

# A Population-Based Cohort Study of the Effect of Common Mental Disorders on Disability Pension Awards

Arnstein Mykletun, M.A.

Simon Overland, M.A.

Alv A. Dahl, M.D., Ph.D.

Steinar Krokstad, M.D., Ph.D.

Ottar Bjerkeset, M.D.

Nicholas Glozier, M.A.,  
M.R.C.Psych.

Leif E. Aarø, M.A., Ph.D.

Martin Prince, M.D.,  
M.R.C.Psych.

**Objective:** Mental illness is consistently underrecognized in general health care, which may lead to underestimation of its effects on awards for social security payments. The authors investigated empirically the contribution of psychiatric morbidity to the award of disability pensions, in particular those awarded for physical diagnoses.

**Method:** Using a historical cohort design, the authors utilized a unique link between a large epidemiological cohort study and a comprehensive national database. Baseline information on mental and physical health was gathered from a 1995–1997 population-based health study of those of working age (20–66 years) in Nord-Trøndelag County, Norway, who were not recipients of disability pension (N=45,782). The outcome assessed was the awarding of disability pensions ascribed to specific ICD-10 diagnoses

within 6 to 30 months as registered in the National Insurance Administration.

**Results:** Anxiety and depression were robust predictors of disability pension awards in general, even when disability pensions awarded for any mental disorder were excluded. These effects were only partly explained by baseline somatic symptoms and diagnoses and were stronger in individuals aged 20–44 than in those aged 45–66. Somatic symptoms accounted for far more disability pension awards than did somatic diagnoses.

**Conclusions:** The cost of common mental disorders in terms of disability pensions and lost productivity may have been considerably underestimated by official statistics, particularly for younger claimants. The results suggest this might be due both to overuse of physical diagnoses and underrecognition of common mental disorders in primary care.

(*Am J Psychiatry* 2006; 163:1412–1418)

**D**isability expenditure (including disability pensions, income maintenance, and support) accounts for a significant proportion of national income across Organization for Economic Cooperation and Development (OECD) countries (comprising most of Europe, the United States, Canada, Australia, New Zealand, Mexico, Japan, and Korea), but varies widely from less than 1% of gross domestic product in Ireland to nearly 5% in Norway and other Nordic countries (1). In the United States, despite the comparatively low levels of income replacement, 10% of all social expenditure is on disability benefits (including veteran's and worker's compensation, employer disability payments, Social Security Disability Insurance, and Supplemental Security Income), and only approximately 1% of claimants stop receiving these benefits each year having reentered employment (1). Disability rates have been increasing in almost all OECD countries, despite overall improvements in key objective health indicators, and between 1990 and 1995 disability benefit reciprocity in the United States increased by 34% (1). In addition to social welfare disbursements, there are huge costs in term of loss of productivity (2).

Little is known about reasons for awarding disability pensions. Most information arises from administrative data, which rely upon doctor and patient attributions.

Awards for mental disorders are prominent; in OECD countries they account for up to one-third of disability pensions (29.7% in Norway [3]) and have increased over the last two decades (4–6).

To our knowledge, only three studies have used a prospective design to estimate the association between mental health and disability pension awards, none based on the general population. Manninen et al. (7) followed 8,821 farmers over 10 years after baseline screening with the SCL-90 in 1979 and found that mental distress predicted disability pension for cardiovascular and musculoskeletal disorders as well as mental disorders. Härkäpää (8) followed 476 patients with chronic low back pain for 4.5 years and found that free-floating anxiety and back pain-related locus of control assessed at baseline predicted subsequent early retirement. Shiels et al. (9) studied sickness certification in U.K. general practice and found mild mental disorders to account for almost 40% of certified illness. Apart from severe and progressive illnesses (such as cancer and severe mental disorder), mild mental disorders were particularly associated with claimants developing long-term work incapacity.

In the present study, we recorded the physical and mental health status of a large representative Norwegian population of working age and ascertained subsequent

awarding of disability pensions by cross-linking to official databases. We hypothesized that after we adjusted for physical health, anxiety and depression would be independent predictors both of disability pensions for all causes and, in particular, for pensions officially attributed to physical conditions. Finally, we expanded the model beyond physical and mental health to examine the effects of sociodemographic and behavioral variables on disability pension awards.

