help policymakers target and tailor services. For example, if a certain group of applicants tends to delay filing, longer interventions may yet be able to serve them. Applicant groups with typically brief filing times, on the other hand, may pose challenging targets. If policymakers opted to target those groups, they would know to design brief, intensive interventions.

In addition to knowing filing times, policymakers may benefit from knowing whether applicants work between disability onset and filing—and if so, for how long. Groups of applicants that are more likely to work after onset represent attractive targets because they may have greater work capacity on average. Interventions targeting these groups could focus on maintaining employment. For applicant groups that are less likely to work after disability onset, interventions could focus on labor market reentry.

This study addresses two sets of questions:

- After disability onset, how long do eventual DI applicants wait to file? How do new findings on filing time, based on administrative data, compare with estimates from previous research based on survey data?
- Which applicant groups tend to delay filing after onset and which continue to work during the delay? How might these patterns of delay and continued employment inform early intervention efforts?

Answering the first set of questions contributes to an existing literature on the timing of disability onset and DI application. Answering the second set should reveal variations in filing times that can inform early intervention policy. Past research on the timing of onset and DI application relies primarily on longitudinal survey data. Relative to the breadth of administrative data, the limited sample sizes of these surveys do not allow for comparisons based on applicant characteristics. This study uses administrative data to uncover policy implications based on comparisons by applicant age, impairment type, and educational attainment that were not available in past research.

We begin by reviewing literature on filing times. We compare various definitions of disability onset with the definition used in the Adult Disability Report, and consider how filing times recorded in administrative data may compare with those derived from survey-based definitions. We then measure filing times across applicant characteristics including age at onset, sex, education, and impairment type. Next, we examine the prevalence and duration of post-onset employment by the same characteristics. We specifically consider groups of applicants who both delay filing and continue to work after onset. Finally, we discuss the implications of these findings for early intervention policies.

Previous Research

Prior studies have used varying definitions of disability onset and have thus produced varying filing-time results (Table 1). From the date that a medical condition "first bothered" the eventual applicant, Burkhauser, Butler, and Weathers (2001/2002) found that 7 to 8 years passed, on average, before application. From the date that the condition "first prevented" work, Benítez-Silva and others (1999) and Maestas, Mullen, and Strand (2015) found considerably shorter typical filing times of about 8 or 9 months.[2]

Filing times also vary with business cycles. Maestas, Mullen, and Strand (2015) estimated that median filing times increase by half a month for each percentage-point increase in the unemployment rate. This is consistent with the hypothesis that some workers in the labor force would become applicants if they were to lose their jobs (Autor and Duggan 2003). To account for this circumstance, we hold the level of these "conditional applicants" constant in this study by analyzing applications in a short period with relatively stable economic conditions (2013–2014).

Our administrative data source measures filing time from the date on which the impairment first prevented work. Thus, our estimates correspond conceptually with the estimates of Benítez-Silva and others (1999) and Maestas, Mullen, and Strand (2015).

Table 1.
Prior studies examining time elapsed from disability onset to disability-benefit application

Study	Data source	Reference period	Median filing time	First-year application hazard rate
	Onset defined as when the medical condition "first bothered" the eventual applicant			
Burkhauser, Butler, and Weathers (2001/2002)	Health and Retirement Study, wave 1	1974–1992	7 years (men),[a] 8 years (women)	0.16 (men), 0.13 (women)
	Onset defined as when the medical condition "first prevented work"			
Benítez-Silva and others (1999)	Health and Retirement Study, waves 1–3	Onset prior to 1996	9 months	--
Maestas, Mullen, and Strand (2015)	Social Security administrative data	Application in 2007	8.2 months	--
Messel and Strand (2019)	Social Security administrative data	Application in 2013–2014	7.6 months	0.63 (men), 0.62 (women)

SOURCE: Authors' review.

NOTE: -- = not available.

a. Mean filing times.

Table 1 also shows the estimated hazard ratios of application within 1 year of onset. From the date the condition first bothered the applicant, the first-year hazard ratio is 0.13 for women and 0.16 for men (Burkhauser, Butler, and Weathers 2001/2002). For the year after the date the medical condition first prevented work, we estimate hazard ratios more than four times those of the 2001 study (0.62 for women and 0.63 for men). This contrast is compatible with the difference between filing times estimated using the "first bothered" and "first prevented" definitions.

Our estimates are to be viewed in the context of a literature that examines the return-to-work determinants of people with severe impairments, much of which has focused on DI beneficiaries. These studies find relative consensus that return to work is most often achieved by younger beneficiaries and by those with sensory impairments (Chan and others 2014; Mann, Mamun, and Hemmeter 2015; Government Accountability Office 2005; Stapleton and others 2008).

The low overall reemployment rate among DI beneficiaries, however, has pushed researchers to focus on the period when people with disabilities are not yet DI beneficiaries (McCrery and Pomeroy 2016; Burkhauser and Daly 2011). Once enrolled in DI, a beneficiary's decision to return to work may risk the predictable income stream of DI benefits—an annuity that could have a high present value (Roberts 2012). Demonstration projects conducted by SSA have indicated only a small employment-rate response, if any, to changing short-term financial incentives. For example, the Benefit Offset National Demonstration tested the employment-incentive effects of gradually phasing DI benefit amounts out as earnings rise above the substantial gainful activity level. Preliminary results indicate no statistically detectable effects on earnings—even though program costs increased because of the benefit offset (Hoffman and others 2017).

