

What Does Research Tell Us About Depression, Job Performance, and Work Productivity?

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Objective: To assess the work impact of depression. **Methods:** A review of research articles published since 2002, reporting on the magnitude and/or nature of depression's impact on work. **Results:** This research is characterized by the use of three outcome indicators (employment status, absenteeism, and presenteeism metrics) and three research designs (population-based, workplace, and clinical). The literature documents that, compared to non-depressed individuals, those with depression have more unemployment, absences, and at-work performance deficits. Methodological variation makes it difficult to determine the magnitude of these differences. Additionally, the research suggests that the work impact of depression is related to symptom severity and that symptom relief only partly reduces the adverse work outcomes of depression. **Conclusions:** Research has contributed to knowledge of the multidimensional work impact of depression. Further developing intervention research is an important next step. (*J Occup Environ Med.* 2008;50:401–410)

Almost 5% of the US working-age population has depression,¹ a recurrent condition causing substantial functional limitation and social role disability.^{2–4} Despite the availability of new and effective treatments, control of the disorder has been hindered by underdiagnosis, poor compliance to prescribed regimens, delivery of sub-optimal care, and frequent comorbidity with other mental disorders.^{5–9}

Since Wells and colleagues¹⁰ first reported on depression's disabling impact in the 1980s, evidence of its human and economic burdens has continued to accumulate.^{11–14} Recent studies focusing on the disorder's impact on employment and work productivity provide new compelling evidence of the magnitude of depression's work effects and its societal consequences.

The aims of this paper are to present up-to-date information regarding the work impact of depression and to elucidate measurement issues associated with research in this area. Using data from recent studies, we address the following questions:

1. What is the magnitude of depression's impact on performance and productivity in paid work?
2. Which aspects of job performance and work productivity are adversely affected by depression?
3. How important is severity of illness in explaining variations in performance deficits and productivity loss?

To facilitate understanding of this growing and complex literature, we have organized the research according

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Tables for this Article: Annotated Bibliography of Depression and Work Literature

The three tables accompanying this article are a comprehensive listing of depression and work literature, divided into three categories: population, workplace, and clinical studies.

Because of their length, they are being published online-only and not in print. They are available free on the JOEM web site and can be viewed via the link to Article Plus from the online table of contents. The three tables are as follows:

Table 1: Population-based studies on the association between depression and work

Table 2: Workplace studies on the association between depression and work

Table 3: Clinical studies on the association between depression and work

to the type of outcome(s) assessed (employment status, absenteeism, and presenteeism) and study approach (population-based, workplace, and clinical). We begin with a brief discussion of the work outcome metrics, methods, and study approaches used within the literature. Then, we present a discussion of published research along with annotated tables, which organize studies according to these salient features.

Metrics and Methods

Depression research has a relatively long history addressing the disorder's relationship with paid work. Initially, social scientists were interested in determining whether depression was a cause of downward socioeconomic mobility (the "social drift" hypothesis), or whether low socioeconomic status caused depression (the "social causation" hypothesis). In these studies, a person's occupation was used to represent his or her socioeconomic position.¹⁵ Also common in the mental health field were studies of work adjustment among patients with depression.¹⁶ The absence of gainful employment has historically been considered to be a behavioral symptom of a depressive disorder.

In current clinical and epidemiological research, employment activ-

ity has acquired new meaning as a surrogate marker for personal health and/or economic status. With regard to the former, a person's employment is considered indicative of functional health and social role disability. In the latter case, employment is a marker of labor market participation and, therefore, productivity.

Within the recent body of depression research, we observe the use of three types of work outcome measures: employment status, absenteeism, and presenteeism.

Employment Status. These variables address multiple dimensions of labor market participation. They are valuable when studying populations vulnerable to unemployment, job or career disruption, disengagement from the labor market, and/or other employment transitions.