## Method

### Design

This historical cohort study used mental and somatic health data obtained from the Health Study of Nord-Trøndelag County (the HUNT Study) carried out from August 1995 until June 1997. Disability pension award outcomes over a 2-year follow-up period after baseline assessment were obtained from the National Insurance Administration and were linked to the HUNT Study data using the national identity number.

### Participants and Procedures

All inhabitants in Nord-Trøndelag County over 20 years of age were invited to a clinical examination as part of a general health screening. Individuals 20 to 89 years of age ( $N=92,100$ ) were eligible, 65,648 (71%) participated in the study, and 60,869 (66%) completed the Hospital Anxiety and Depression Scale and other variables relevant for this study. Retired persons or those reaching the retirement age of 67 years during the follow-up were excluded ( $N=11,123$ ), since retirement precludes awarding of a disability pension. Those already receiving disability pension were also excluded ( $N=3,964$ ). After exclusion, the final study population consisted of 45,782 persons (22,056 men and 23,726 women).

### Assessment of Depression and Anxiety

The Hospital Anxiety and Depression Scale is a self-report questionnaire consisting of 14 four-point Likert-scaled items, seven for anxiety and seven for depression. No somatic items or items regarding sleeping difficulties are included. In accordance with the findings on anxiety disorders and depression in the National Comorbidity Survey (10), we previously found a shared variance of 30% between the anxiety and depression subscales (11). According to a recent literature review covering 31 studies, the Hospital Anxiety and Depression Scale has shown good case-finding properties for anxiety and depression inpatient populations in primary care and hospital settings (12). A cutoff score of 8 on both subscales was found to give an optimal balance between sensitivity and specificity, both at about 0.80, for depression and anxiety according to DSM-III, DSM-IV, ICD-8, and ICD-9. This is similar to the sensitivity and specificity of the General Health Questionnaire. By employing these cutoffs, four groups were identified: current anxiety only, current depression only, current comorbid anxiety and depression, and no disorder (reference group). In addition, a dummy variable, indicating anxiety and/or depression, was employed for tests of interactions with age and gender.

### Assessment of Physical Health

Physical health was assessed with a somatic symptom index computed as the sum of symptoms from organ systems weighted as subsequently described in the analyses. The following organ system symptoms were covered: gastrointestinal (nausea, heartburn, diarrhea, and constipation), musculoskeletal (neck, shoulder, elbow, hand, breast, back [three areas], hip, knee, and ankle pain), headache, migraine, problems with hearing and sight, heart palpitations, and respiratory problems.

A second assessment of physical health was an index for self-reported somatic diagnoses: asthma, angina pectoris, stroke, myocardial infarction, diabetes, goiter, hypo- and hyperthyroid function, other thyroid gland diseases, fibromyalgia, osteoporosis, arthritis, rheumatism, ankylosing spondylitis, myocardial infarction, cancer, epilepsy, blood pressure (being treated or monitored), and one open item for any other illness.

### Sociodemographic Variables and Health-Related Behavior

Information on age, gender, and marital status was obtained from the national population registry. Social networks and engagement were addressed through responses to the items inquiring about having enough good friends, being active in voluntary organizations, and living with a spouse or partner. Educational level (3 levels), daily cigarette smoking, having consumed too much alcohol during the last 14 days, and being physically active for one or more hours in the last week were also obtained from self-reports. These were selected a priori to include demographic characteristics, social support, and health risk behavior variables associated with disability.

### Disability Pension Awards

The National Insurance Administration records one or two diagnoses warranting disability pension for every application, and multiple applications are common in individuals being awarded partial disability pension. Fifty-two percent were awarded disability pension with reference to one diagnosis only. Diagnoses were encoded according to ICD-9 and ICD-10; these were used to identify disability pension awards for any mental disorder, defined as any "F diagnosis" in ICD-10 and corresponding sections of ICD-9 (290.0 to 316.9), excluding mental retardation. Pensions were defined as being awarded for mental disorders even if a contributing physical condition was recorded and also if the mental disorder diagnosis was reported in a later application for increased degree of disability pension during follow-up. The mean number of diagnoses examined per disability pensioner ( $N=1,065$ ) was 1.62 (range=1–4). There was no significant difference in the mean number of diagnoses between disability pensioners with mental diagnoses versus others, and 73% of individuals with a mental diagnosis had this as their primary diagnosis on the first application.

### Analysis

The physical health measures (indexes for symptoms and diagnoses) were weighted using physician-certified sick leave as the dependent variable. Two separate regression models were used to estimate weights for the diagnoses and symptoms included in the indexes. Unstandardized regression coefficients were used as weights, and the indexes were computed as a sum of products between the standardized symptoms and diagnoses and their weights.