In contrast with those results, reemployment rates for clients who receive vocational rehabilitation (VR) services prior to receiving disability benefits are three times higher than those of DI beneficiaries overall (Mann and others 2017; Mann, Mamun, and Hemmeter 2015). The correlates of successful return to work are more difficult to characterize among this population, however. For instance, some studies find, consistent with Ticket-to-Work Program results, that VR service recipients with sensory impairments achieve relatively high postintervention employment (Chan and others 2014; Rosenthal and others 2006). Yet O'Neill and others (2017) find that many of these VR recipients work outside competitive employment in sheltered workshops. Viewed from another angle, Mann and others (2017) find that clients with intellectual disability have comparatively high long-term reemployment rates (1–6 years after VR case closure). With these findings in mind, we analyze sensory impairments and intellectual disability alongside the impairment groups that represent larger numbers of applicants, such as mental disorders and back (musculoskeletal) impairments.

The success of early interventions may also vary by applicant education and age. Individuals with higher levels of education generally achieve higher reemployment rates after VR services. For age, findings are mixed; some studies find a clear decline in reemployment levels with age, but the overall picture is unclear (Mann and others 2017; O'Neill and others 2017). Our primary interest in adding to existing findings on filing times by education and age is to identify logical targets for early intervention.

Methods

This study uses data from SSA Form 3368, the Adult Disability Report. The data are stored in SSA's Electronic Disability Collect System (EDCS). The Adult Disability Report is similar to surveys used in previous studies in that individuals provide retrospective reports of their disability and employment history. It includes the applicant's sex and educational attainment, the alleged date of onset, the date the applicant exited the labor market, whether and how the applicant modified work hours or responsibilities, and the date the initial-level claim was filed. In Appendix A, we define the study variables that underlie the population characteristics we report.

The study population consists of 2,155,658 individuals who applied for DI during 2013–2014. SSA field-office staff verified that the applicants were insured and state Disability Determination Services staff found them to have a severe impairment expected to last 12 months or longer. The population includes individuals who received either a medical allowance in the third step of SSA's five-step determination process, a denial based on the ability to engage in past work at step 4, or a decision based on the ability to engage in another type of work at step 5.[3] We restrict the population to applicants who experienced disability onset at ages 25 to 66. The population excludes applicants reporting childhood onset because their filing times would be difficult to compare meaningfully with those of applicants with adult onset.[4] We also exclude individuals who reapply citing the same impairment in both the initial and subsequent applications (these account for about 6.4 percent of all applications).

Table 2 shows the study population characteristics. The median onset age is 51.2, and the population is evenly divided by sex. Most applicants completed high school (81.3 percent), but very few completed four years or more of college (11.4 percent). Among the impairment types we highlight in the study, back impairments are the most common, followed by arthritis, mental disorders, cardiovascular impairments, and neoplasms. Few applicants report metabolic/endocrine disorders, respiratory impairments, injuries, sensory impairments, or intellectual disability. Although the majority of applicants stop working at the time of onset, about one in five of them (20.3 percent) continue to work.

This article presents descriptive statistics.[5] We report filing times by quantiles rather than as means because small numbers of very long filing times skew the means positively. Because we use population data rather than sample data, all cross-category variations in filing times are statistically significant.

Table 2.
Characteristics of 2013–2014 DI applicant study population

Characteristic	Number	Percent
Total	2,155,658	100.0
Sex		
Men	1,075,434	49.9
Women	1,080,224	50.1
Education [a]		
None	7,677	0.4
Less than high school	375,531	18.3
High school	976,405	47.6
Less than 4 years of college	457,630	22.3
At least 4 years of college	234,285	11.4
Age at onset		
25–47	836,240	38.8
48–66	1,319,418	61.2
Median age at onset	51.2	
Diagnosis		
Back impairments	468,791	21.7
Arthritis	312,103	14.5
Mental disorders	263,808	12.2
Cardiovascular impairments	223,755	10.4
Neoplasms	181,704	8.4
Metabolic or endocrine disorders	83,960	3.9
Respiratory impairments	80,992	3.8
Injuries	64,228	3.0
Sensory impairments	42,119	1.9
Intellectual disability	5,684	0.3
Other impairments	428,514	19.9
Employment		
Worked after onset	436,160	20.3
With modified hours or responsibilities	274,533	12.8
With no modifications	161,627	7.5

SOURCE: Authors' calculations using Adult Disability Report data.

a. Omits 104,130 applicants with missing/unknown data.