In some depression studies, especially those in which employment is not a primary endpoint, it is sufficient to ascertain whether a person is working or not working. In studies that require a more refined outcome gradient, it may be important to have further details about employment (full-time or part-time) or lack of employment (such as whether a person is unemployed, retired, or disabled). Among populations in which job or career change is a plausible and important outcome, it may be worthwhile to

measure job turnover or job retention (whether a person was able to keep a job after a defined event or over a stated time period). Some researchers and policymakers also have become interested in understanding the population's work arrangements, for instance by distinguishing whether a job is permanent or whether it represents a contingent job or a so-called "alternative work arrangement." The United States Bureau of Labor Statistics (BLS) defines contingent workers as those "who do not have an implicit or explicit contract for ongoing employment." Alternative work arrangements are defined as those associated with independent contractors, on-call workers, temporary help agency workers, and workers provided by contract firms.¹⁷

Employment status variables provide global summaries of the burden of depression or the outcome of intervention. There are three considerations related to their use. First, they possess coarse measurement properties and may not be sufficiently sensitive to subtle differences in degree or type of illness or treatment effect. For example, within groups that are already employed, an improvement in depression symptom severity from moderate to mild may have no discernable effect on employment, full- or part-time status, turnover or retention, or other similar parameters. Second, employment status may also be influenced by variables other than health (eg, corporate downsizing, the economy). To some extent, this problem can be managed with careful study design, measurement, and/or analytic techniques. Third, employment status variables may not be good for assessing short-term outcomes. Change in employment status can be abrupt or represent a more long-term consequence of depression.

A strength associated with employment status variables is their relevance to certain populations. Within chronically and severely mentally ill populations involved in vocational counseling and job training programs, employment status is a key success indicator. Employment is

also relevant within studies of aging workers for whom depression and retirement decisions are linked.¹⁸ Finally, employment status data are relatively easy to obtain from a variety of sources including archival datasets, self-report, and even surrogate report.

Absenteeism. Like employment status, absences are well-established metrics because they are relatively easy to measure (through records or self-report), and provide compelling impact information. Additionally, in lieu of direct measurement, absences may be inferred from available data (such as medical care claims), which contain information on events that take time away from work (eg, hospitalizations and doctors' office visits).

Absence metrics reflect work time lost and may be stated relatively globally (present or absent), and/or on a more refined measurement scale (as numbers of days or hours missed). It is sometimes important to distinguish types of absences. Depression studies may benefit from measuring incidental or unplanned absences; and, when longer-term disruptions are expected, absence episodes (eg, periods of disability, leaves of absence, and absences qualifying under the Family and Medical Leave Act), return to work, and duration of time off.

The pitfalls of using absence measures relate to their accuracy, availability, and sensitivity. Absences recorded by employers generally do not distinguish health-related events from other kinds (eg, time off for child care), are not checked for accuracy (making them vulnerable to misreporting), and frequently are not collected for all categories of workers.

Alternatively, self-report absence questions can target health-related time loss. However, they may be susceptible to recall bias. Numerous studies have used long recall periods, up to a year, to assess absences without adequate evidence of accuracy.

In the case of both archival and self-report measurement, absences can be heavily influenced by vari-

ables such as workplace absence policies and norms regarding worker time-off behavior. When medical care is involved, absences may be influenced by physician practice patterns (such as advice given about activity restrictions) and not the illness per se.

Despite these issues, time loss metrics can provide valuable descriptions of the health and/or economic burden present in a population. Again, many problems with inaccuracy and interpretation can be reduced with careful attention to methodology.

Presenteeism. Measurement of at-work decrements in job performance and productivity is the newest work outcome assessment approach. Interest in measuring presenteeism evolved partly as a result of an awareness of the large amount of time Americans spend at work,¹⁹ the restructuring of work (such as the growth in home offices and flexible scheduling), and anecdotal reports of the unmeasured impact of employee health problems. A recent employer study suggests that presenteeism is more costly than medical care, absences, and disability combined.²⁰

Presenteeism is measured indirectly, principally by self-report, partly because parameters such as task performance, work effort, or productivity at the individual worker level are increasingly difficult to collect. An important reason for this is the changing nature of work, shifting away from manufacturing and other "countable" tasks. Employer archival data are rarely available for the measurement of this indicator, thus methods that rely on self-report are the standard.²¹

Among the self-report survey instruments, the measurement metrics range from global assessments of at-work productivity to more detailed assessments. Generally, the more detailed assessments have better psychometric properties (eg, they are better able to track the effects of health and health care compared to global assessments), but they may take longer to complete.

Of the four most common questionnaires, the Work Limitations Questionnaire (WLQ),²² the Health and Productivity Questionnaire (HPQ),²³ the Stanford Presenteeism Questionnaire,²⁴ and the Work Productivity and Activity Impairment Survey,²¹ only the first two have been used extensively and performed well in populations with depression.