Logistic regression was used to examine the relationship between anxiety and depression (exposure) and the subsequent award of a disability pension (outcome). All analyses were carried out equivalently for two nested outcomes, the subsequent award of 1) any disability pension and 2) disability pension excluding those justified in any way by a mental disorder diagnostic code. Results are presented as odds ratios with 95% confidence intervals (CIs), in each case adjusted for gender and age (in 10-year bands). First, we tested for the effect of anxiety or depression adjusting for age and gender only, then with further adjustment for somatic symptoms and somatic diagnoses. Interactions of age and gender with anxiety or depression were included. We next examined all health and sociodemographic variables showing statistically significant univariate associations with pension award for inclusion in a final model predicting award of disability pen-

TABLE 1. Effect of Baseline Anxiety and Depression on Subsequent Likelihood of Receiving Disability Pension Awards

Model and Baseline Psychiatric Diagnosis <sup>a</sup>	Likelihood of Subsequent Disability Pension (population at risk: N=45,782; total number of pension awards: N=1,065)			Likelihood of Subsequent Disability Pension for Non-Mental Conditions (population at risk: N=45,527; total number of pension awards: N=810)		
	OR	95% CI	Population Attributable Fraction <sup>b</sup>	OR	95% CI	Population Attributable Fraction <sup>b</sup>
<b>Crude effects model</b>						
No anxiety or depression (reference)	1.00		0.11 <sup>c</sup>	1.00		0.08 <sup>c</sup>
Anxiety	2.21	1.83–2.66	0.05	1.56	1.23–1.96	0.04
Depression	2.19	1.72–2.78	0.02	1.93	1.48–2.52	0.02
Comorbid anxiety and depression	4.47	3.74–5.35	0.04	2.59	2.05–3.28	0.03
<b>Adjusting for number of somatic diagnoses</b>						
No anxiety or depression (reference)	1.00			1.00		
Anxiety	1.93	1.59–2.33	0.05	1.35	1.06–1.71	0.03
Depression	1.99	1.56–2.55	0.02	1.76	1.35–2.31	0.01
Comorbid anxiety and depression	3.73	3.11–4.49	0.04	2.13	1.68–2.72	0.03
<b>Adjusting for number of somatic symptoms</b>						
No anxiety or depression (reference)	1.00		0.08 <sup>c</sup>	1.00		0.03 <sup>c</sup>
Anxiety	1.54	1.27–1.86	0.03	1.05	0.83–1.33	0.005
Depression	1.77	1.39–2.25	0.01	1.54	1.18–2.02	0.01
Comorbid anxiety and depression	2.86	2.38–3.45	0.03	1.62	1.27–2.06	0.02
<b>Adjusting for number of somatic diagnoses and symptoms</b>						
No anxiety or depression (reference)	1.00			1.00		
Anxiety	1.50	1.23–1.82	0.03	1.02	0.80–1.30	0.002
Depression	1.71	1.34–2.19	0.01	1.49	1.14–1.96	0.01
Comorbid anxiety and depression	2.70	2.24–3.27	0.03	1.51	1.18–1.94	0.02

<sup>a</sup> Diagnoses were based on self-reported scores of 8 or higher on the anxiety or depression subscales of the Hospital Anxiety and Depression Scale. All models adjusted for age and gender.

<sup>b</sup> Proportion of disability pension awards in the population theoretically prevented if exposure to the independent variable was removed.

<sup>c</sup> Sum of population attributable fractions across categories.

sion. Population attributable fractions (13) were calculated to signify the proportion of disability pension award in the population that would theoretically be prevented if the exposures were removed, assuming an unconfounded causal association. Last, we produced a final model predicting disability pension award by simultaneously entering all univariate predictors into a multiple regression model.

**Ethics**

The HUNT Study was approved by the National Data Inspectorate and the Board of Research Ethics in Health Region IV of Norway. Written informed consent was obtained from all subjects included in this study.

**Results**

Among the 45,782 persons not receiving disability pension at baseline, 1,065 (2.3%) (483 men and 582 women) were granted this during the follow-up period, of whom 255 (24%) had a mental disorder reported in their medical statement(s) as at least one of the causes for the disability pension (Table 1). At the baseline examination, anxiety only was reported by 9.8%, depression only by 3.4%, and comorbid anxiety/depression by 4.8% of the study population. The prevalence of other baseline characteristics are given in Table 2.