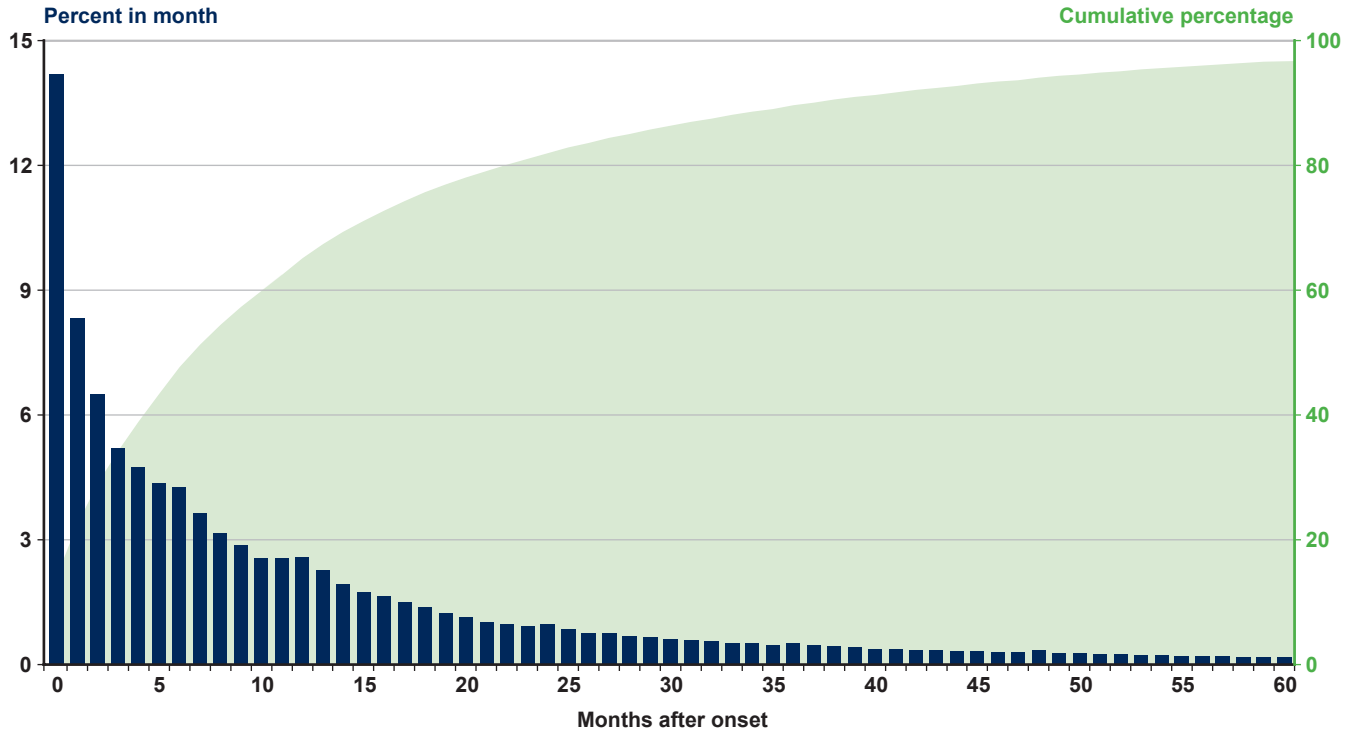
Results

How long do DI applicants wait to file? The median filing time for DI benefits is 7.6 months after onset. Chart 1 shows the percentage of eventual applicants that files in each successive month after onset, as well as the cumulative percentage of eventual applicants that has filed by the end of each successive month. Slightly more than 14 percent of applicants file within 1 month of onset. An additional 8.4 percent file in the second month and 6.5 percent file in the third. The share of applicants filing in each successive month drops steadily. Within 18 months of onset, three-quarters of eventual applicants have filed, and only about 10 percent wait longer than 36 months to file.

As noted earlier, filing times recorded in administrative data more closely reflect the results of surveys that define onset as when work was first prevented than of those that define onset as when the respondent was first bothered (Table 1). Because the Adult Disability Report instructs applicants to indicate when their condition kept them from working—synonymous with work *prevention*—the pattern revealed in Chart 1 aligns with expectations.

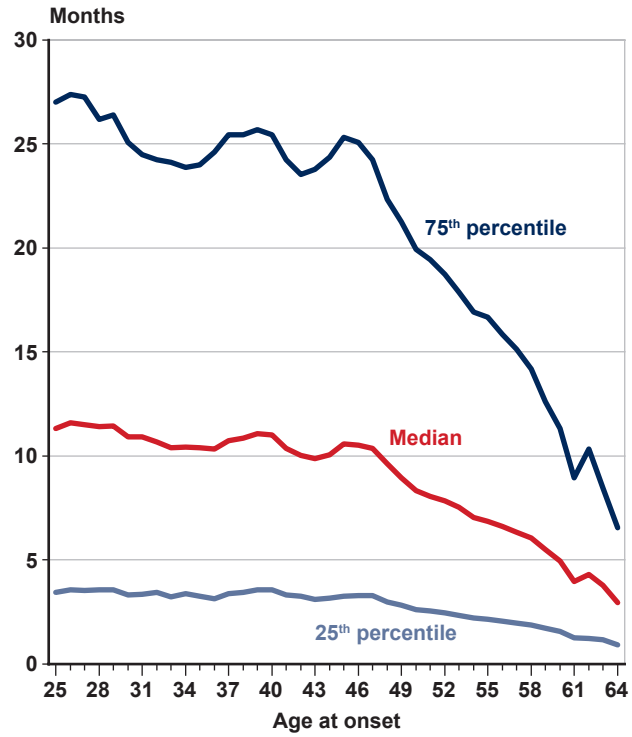
Which applicants tend to wait longer to file? The variable with the most striking differences in filing times is onset age. Chart 2 shows that the median filing time changes very little from onset ages 25 to 47, but drops steadily from onset ages 48 to 64. Through age 47, applicants wait 10–11 months after onset to file. At onset age 50, the median filing time is 8 months. For onset age 56, the median filing time is about 6.5 months and for onset age 61, it is 4 months. Chart 2 also shows the 25th- and 75th-percentile filing times at each onset age. At the 25th percentile, filing times remain relatively constant at about 3.5 months for onset ages 25 through 47 and decline to about 2 months for individuals with onset ages in the mid-50s or later (indicating that one-quarter of individuals with onset in their early 60s wait less than 2 months to file for benefits). The 75th percentile trend line varies more dramatically. Among those with onset ages of 25 to 47, roughly one-quarter of eventual applicants wait 2 years or longer to file for benefits. Among those with an onset age of 61, however, only one-quarter of applicants wait *1 year* or longer to file for benefits. Recall that approximately 1 year is the *median* filing time for eventual applicants with onset ages younger than about 40.

Chart 1.
2013–2014 DI applicants, by filing time (in percent)



SOURCE: Authors' calculations using Adult Disability Report data.

Chart 2.
Median, 25th-, and 75th-percentile filing times, by age at onset: 2013–2014 DI applicants



SOURCE: Authors' calculations using Adult Disability Report data.

Table 3.
Percentage distribution of 2013–2014 DI applicants, by diagnosis and age at onset

Diagnosis	EAO (ages 25–47)	LAO (ages 48–66)
Total	100.0	100.0
Intellectual disability	0.5	0.1
Mental disorders	20.6	6.9
Back impairments	21.9	21.7
Arthritis	10.5	17.0
Metabolic or endocrine disorders	2.3	4.9
Respiratory impairments	4.1	3.6
Injuries	3.4	2.7
Cardiovascular impairments	6.5	12.9
Neoplasms	4.6	10.9
Sensory impairments	2.0	2.0
Other impairments	23.7	17.4

SOURCE: Authors' calculations using Adult Disability Report data.