The WLQ uses a multi-dimensional measurement approach. The WLQ development and validation process identified four dimensions of work task performance that were common to a wide variety of jobs, sensitive to the effects of mental and physical conditions and related treatments, and were related to work output (productivity). The WLQ items address the impact of physical health and emotional problems on job performance on these four dimensions: time management, physical job tasks, mental and interpersonal job tasks, and output tasks (those addressing ability to carry the workload, achieve quantity and quality standards, and complete work on time). The questionnaire produces four scale scores (reflecting percentage of time performance decrements occurred) and a composite at-work productivity loss score. A short-form version is widely used as a tool for assessing large employed populations (such as a firm's employees, health plan members, and health promotion program participants) and is frequently included in standard health risk assessment tools. The original form, also brief, is used extensively for outcomes measurement, as a health improvement program evaluation tool, and as an endpoint in industry clinical trials and other research. The WLQ has explicitly been validated for use in depression studies.^{25,26}

The HPQ, developed for the World Health Organization (WHO) Global Burden of Disease Initiative, has an established history of testing and usage. This questionnaire measures presenteeism with a global rating scale preceded by memory priming and decomposition ques-

tions intended to increase the accuracy of global item responses.²⁷ Studies assessing the HPQ's validity have found that presenteeism measured with this survey has good concordance with independent employer records of job performance within several occupations²³ and supervisor ratings of performance.²⁷ The HPQ is a module in the WHO Disability Assessment Schedule (WHO-DAS), which is administered internationally.²⁷

Different tools take different approaches to measurement. Thus, while measuring presenteeism, they may not be completely overlapping in content, and may yield somewhat different results. For example, the WLQ scoring method is relatively conservative. WLQ scale scores are converted to a percentage of productivity lost by multiplying each scale score by a specified fraction. Each fraction represents an empirically based statistical estimate of the relationship of the self-report scale score to objectively measured productivity. Other presenteeism surveys do not make this conversion. The amount of productivity loss that is reported by the employee is regarded as the correct amount of loss. Thus, it is important to select tools based on features such as their content, their performance (testing results), practicality, and ease of interpreting and communicating results to target audiences.

Choosing Metrics and Measurement Methods

Choosing measurement methods involves several considerations: 1) the accuracy of the resulting data; 2) the efficiency of obtaining the data (cost and ease of use); and 3) the information value of the data to various health care stakeholders (eg, employers, employees, physicians, and policymakers).

While performance test results from self-report tools are generally available, none of the self-report work outcomes measures were developed specifically for depression. Because depression may involve

losses in concentration, attention, and/or motivation, a legitimate concern is whether people with depression symptoms can report accurately. This concern may unnecessarily lead researchers and decision-makers to feel they must only rely on data from "objective" sources such as employer archives and medical care claims. Evidence obtained for the WLQ suggests that self-report health and work productivity data are similarly accurate for depressed and non-depressed workers.^{25,26}

Study Designs

Three types of studies, population-based, workplace, and clinical, dominate the literature concerning the work impact of depression. Population-based studies typically address epidemiological questions (eg, about patterns of disease and risk factors), may be cross-sectional or prospective (involving a baseline and one or more follow-ups), and sometimes include comparison groups. Workplace studies involve employees and address questions regarding health and health care costs within the workplace; these may encompass investigations of employee health promotion programs, employer cost, and occupational health and safety issues. Many of these studies are cross-sectional, rely on convenience samples, and are naturalistic (eg, do not involve control or comparison groups or pre-test/post-test designs). Clinical studies involve patient populations and focus on questions related to health care organization, delivery, and/or financing. This research typically involves sicker populations and implies some contact with the health care system; samples may or may not be drawn to be representative of a broader patient population.

A great deal of the research on depression and work is observational and many studies are done under naturalistic conditions. Substantial variations in study methods make it difficult to compare results and draw inferences.

In the next sections, we discuss research results referencing these im-

portant distinctions in metrics and designs. The literature regarding recent estimates of the magnitude and nature of depression's impact on work was identified by searching the Science Citation Index Expanded, Social Sciences Citation Index, and the Arts and Humanities Citation Index, using the keywords "depression" or "depressive," combined with keywords "work," "productivity," "employment," "disability," or "functional impairment." The search was limited to 2002 through 2007. To the resulting group of articles, we added notable articles published prior to 2002. Tables 1 through 3 (available online) describe the resulting population studies, workplace studies, and clinical studies, respectively. Due to space limitations, we only summarize findings; for specific study results and details, refer to the tables.