Persons with either anxiety or depression, and particularly those with both disorders, had a significantly elevated risk for subsequent disability pension awards during the follow-up period relative to those without psychiatric

disorder (Table 1). There was no differential effect on those awarded a nonpsychiatric pension earlier (6–18 months) relative to later (19–30 months) in the follow-up period (32% and 28%, respectively, had anxiety or depression at baseline; Pearson  $\chi^2=1.85$ ,  $df=1$ ,  $p=0.18$ ).

These effects were only marginally attenuated after adjustment for baseline somatic diagnoses. Adjusting for somatic symptoms reduced this association (Table 1). There was no interaction effect between anxiety and depression on award of disability pension, so the higher risk in the comorbid group is merely an additive effect. There was a significant interaction between anxiety or depression and age (step  $\chi^2=7.83$ ,  $df=1$ ,  $p=0.005$ ) on pension award. The effect of anxiety or depression was significant for both those younger than 45 at screening (odds ratio=4.32, 95% CI=3.27–5.70) and those 45 and older (odds ratio=2.51, 95% CI=2.17– 2.90), but was strongest in the younger group. There was no interaction with gender.

The effects of anxiety and depression were almost equally strong in those awarded a pension for somatic conditions (excluding pensions awarded for comorbid psychiatric disorders) as for the award of disability pension in general, with age- and gender-adjusted population attributable fractions of 0.11 and 0.08, respectively (Table 1). The effect of adjusting for somatic diagnoses and somatic symptoms was similar to that observed for all pensions.

In a final model (Table 2), the strongest effect on disability pension award for any reason was age followed by so-

TABLE 2. Population Characteristics as Risk Factors for Disability Pension Awards

Variable	N	%	Crude Effects Model <sup>a</sup>		Final Model <sup>b</sup>		Population Attributable Fraction <sup>c</sup>
			Odds Ratio	95% CI	Odds Ratio	95% CI	
<b>Psychiatric diagnosis</b>							0.07
Anxiety	4,480	9.8	2.21	1.83–2.66	1.52	1.25–1.84	0.03
Depression	1,552	3.4	2.19	1.72–2.78	1.60	1.25–2.05	0.01
Comorbid anxiety and depression	2,197	4.8	4.47	3.74–5.35	2.41	1.99–2.93	0.03
<b>Age</b>							0.60
20–39 <sup>d</sup>	8,443	18.4	1.00		1.00		
30–39	11,117	24.3	2.64	1.72–4.05	2.34	1.51–3.64	0.14
40–49	12,558	27.4	4.59	3.06–6.88	3.24	2.12–4.95	0.19
50–59	9,163	20.0	16.6	11.2–24.5	9.85	6.51–14.9	0.18
60–67	4,501	9.8	22.8	15.4–33.8	11.6	7.58–17.9	0.09
<b>Gender</b>							0.01
Female	23,726	51.8	1.19	1.05–1.34	1.01	0.88–1.15	0.01
Male <sup>d</sup>	22,056	48.2	1.00		1.00		
<b>Somatic diagnoses, percentiles</b>							0.16
0–67 (few diagnoses) <sup>d</sup>	30,550	66.7	1.00		1.00		
68–74	3,992	8.7	1.38	1.09–1.75	1.26	0.99–1.60	0.02
75–82	3,345	7.3	2.04	1.60–2.61	1.73	1.35–2.22	0.03
83–91	3,696	8.1	2.87	2.36–3.49	2.30	1.88–2.82	0.05
92–100 (many diagnoses)	4,199	9.2	5.44	4.66–6.35	3.59	3.05–4.22	0.07
<b>Somatic symptoms, quintiles</b>							0.37
1 <sup>st</sup> (low symptom level) <sup>d</sup>	10,831	23.7	1.00		1.00		
2 <sup>nd</sup>	9,379	20.5	1.31	0.97–1.77	1.20	0.89–1.63	0.03
3 <sup>rd</sup>	10,038	21.9	2.52	1.95–3.24	1.97	1.52–2.55	0.11
4 <sup>th</sup>	7,159	15.6	3.91	3.05–5.02	2.63	2.04–3.40	0.10
5 <sup>th</sup> (high symptom level)	8,375	18.3	6.29	4.97–7.96	3.33	2.59–4.27	0.13
<b>Educational level</b>							0.14
Compulsory only	11,914	26.0	2.05	1.69–2.48	1.51	1.23–1.84	0.09
Secondary, non-university	22,705	49.6	1.36	1.12–1.65	1.11	0.91–1.36	0.05
University <sup>d</sup>	11,163	24.4	1.00		1.00		
<b>Work status</b>							0.08
Full-time nonpaid housework	1,963	4.3	0.56	0.38–0.82	0.43	0.29–0.64	0.02
Rehabilitation program	1,708	3.7	1.87	1.49–2.33	1.45	1.16–1.81	0.01
Job seeker	1,728	3.8	3.15	2.46–4.03	2.31	1.78–2.99	0.02
Education or military service	2,021	4.4	1.64	0.95–2.82	1.48	0.86–2.55	0.01
Employed or self-employed <sup>d</sup>	37,881	82.7	1.00		1.00		
None of the above	481	1.1	5.70	4.10–7.93	3.86	2.72–5.49	0.01
<b>Health-related behavior</b>							
Current smoker (reference=no)	8,518	18.6	1.37	1.19–1.57	1.14	0.99–1.31	0.02
Physically inactive (reference=active)	11,545	25.2	1.51	1.33–1.72	1.24	1.09–1.42	0.05
Not active in any voluntary organizations (reference=active)	30,168	65.9	1.67	1.47–1.88	1.37	1.20–1.55	0.18