NOTE: Rounded components of percentage distributions do not sum to 100.0.

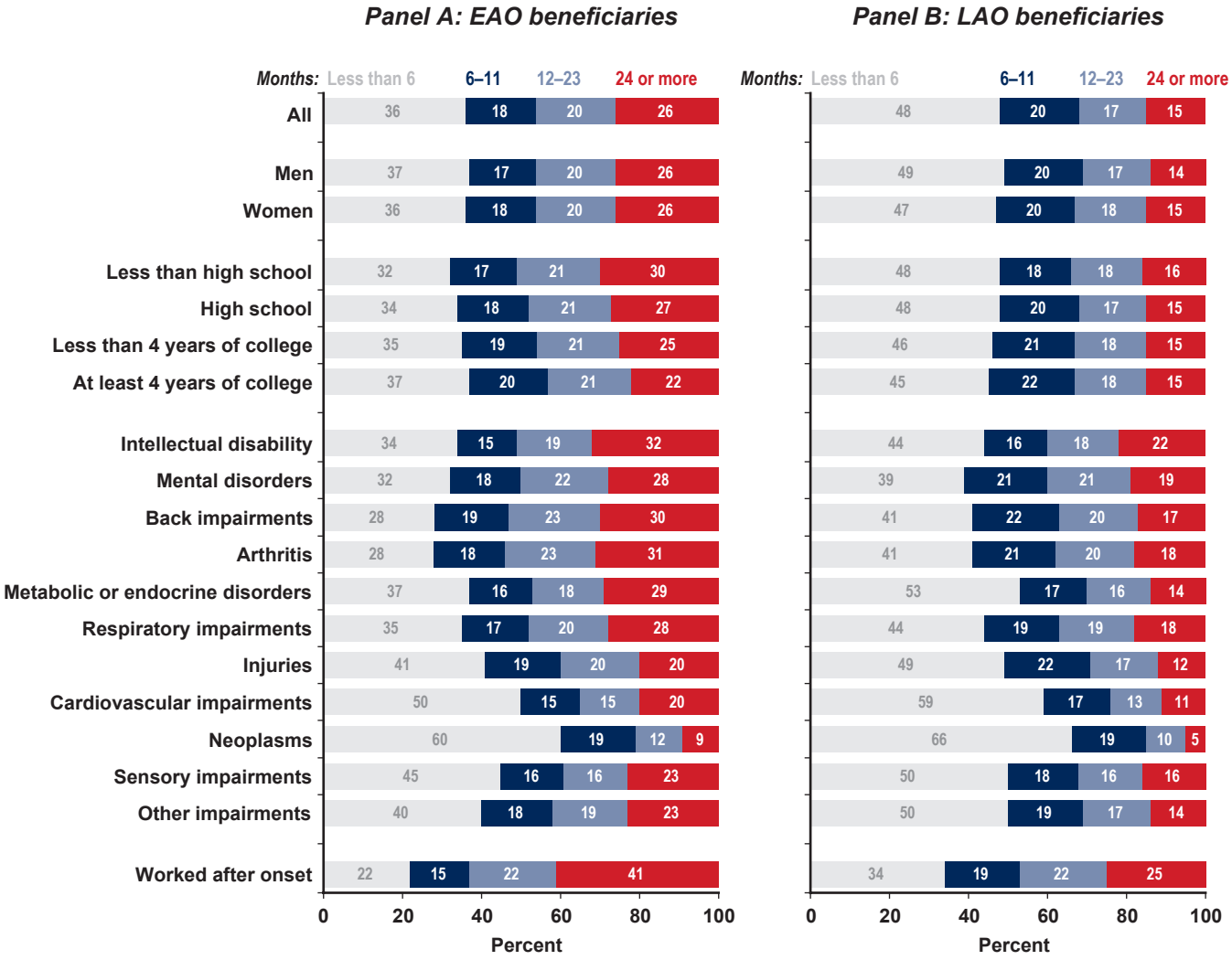
Because filing times vary so distinctly by onset age, the remainder of this article divides the population of eventual applicants into two groups: those with disability onset at ages 25 through 47 and those with onset at ages 48 through 66. We call these groups early adult onset (EAO) and late adult onset (LAO) applicants, respectively.

Dividing the population into onset age groups also removes the primary source of collinearity, such that the results of the bivariate analyses mirror those of multivariate analyses. For instance, Table 3 shows that the distribution of primary impairments varies by onset age. As a result, failing to consider onset age could bias the reported relationship between impairment type and filing time.

Applicant groups who typically wait longer to file may be logical targets for early interventions. Chart 3 shows the distributions of eventual applicants across four filing-time categories: less than 6 months, 6–11 months, 12–23 months, and 24 months or longer. Although nearly two-thirds of all EAO applicants waited 6 months or longer to file, barely more than one-half of all LAO applicants did. In particular, EAO applicants were much more likely to wait more than 2 years to file (26 percent did so, compared with 15 percent of LAO applicants). Along with the findings depicted in Chart 2, this suggests that EAO applicants may be better candidates for early intervention programs.

Among EAO applicants, filing times vary substantially across certain characteristics. Although filing times differ little by sex—women and men are equally likely to wait 6 months or longer—they vary by education. Applicants with lower levels of education wait longer to file. Although only 22 percent of applicants with at least 4 years of college wait 2 years or longer to file, 30 percent of those who did not complete high school do. Applicants with intellectual disability have longer filing times than do those with other impairment types. Those with back impairments and arthritis also tend to wait relatively long; nearly three-quarters wait 6 months or more to file, and 30 percent wait 2 years or more. Applicants with mental disorders also tend to wait longer to file (68 percent wait 6 months or longer). Although a sizable portion of applicants with metabolic/endocrine and respiratory impairments wait very long to file (almost 30 percent wait 2 years or more), these groups are also slightly more likely to wait less than 6 months. Applicants with sensory impairments, injuries, cardiovascular impairments, and neoplasms also tend to file more quickly. Most importantly, applicants who continue working

Chart 3.
Percentage distributions of EAO and LAO beneficiaries, by filing time and selected characteristics, 2013–2014



SOURCE: Authors' calculations using Adult Disability Report data.

beyond onset are much more likely to delay filing. Nearly four-fifths of these applicants wait 6 months or longer, and two-fifths wait 2 years or longer.