The Magnitude and Nature of Depression's Impact

Employment Status. Both cross-sectional and longitudinal studies have generally shown that populations with depression are vulnerable to unemployment. Most studies use the term "unemployment" to mean the absence of a paying job, and do not bother to distinguish between job loss, elective unemployment, or disability. Employment status has been reported in population-based and clinical studies but not workplace studies.

In three population-based, cross-sectional studies, the unemployment rate was higher for groups with depression than for those without depression. One study measured a 13% overall unemployment rate (for all subjects), while the other reported gender-specific rates of 26% for women and 13% for men.^{28,29} A similar investigation reported an unemployment rate of individuals with depression as almost 50%.³⁰ This high rate may reflect identification of depression through a single item screener ("Did you have major de-

pression?"), rather than identification through diagnostic interview.

Two population-based longitudinal studies compared initially employed individuals with depression to similarly employed healthy controls. Depression was associated with a 20% and 40% greater likelihood of unemployment, respectively.^{31,32} While each study indicates an employment impact, we cannot discern if the specific findings are comparable due to the use of different outcome metrics.

Adding further complexity to this discussion are results from two additional population-based longitudinal studies examining employment trends in retirement age workers. In these, unemployment was significantly higher only within certain depression subgroups. Emptage and colleagues³³ reported a significant relationship between depression and subsequent unemployment for individuals with depression and severe pain. Tian¹⁸ found a significant relationship between depression and unemployment only among women, not among men.

An observational clinical study measured job loss secondary to depression and job retention as outcomes. Patients in primary care physician offices were screened for depression and current employment. Compared to similarly employed controls without depression, the depression group had a 15% job loss rate versus 3.5% in the control group. At 18-month follow-up, few depressed patients had found new jobs.³⁴ Thus, this study's job loss rate and the unemployment rates cited previously were of similar magnitude.

However, deviating from the findings of other studies are the magnitude estimates obtained from clinical studies of depression treatment interventions. In the well-known Partners in Care (PIC) trial, patients assigned to experimental treatment had better employment outcomes than control or comparison groups.^{35,36} Schoenbaum and colleagues³⁶ found that patients with depression who received appropriate care had significantly

higher rates of employment at 6-months compared with patients with depression who did not receive appropriate care; the reported rates were 72% versus 53%. These relatively high unemployment rates occurred despite significant improvements in the appropriate care group. Rates may result from the trial's focus on patients, and/or including some individuals not working at baseline. Using PIC study data, Miranda and colleagues³⁵ found that employment rates at follow-up were only significantly higher for non-minority patients who had received appropriate treatment; but appropriate treatment did not increase employment among patients from racial/ethnic minority groups. In another clinical intervention study that assessed outcomes in patients employed at baseline, enhanced care relative to usual care resulted in a 10% increased likelihood of employment at 1-year follow-up.³⁷

A small number of studies have looked at underemployment. Most have used relatively crude indicators such as work hours and compensation (eg, earnings). Two population-based studies, one cross-sectional and one longitudinal, compared individuals with major depressive disorder to depression-free controls. Neither study found evidence of a relationship between major depressive disorder and underemployment, measured as a differential in hours or wages.^{29,31} A longitudinal clinical observational study of employed primary care patients also found no association between major depression and loss of work hours.³⁴

The results of some studies suggest that dysthymia, a chronic mood disorder on the depression spectrum, contributes to underemployment. One population-based study comparing groups with dysthymia to depression-free controls found that the former had fewer usual work hours.²⁹ A clinical study found an association between dysthymia and work transitions from full-time to part-time work, part-time to tempo-

rary work, and from a higher- to a lower-paying job.³⁸ The same study found no differences in work hours of individuals with dysthymia and non-depressed controls.

Job turnover and job retention were assessed in two studies. The longitudinal clinical observational study of employed primary care patients cited previously found that, compared to controls, patients with depression had higher rates of job turnover and less job retention.³⁴ Supporting the link between depression and job retention, one recent worksite study found that job retention rates may be improved by a telephonic outreach-treatment intervention.³⁹

Finally, the same worksite study examined whether rates of critical incidents among persons with depression are affected by telephonic outreach-treatment intervention. In this study, critical incidents were defined as any job-related accidents, work failures, or work successes reported in three separate open-ended questions.³⁹ The investigators found no relationship between the intervention and critical incidents at the 6-month and 1-year follow-ups. A clinical intervention study that assessed outcomes in patients in enhanced care relative to usual care, however, found the intervention resulted in a 10% decreased likelihood of workplace conflict at 1-year follow-up.³⁷ Workplace conflict in this study was defined as any arguments or difficulties with people at work.