<sup>a</sup> Odds ratios adjusted for age and gender only.

<sup>b</sup> Odds ratios adjusted for all variables in the table.

<sup>c</sup> Proportion of disability pension awards in the population theoretically prevented if exposure to the independent variable was removed. Values in shaded rows represent the sum of population attributable fractions across categories.

<sup>d</sup> Reference category.

matic symptoms, not being active in any voluntary organizations, educational level, somatic diagnoses, work status, psychiatric diagnosis, and physical inactivity. Alcohol problems, not having enough good friends, and living with a partner did not explain disability pension award in the fully adjusted model and were therefore not included in the final model.

## Discussion

In summary, we found that anxiety and depression at baseline were strongly associated with subsequent disability pension awards, an effect only partly explained by adjusting for comorbid somatic symptoms and diagnoses. The effect of comorbid anxiety/depression was stronger than that of either anxiety or depression alone. The effect

of psychological morbidity appeared to be stronger for younger persons than older. Anxiety and depression were also strongly and independently associated with disability pensions granted for physical conditions and diagnoses, indicating that administrative data may have underestimated the contribution of mental disorders to the awarding of disability pension.

The present study has several strengths mainly arising from the cohort design. The study group was large, and the participation rate at baseline was high. Both exposure and outcome assessments should have been relatively unbiased. When anxiety and depression were assessed at baseline, neither participants nor administrators were aware of the specific research hypotheses. Ascertainment of disability pension status at baseline and at follow-up was obtained from the National Insurance Administra-

tion. These data are complete (including those moving to other parts of the country) and should not be influenced by exposure status.

There are some limitations to our study. First, anxiety and depression at baseline were established by self-report rather than clinical diagnosis. Misclassification is likely to have been random, resulting in an underestimation of the true association, but bias cannot be excluded. Second, screening for psychiatric morbidity was limited to symptoms of anxiety and depression. The impact of, for example, psychoses and substance use disorders may well have been only partly captured.

Third, data on somatic diagnoses and symptoms from the baseline screening were self-reported, and the categories used are not exhaustive. Consequently, the effect of somatic diagnoses and symptoms may be somewhat underestimated, and the effects of anxiety and depression, when adjusted for somatic symptoms and diagnoses, overestimated. The number of diagnoses reported by general practitioners on any one application for disability pension is limited to two. In our analysis of anxiety and depression as causes for disability pensions awarded for nonpsychiatric diagnoses, we excluded individuals with any mental disorder diagnostic code as primary or secondary diagnosis in the first or any later application. However, if general practitioners intended to report mental diagnoses but were hindered by this restriction to number of diagnoses, this could have contributed to overestimation of the effects of anxiety and depression. We do, however, believe this to be a limited problem, since mental disorder diagnoses, when used, commonly were reported as primary diagnoses. In addition, one diagnosis only was reported in the majority of applications.