Filing-time patterns among LAO applicants are similar to those of EAO applicants for some characteristics, but not for others. LAO women are slightly more likely than men to wait at least 6 months to file (53 percent versus 51 percent). Contrary to EAO applicants, LAO applicants with at least some college education are more likely to delay filing 6 months or more than are those with no postsecondary education (although differences by level of attainment are less marked than are those of EAO applicants). Comparing by impairment type, applicants with mental disorders are the most likely to wait at least 6 months to file (61 percent), followed by those with arthritis and back impairments (59 percent for both). As with EAO applicants, more than half of LAO applicants with respiratory impairments wait 6 months or longer to file, but more than half of applicants with metabolic/endocrine disorders do not. Likewise, almost half (or more) of applicants with injuries, cardiovascular impairments, neoplasms, and sensory impairments file in less than 6 months. Applicants who continue to work after onset are the LAO subgroup most likely to delay filing—two-thirds wait 6 months or longer, and one-quarter wait 2 years or longer—although they are less likely to delay filing than are EAO applicants who continue work.

The patterns in Chart 3 suggest potential candidates for early intervention. More than two-thirds of EAO applicants in the following groups delay filing by 6 months or longer: those who did not complete high school; those with intellectual disability, mental disorders, back impairments, or arthritis; and those who continue working after onset.

Chart 4 shows the percentages of EAO and LAO applicants who continue working—both with and without modifications of their work hours or responsibilities—after disability onset, as well as the average number of months that they work.

Nearly one-quarter of all EAO applicants work after onset. On average, they continue working for 11 months. Women continue work more often than men do, although they do not work as long. Working after onset does not vary distinctly by education level, although individuals with at least some college education are more likely to modify their hours or responsibilities. This may indicate that EAO applicants with more education have greater access to workplace accommodations (McDowell and Fossey 2015; Yelin, Sonneborn, and Trupin 2000; Zwerling and others 2002). Of all subgroups, applicants with intellectual disability are the most likely to work after onset (36 percent). They also have the longest average duration of work after onset (17.1 months). Applicants with mental disorders are the second most likely to work after onset (28 percent), and have the second longest average duration (12.0 months). Slightly lower proportions of applicants with arthritis and with back, metabolic/endocrine, and respiratory impairments work after onset, but they also tend to keep working for about a year. Proportionally, fewer applicants with injuries, cardiovascular impairments, and neoplasms work after onset.

Less than one-fifth of all LAO applicants (17 percent) work after onset. Moreover, they work for only about half as long as EAO applicants do (6.2 months on average). LAO women are more likely to continue working than men are—and with a slightly longer average duration. Applicants with any college education are more likely to work with modifications than applicants with less education do, but they are not substantially more likely to continue work overall or to work longer. Work continuation rates do not vary widely by impairment type for LAO applicants. With the notable exception of intellectual disability, no impairment group exceeds 20 percent.

Together, Charts 3 and 4 show some overlap in the applicant groups that tend to delay filing and to continue working after onset. Among EAO applicants with intellectual disability, mental disorders, back impairments, and arthritis, two-thirds delay filing by 6 months or longer and at least one-quarter continue working after onset (and work for about a year or longer on average). On the other hand, some groups of applicants are more likely than others to delay filing, but not necessarily to work after onset. For instance, EAO applicants who did not complete high school often delay filing, but are not especially likely to work after onset. Similarly, EAO applicants with back impairments and arthritis wait longer to file than do applicants with other impairments. Yet, applicants with mental disorders—who also tend to delay filing—are more likely to work after onset.