Absenteeism. All three types of studies (population-based, clinical, and worksite) have documented depression's adverse impact on work attendance.^{34,38,40-46} Absenteeism mainly has been measured by self-report. Studies use different timeframes and metrics (eg, days and hours), and do not necessarily separate incidental or short-term absence from longer-term episodes.

We converted self-reported absenteeism results to a standard time frame and unit of measurement. Absences among groups with depression ranged from 0.3 to 3.8 missed

workdays a month.^{11,34,40,41,43,45–47} Two of the studies that reported more than one missed workday a month were clinical studies (possibly including sicker individuals and/or those with more medical visits). An observational population-based study reported that (compared to non-depressed employees), employees with depression had 1.5 greater odds of any work-loss days, a combination of absenteeism and presenteeism.⁴⁸

Several workplace studies examined absenteeism rates using administrative data, reporting results as employer cost. Study results are difficult to compare because of methodological differences: cost estimates are given for disability and/or incidental days, and as the average cost per depressed employee or the aggregate cost for all employees company-wide. One workplace study, which measured absenteeism costs as the total of disability and incidental absence expenses, reported that female employees with depression cost \$4602 annually, while male employees with depression cost \$3541.⁴⁹ Another study, which combined disability and incidental absences as well as health care expenses into a measure of total health and disability costs, found that employees with depression cost \$5415 annually.¹¹ Cost burden was calculated using the employee's actual daily salary as a base.

Three studies separated the costs associated with disability days from costs associated with incidental absences.^{20,50,51} Two studies measured costs on a similar scale. Within the entire disability insurance-eligible population, the annual per employee disability cost to employers attributable to depression was \$4 and \$14, respectively. Incidental absences cost just under \$8 and \$33, respectively.^{20,50} The discrepancies in results are probably linked to differences in costing methods. To generate cost data, some studies use average hourly wages and benefits as reported by the BLS. Others use a blend of the BLS wage averages and other averages. Addition-

ally, differences in results are related to the definition of mental disorder. Higher disability and incidental absences costs are reported when depression and other mental illnesses are combined. The other study, which estimated absenteeism from administrative data and separated disability costs from the cost of incidental absences, found that individuals with likely treatment-resistant depression had higher annual disability costs (\$4858 versus \$2154) and incidental absences costs (\$2154 versus \$940) than individuals with depression that is not likely to be treatment-resistant.⁵¹

In clinical treatment studies, guideline-concordant treatment and enhanced care is associated with less absenteeism and/or symptom reduction.^{44,52} Daily functioning of individuals with depression and medical comorbidities improves at an equal rate as that of individuals with depression without medical comorbidities.⁴⁵

Presenteeism. In most studies, irrespective of study type, depression was significantly associated with decrements in job performance and at-work productivity.^{34,40–42,46,52–55} Only one study, which estimated less than 1.0 day of impairment per month, found no significant association between depression and presenteeism.³⁹

Five studies using the WLQ reported on presenteeism as a function of depression. Studies examining data from a longitudinal, observational clinical study found that, compared to healthy controls, patients with depression (dysthymia, major depression, or both types) had significantly greater deficits in managing mental-interpersonal, physical, time, and output tasks.^{34,38,42,54} Generally, depression limited performance of physical job demands an average of 20% of the time. Performance of time management, mental-interpersonal demands, and output demands is impaired by depression 35% of the time or more on average. Also, indi-

viduals with more severe depression had more job performance deficits than those with moderate or mild depression, while individuals with dysthymia had fewer job performance deficits than patients with major depression had.^{34,42,54}

Two of these studies reported that patients with major depression had a higher percentage of on-the-job productivity loss than non-depressed controls had (approximately 10.5% productivity loss for patients with depression versus 2.5% for depression-free patients).^{34,42} A separate analysis showed that as depression symptoms improved, job performance deficits declined. However, this study also showed that, over 18 months of follow-up, employees who had experienced clinically significant improvements in their depression still had significantly greater performance deficits than healthy controls had.⁵⁴

Similarly, Burton's⁵⁵ workplace study found an association between depression and each of the four WLQ job performance dimensions. In this study, using a different scoring methodology, employees with depression were impaired in their ability to perform mental-interpersonal tasks 60% of the time on average. This study and the clinical study cited above found that while workers were impaired in their ability to perform physical job tasks, these decrements were smaller than those related to time management, ability to manage mental and interpersonal job tasks, and ability to manage output tasks.