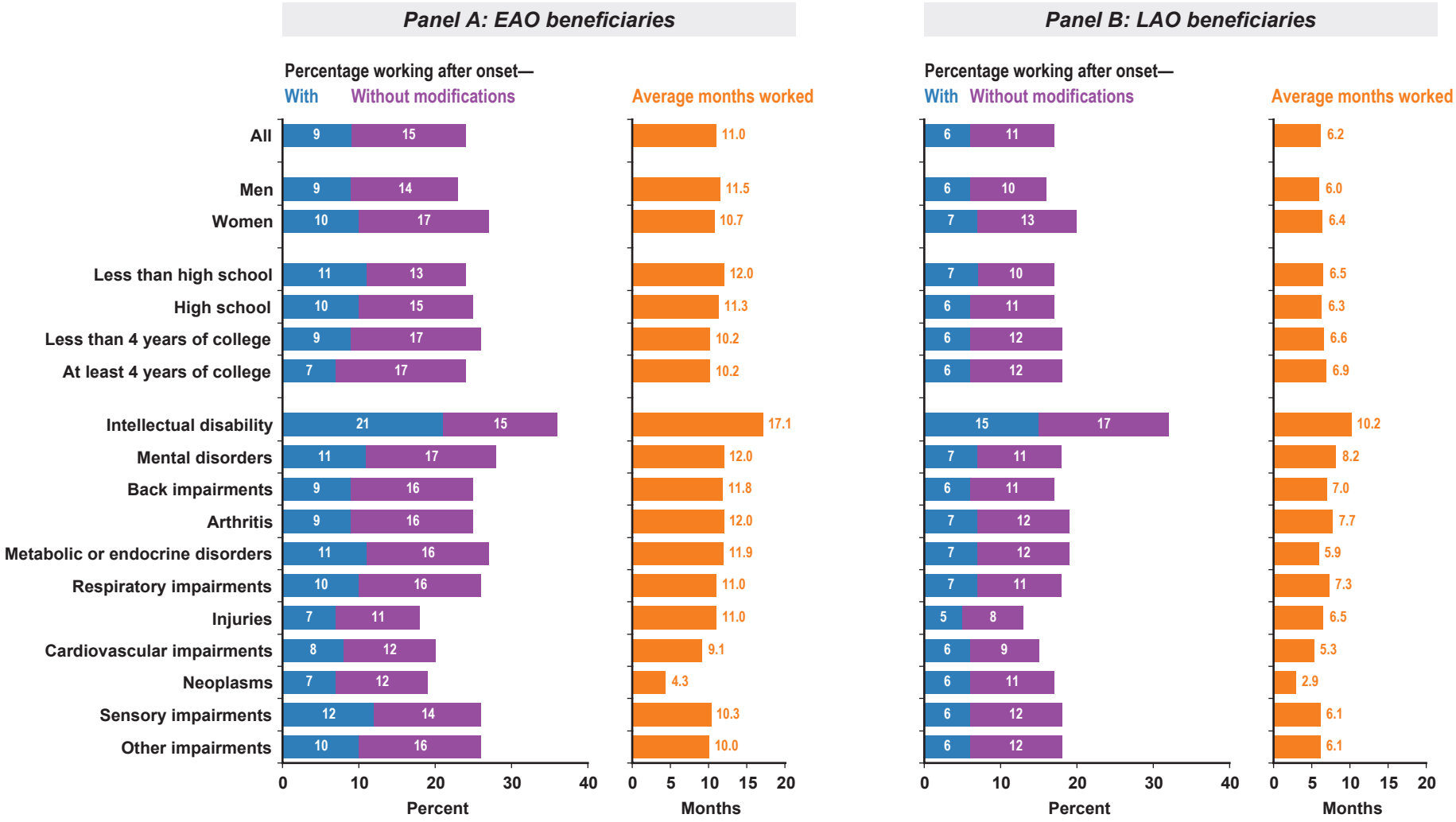
Discussion

Some of the patterns have implications for early interventions. First, interventions targeted to applicants who experienced onset prior to age 48 (EAO applicants) may have more time to take effect.[6] As Chart 2 showed, the median time from disability onset to DI application does not vary widely from ages 25 to 47, remaining consistent at approximately 11 months. Among EAO applicants who tend to delay filing, five particular subgroups deserve further attention (Chart 5).

The two subgroups that are most likely to delay claiming and to continue working are those with intellectual disability and those with mental disorders. Applicants with intellectual disability wait substantially longer to file and continue working after onset more than any other group. Early interventions have achieved well-documented success in promoting employment among workers with intellectual disability (for example, Mann and others 2017; Wehman and others 2014). Although our findings suggest that EAO applicants with intellectual disability could be a fruitful target for interventions focused on maintaining work, they represent a small fraction of all applicants (less than 1 percent in 2013–2014).

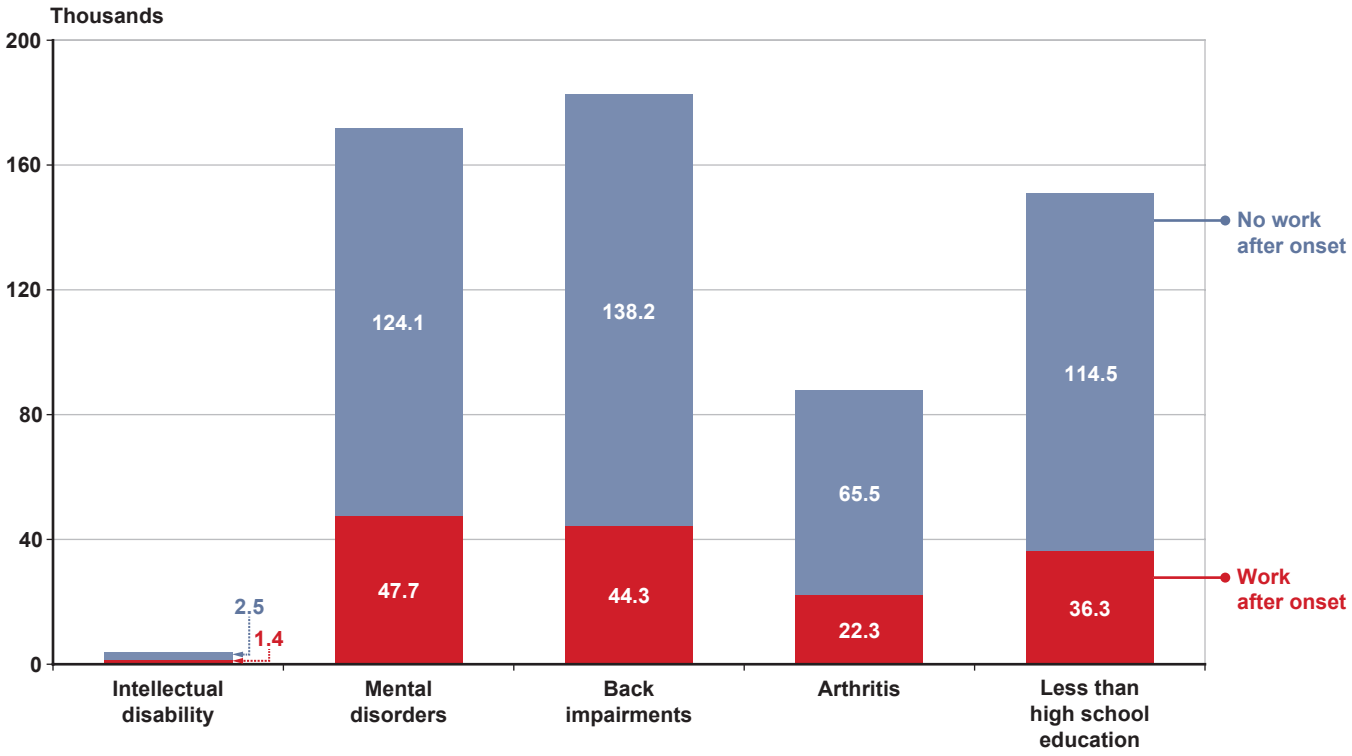
EAO applicants with mental disorders are a much larger group (about 172,000), but they do not delay as long or work as often as do applicants with intellectual disability. Interventions that target them would thus have less time to take effect and might benefit from focusing on both work maintenance and labor market reentry. Among mental disorders, depression

Chart 4.
Work after disability onset: Percentage of EAO and LAO applicants who work with or without modifications to work hours or responsibilities, and average duration among those who work, by selected characteristics



SOURCE: Authors' calculations using Adult Disability Report data.

Chart 5.
Numbers of EAO applicants who worked and did not work after disability onset: Five key subgroups, 2013–2014



SOURCE: Authors' calculations using Adult Disability Report data.

alone costs the United States more than $51 billion in lost productive time annually (Greenberg and others 2015) and is a major source of growth in DI enrollment (Autor and Duggan 2003). If effectively targeted, early interventions could reduce the number of DI applications. Future research should identify workers with mental disorders who are most likely to apply for DI to target interventions more precisely. In 2016, SSA funded the Supported Employment Demonstration (SED), a 6-year study of how interventions providing employment supports in combination with integrated behavioral health and social services can help workers with mental disorders to reenter or stay in the labor force.[7] That demonstration targets applicants who have been denied benefits, as opposed to the beneficiary population targeted by programs such as the Ticket to Work.

Three other EAO applicant subgroups also delay filing, but are slightly less likely to work after onset. EAO applicants with back disorders are roughly similar in number (about 182,000) to those with mental disorders. They continue working less often, and thus targeted interventions for them might focus more on labor market reentry. Future research might identify industries of employment, occupations, and physical work requirements that are common among applicants with back impairments to target those workers more effectively. EAO applicants with arthritis are fewer in number (about 88,000) and less likely than are those with mental disorders to work after onset. Future research might focus on the specific employment challenges of workers who drop out of the labor market because of the onset of arthritis in early to mid-adulthood.

Finally, applicants who did not complete high school are nearly as numerous (about 151,000) as applicants with mental disorders and back impairments. They wait longer to file than applicants with at least a high school diploma but they are not more likely to continue working. Future research might explore why filing times vary by education level. Young applicants who did not complete high school may face barriers to applying, such as a lack of information, which could result in delayed filing. On

the other hand, individuals with more education may apply only if they have relatively more severe impairments, and thus tend to file quickly. Because their jobs often have fewer physical requirements and offer more workplace accommodations (McDowell and Fossey 2015; Sevak and others 2015), highly educated individuals with less severe impairments may choose not to apply for DI. If so, exploring how post-onset work experiences differ by education level may inform early intervention strategies. For instance, what supports help disabled workers with a college education remain in the labor force? If provided access to similar supports, would workers with less education continue to work and forgo DI application?

Interestingly, this study shows that individuals with sensory impairments tend to file more quickly than other groups but are no more or less likely to work after onset than applicants with other impairments. Although postapplication interventions have promoted employment in this group, targeted interventions in the period after the disability prevents work and before DI application may not have as much time to take effect.

In terms of implementing interventions, target groups identified in this study present some challenges. First, certain groups may be difficult to reach. For instance, because eventual applicants with intellectual disability represent a small subpopulation with a wide geographic distribution, a direct intervention with a fixed-location service center may prove untenable on a national scale.[8] Claimants with mental disorders and musculoskeletal impairments constitute larger subpopulations, but no centralized data system exists from which the agency could identify potential candidates for intervention. The Demonstration to Maintain Independence and Employment (DMIE) exemplified the challenge of targeting workers with specific impairments—even when the populations of such workers are large—without such a data system. For instance, the Hawaii DMIE site targeted individuals with diabetes and used an employer-based voluntary outreach strategy—and, eventually, an open-enrollment outreach through media, health fairs, and service-care providers—rather than existing program data. Recruitment fell far short of the goal. Conversely, the Kansas DMIE site targeted individuals with a range of impairments using data from an existing program (the state's high-risk insurance pool) and met recruitment goals (Gimm and others 2009).

Justifying interventions for applicant groups that have relatively low initial allowance rates may also pose a challenge. For example, in this study, applicants with mental disorders had initial-level allowance rates of 26 percent (not shown). An intervention targeting potential applicants with arthritis may be easier to justify, given their 44 percent initial allowance rate.

In terms of study methodology, the availability of data on more types of variables would remove a key limitation on further research. Many applicant groups may tend to delay filing or work after onset, including those in certain industries or occupations or with various levels of functional capacity. These groups and others are not represented in this study because those variables cannot be examined using EDCS data. Furthermore, this study lacks variables that might explain why certain groups of applicants delay filing. For instance, it would be helpful to know which resources and supports DI applicants may have used before filing. Future research may augment SSA-3368 data by merging them with data from external sources. These could include longitudinal survey data (such as the Health and Retirement Study and the Survey of Income and Program Participation) or contextual data such as area unemployment rates, as Burkhauser, Butler, and Gumus (2004) used. Future research might also build on this study by documenting the post-onset experiences of specific applicant groups.

Conclusions

This study adds to an emerging literature on filing time—the time that DI applicants wait to file after disability onset. It uses the Adult Disability Report (SSA-3368) to capture self-reported onset dates. We find that administrative records on filing times align closely with findings of previous survey-based studies that defined onset in terms of when an impairment first prevented work. Nearly two-thirds of eventual DI applicants file within a year of onset. The median filing time remains constant at approximately 11 months for eventual applicants with onset occurring at any age from 25 to 47, but drops steadily as onset age increases thereafter. This study uses the variation in filing times by onset age—as well as other differences in filing times and post-onset work by other applicant characteristics—to identify potential targets for early interventions. Key target groups include EAO individuals with mental disorders, back impairments, and arthritis, and those who did not complete high school.