Another type of study examined variables associated with the impact of depression on work impairment and recovery measured by the WLQ. Although individuals with depression often have medical comorbidities, Greco et al⁵⁶ found in their clinical study that job performance decrements were more highly related to depression symptoms than to physical morbidity.

Wang and colleagues⁵³ workplace study used the HPQ, supple-

mented by a factor analysis, to identify impairments in different work tasks. They found that depression significantly impaired ability to focus on tasks.

With one exception,⁴⁷ studies measuring both absenteeism and presenteeism were consistent in finding that presenteeism created the higher cost burden.^{7,20,41,46} This finding held true whether absenteeism was measured by self-report or using administrative data.

A workplace study quantified the annual cost of presenteeism to employers at \$246 per employee in the workforce.²⁰ Another workplace study estimated the annual cost of depression at \$273 per employee in the workforce, but these figures were not directly comparable because they include costs associated with both reduced absenteeism and presenteeism and used a different method of assigning cost.⁵⁷

In clinical studies testing the effects of interventions on presenteeism, results were mixed. One clinical intervention study, which measured the effect of enhanced depression care on employment outcomes, found that enhanced care improved at-work productivity 6.1% over 2 years.⁵² Another study, which measured the effect of a depression outreach and treatment intervention, did not find that the intervention had an impact on job performance at the 6- or 12-month follow-up although it did have a significant positive impact on hours worked (annualized to 2 weeks of work a year).³⁹

Total Cost of Depression. Three studies, one population-based and two conducted in the workplace, estimated the annual economic impact of depression in the United States. Using data from several national surveys, Greenberg⁵⁸ estimated the total economic burden of depression in the United States (including health care, workplace, and suicide-related costs) in 2000 at over \$83 billion dollars with workplace costs (absenteeism and presenteeism) contributing \$51.5 billion to the total. Two

other studies estimated workplace costs associated with major depression; Kessler et al⁴¹ estimated workplace costs to US employers to be \$36.6 billion a year while Stewart et al⁴⁶ found that workplace costs total \$44 billion a year. Kessler et al used self-reported salary incremented by 25% for fringe benefits to transform lost work performance to a salary metric. Stewart et al estimated lost labor costs by multiplying lost productive hours with self-reported income and projecting costs differences between individuals with depression and depression-free individuals to the US workforce.

Six workplace studies estimated total employer costs of depressed workers.^{11,20,49–51,57} Study estimates were generally not comparable because they varied in the types of costs included (medical care costs, disability costs, absenteeism, presenteeism costs, etc.), whether they measured the average cost per depressed worker or per employee across the entire population, and how they monetized productivity. Of those that included medical costs, one estimated that depression cost \$24.02 annually per employee across the workforce while another estimated that depression cost over \$8500 annually per employee with depression. Costs were found to be greater for female employees⁴⁹ and for employees with likely treatment-resistant depression.⁵¹

Importance of Depression Symptom Severity. Identifying variables that explain variations in health-related job performance and work productivity conceivably could help in developing more efficient and effective interventions. Several variables have been cited in the literature as important to explaining outcomes: symptom severity, type of depression, presence of specific symptoms, comorbid conditions, and lifecycle issues as well as factors related to the work environment, clinical care, and government policies. Depression research has suggested that unemployment is higher among in-

dividuals with co-occurring pain,³³ women,^{18,30} individuals with relatively less education,^{30,31} and older groups.³⁰ Absenteeism is higher for employees with co-occurring psychiatric disorders,⁴⁰ employees with bipolar depression,⁴¹ and employees with specific physical symptoms.⁴⁶ Presenteeism is greater among employees with co-occurring psychiatric disorders,⁴⁰ employees with bipolar depression,⁴¹ and employees with specific physical symptoms,⁴⁶ while presenteeism declines as depression symptoms subside.^{52,54}