Appendix A: Study Variables

Onset date. To measure the time that individuals wait to file for DI benefits after they perceive their disability to begin, this study uses the applicant's alleged onset date. In most cases (62.3 percent), individuals alleged an onset date that aligned with the day they stopped working.[9] Although using the EDCS data from the Adult Disability Report allows more precise measurement of disability onset than survey data—because it records the day of onset, rather than only the month or year—it also contains some reporting bias. Applicants report disability onset dates as the beginning of calendar years and calendar months more often than other dates,[10] and may also "round" to the nearest 6 months.

Filing date. This study uses the date on which the claim is filed at the SSA field office, known as the *claim effective filing date*. The study included applicants who filed during the period January 1, 2013 to December 31, 2014.

Educational attainment. We convert the educational information available in the EDCS (number of school years completed) into five categories: no school (0 years), less than high school (1 to 11 years), high school (12 years), less than 4 years of college (13 to 15 years), and at least 4 years of college (16 or more years).[11] In this classification, 47.6 percent achieved a high school level of education, 22.3 percent had less than 4 years of college, and 11.4 percent had completed 4 years or more of college.

Impairment categories. This study uses SSA primary diagnosis codes to classify impairment categories, focusing on the eight most common types: mental disorders (specifically, affective and anxiety disorders), back impairments, arthritis, cardiovascular impairments, neoplasms, metabolic/endocrine disorders, respiratory impairments, and injuries. It also presents results for intellectual disability and sensory (visual, hearing, and/or speech) impairments, because previous research has shown relatively high levels of employment among these populations (for example, Mann, Mamun, and Hemmeter 2015). All remaining impairments are included in the "other" category.

Working after onset. This article categorizes applicants by whether or not they continue working beyond onset. The study assigns applicants to these categories based on the self-reported date on which they stopped working.[12] Modified work hours or responsibilities for those who continued working were indicated in the EDCS.

Notes

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[1] Additionally, Autor and others (2015) find that applying for DI benefits significantly reduces subsequent employment.

[2] Similarly, Singleton (2014) found that respondents are more likely to file a claim within a year when a disabling condition prevents work as opposed to limiting it; however, Singleton did not present specific figures for either concept.

[3] The study population excludes individuals who received a technical (nonmedical) denial at step 1 and those found not to have a serious impairment or one that will last longer than 12 months at step 2. As Appendix Table A-1 shows, these groups typically have much longer filing times. We also exclude those who provided incomplete

Table A-1.
Disability-benefit filing times by step of the determination process at which award/denial was decided and age at disability onset: 2013–2014 DI applicants (in months)

	EAO (ages 25–47)		LAO (ages 48–66)	
Step	Median	Mean	Median	Mean
1 (technical [nonmedical] denial)	24.6	49.3	10.9	22.6
2	34.0	54.0	14.0	29.6
3	5.4	13.3	3.7	8.0
4	11.6	20.9	8.4	14.5
5				
Allowance	11.8	19.7	7.8	13.0
Denial	12.0	24.2	6.5	11.9
Other denials	11.7	24.0	8.5	16.2

SOURCE: Authors' calculations using Adult Disability Report data.

information, failed to participate in requests for consultative examinations, or reported no work history; and cases of res judicata and collateral estoppel (in broad terms, these are denials and allowances, respectively, based on prior determinations).

[4] Restricting the population to adult-onset applicants also ensures that most of the population will have completed their lifetime educational attainment, which is important for analyzing variation in filing times by that metric.

[5] Because some characteristics in this study (such as age and impairment type) are highly correlated, bivariate analyses could generate potentially misleading results. We conducted a multinomial logistic regression analysis, which modeled the likelihood that an applicant would wait certain periods (3–5 months, 6–11 months, 12–23 months, and 24 months or longer) after onset to apply for benefits. Our models included the variables shown in Table 2. Because the results of the multivariate analysis did not differ substantively from those of the descriptive analyses, we omitted them from the article. We will provide those results on request (Matt.Messel@ssa.gov).

[6] They may also be the most potentially cost-effective group to target, given the literature showing that receipt of DI benefits reduces labor force participation for younger individuals more than for older ones (for example, French and Song 2014; Maestas, Mullen, and Strand 2013).

[7] More information is available at https://www.ssa.gov/disabilityresearch/supported_employment.html.

[8] However, some local-scale SSA demonstrations targeted to individuals with intellectual disability have produced some positive employment outcomes (Decker and Thornton 1995; Kerachsky and Thornton 1987).

[9] Because SSA policy defines disability as the inability to engage in substantial gainful activity, it makes intuitive sense that applicants would associate disability onset with their exit from employment. These dates align more often for individuals who stopped working because of their impairment (73.0 percent) than for individuals who stopped working for other reasons (57.2 percent).

[10] For instance, assuming individuals face an equal risk of disability onset every day of the year, one would expect less than 0.3 percent of individuals to report onset on January 1. Instead, roughly 4 percent report a January 1 onset (ranging from 2 percent of those who filed within a year of alleged onset to 12 percent of those who filed 5 years after onset). Likewise, for onset within a given month, one would expect about 3.3 percent would occur on the first day of that month. Instead, the first day is reported by 18 percent of those reporting onset in that month (ranging from 8 percent of those who filed within a month of onset to 33 percent who filed 24 months after onset). The latter phenomenon might also be partly due to individuals deciding to wait to quit working until the end of a month.

[11] EDCS data do not record whether an individual actually obtained a high school diploma or college degree.

[12] We also used these self-reported dates to measure how long applicants continued to work after onset.

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