At present, the most consistent finding is that depression symptom severity has an important influence on work outcomes. Dooley and colleagues,³¹ in a study examining longitudinal survey data, found that depression severity at baseline predicted adequate employment at 2-year follow-up. Lerner's group⁴² found that depression severity as well as physical health strongly influenced presenteeism. Greco et al⁵⁶ also found that depression symptom severity had a significant important impact on work functioning and concluded that symptom severity had a greater influence than physical symptom severity. Three studies examining absenteeism rates found that individuals with more severe depression symptoms were more likely to report days of work loss due to depression.^{40,42,43} Adler⁵⁴ found that improvements in job performance over time were predicted by symptom severity. Also studying clinical samples, Simon and colleagues⁴⁵ found that symptom improvement predicted reduced absenteeism and Berndt et al⁵⁹ found that at-work performance of chronically depressed patients improves with reduction of depression severity.

Many individuals with depression have physical symptoms as well as emotional ones.⁵⁶ Physical symptoms may have a more acute effect on work due to their tendency to reduce functioning. Indeed, symptoms that appear to be the most problematic for individuals with de-

pression in terms of work productivity include difficulty concentrating, tiredness, and sleep problems.⁴² These symptoms are similar to those that the psychiatric rehabilitation literature indicates influence employment.⁶⁰ The presence of severe pain is also likely to influence employment.³³ In terms of depression severity improvement, individuals with depression and physical symptoms improve at the same rate as individuals without physical symptoms; however, improvement in physical symptoms appears to level off over time while non-physical symptoms do not.⁵⁶

What Have We Learned From Our Studies on Depression and Productivity?

Summarizing the evidence does not do justice to the depth and breadth of the research. At best, we can underscore the main messages and discuss some of the remaining challenges.

The research supports the contention that individuals with documented depression have higher unemployment rates than those without depression. In the general population, the magnitude of unemployment is approximately 10% to 15%. The rates are higher in patient samples. The job loss and turnover rates documented in one study suggest that employment is less stable for employees with depression than among healthy employees. The research on underemployment suggests that dysthymia is related to a disadvantage in hours and earnings relative to other workers. The results for major depression are inconsistent.

Absence rates and absence costs are higher in groups with depression compared to other workers in general and healthy workers. However, there was little consistency in the magnitude of the burden except for the population-based versus clinical sample difference (rates were higher for patients). The average number of days reported for depression was be-

tween under a half a day to almost 4 days per month. Due to a lack of standardization in reporting methods, determining the actual cost burden associated with absences is methodologically complex and requires making a number of assumptions.

The presenteeism research finds that depression is associated with at-work performance deficits and productivity loss. Some of the consistency in findings reflects the small number of measurement tools used. Patient studies estimate that at-work deficits occur around 35% of the time in a 2-week window. A workplace study, in which performance deficits might be assumed to be lower, had a rate of 60%. The discrepancy results from use of an alternative scoring method in the latter study.

Total depression costs attributed to absenteeism and presenteeism range from approximately \$51.5 billion to \$44 billion to \$36.6 billion. The differences, while substantial and not completely explained in the literature, communicate the same message: depression is costly on a national level.

Finally, depression symptom severity has been shown repeatedly to account for some of the variation in work outcomes. Several of the intervention studies, all of which address symptom reduction, indicate that guideline-concordant care reduces the burden of symptoms and can reduce depression's otherwise adverse impact on work. The most definitive study to date,³⁹ which used work outcomes as primary endpoints, achieved a reduction in absenteeism but not presenteeism. Adler and colleagues have also found that a clinically significant reduction in symptoms does not translate into sufficient improvements in job performance; the performance gap between the healthy and the clinically improved groups remained over time.⁵⁴

Collectively, the research suggests two opportunities. One is the importance of methodological improve-

ments. While it may be impossible and even undesirable to achieve standardization in measurement, it is not unreasonable to insist upon higher quality methods sections in publications and some standardization of review practices. Improvements in the quality of research, especially research that can be used as a basis to draw inferences to other groups (especially to workers in specific occupations and industries), will require funding, which often is not available. Another opportunity is for more intervention research. There is a need to develop and test intervention programs that build upon improvements in medical care and expand into new terrains. Interventions that address workplace environment issues and provide job-coaching services may show promise (see Lerner et al⁶¹).

Helping individuals with depression to retain their jobs and remain productive while also helping employers to stop unnecessary productivity loss is an appealing goal. We are only at the beginning of what is proving to be a rich area of research.

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