Fourth, there exists the complex relationship between psychiatric and physical disorders. We attempted to disentangle mental from physical symptoms and disorders by employing the Hospital Anxiety and Depression Scale (which includes no somatic symptoms of anxiety or depression) and then adjusting for somatic symptoms. Using this approach, we probably overadjusted our model and thus underestimated the effects of anxiety and depression upon disability pension awards for physical conditions, since several of the somatic symptoms may have been part of a psychiatric disorder (14). Yet another source of overadjustment resides in the final model, where we included variables for health-related behavior (e.g., smoking and lack of exercise) that may be causally related to depression. Conversely, overestimation may stem from situations in which anxiety and depression are independent risk factors, or on the causal pathway from similar pathophysiological mechanisms, to the later development of chronic physical illnesses (e.g., cardiovascular diseases [15]) not yet present at the health screening or where emerging physical conditions give rise to psychiatric symptoms. We are able to discount the latter protopathic effect as important here from the lack of any difference in

baseline psychiatric prevalence between those with late and early pension awards for nonpsychiatric conditions. We cannot estimate the relative effect of the other situations on the associations found here.

Fifth, since generalized anxiety disorder typically follows a more chronic course than depression, the risk of misclassifying individuals with depression (e.g., those being in remission between depressive episodes at the screening) surpasses the corresponding risk with anxiety. This precludes direct comparison of effects of anxiety with effects of depression upon disability pension awards. However, the problem is limited, since chronic cases are more prone to be identified in a cross-sectional health survey of the general population than cases with shorter episodes.

Last, some may question the study's generalizability. However, the disability pension processes in Norway are similar to other OECD countries, and similar secular increases in the proportion of inflow cases justified by psychiatric diagnoses have been reported (3).

The disability arising from depression and anxiety disorders is unsurprising. The Medical Outcomes Study reported that patients with depressive syndromes suffer equal or worse disability than those with chronic major medical conditions (16). In the Global Burden of Disease Study (17), major depression was the second most disabling condition in the developed world. Less attention has been given to impairment arising from anxiety disorders. Generalized anxiety disorder is associated with considerable impairment even when no comorbid depression is present, and the social disability associated with generalized anxiety disorder is also as severe as is seen with chronic somatic diseases (18). The National Comorbidity Study and the Midlife Development Survey demonstrated that the disability associated with generalized anxiety disorder alone was similar in magnitude to that caused by major depression (14).

There may be several explanations for the previously unreported observation that psychiatric morbidity independently predicts pension awards for ostensibly somatic diagnoses. It is well recognized that poor physical health is an important risk factor for the onset of depression. Psychiatric morbidity may therefore be an epiphenomenon, or, more likely, in the causal pathway, compounding the disabling effect of declining physical health. Another explanation may be the well recognized process by which people with primary psychiatric pathology present to physicians with somatic symptoms. It follows from this argument that adjusting for somatic symptoms may lead to spurious underestimation of the true effect of anxiety and depression on disability pension awards. This tendency to somatize may explain the very large component of variance in disability pension awards accounted for by somatic symptoms, even after adjustment for somatic diagnoses and mental disorder. We would argue from the weight of evidence that supports the high frequency of "medically unexplained symptoms" in primary care (19)

that much of the association between diffuse somatic symptoms and disability pension awards may be underpinned by unidentified psychopathology. Given the large effect of somatic symptoms on pension awards, even after adjusting for somatic diagnoses, it is indicated that effective interventions targeted at this level may have a significant impact upon the rising levels of disability pensions.

There is no convincing evidence of an increasing prevalence of psychiatric morbidity in recent years (20), yet a greater proportion of disability awards are justified by psychiatric disorders (3). In the United Kingdom, the proportion of the workforce claiming their work has made them ill has approximately doubled over the past decade, primarily concentrated among "stress-related" conditions (21). Occupational demands have changed radically over this period, with many employees shifted to outsourced and contracted workforces. These often involve short-term contracts with an emphasis on the maintenance of productivity. The level of psychiatric-related disability tends to fluctuate in synchrony with the severity of the condition (22), which has a relapsing and remitting course (23). This aspect may make those with psychiatric disorder likely to fall foul of newer work practices, and the widespread stigma to psychiatric conditions make reentry into the job market more difficult (24, 25). While official regulations require that pension awards be linked to disability arising from physical or mental health conditions, some have viewed the rise in disability pensions as a socially sanctioned route into early retirement (5), with new awards concentrated among those aged 45 years and over.

Our findings suggest that the cost of lost productivity and disability pension expenditure arising from psychiatric morbidity may be considerably underestimated in official data. State disability expenditures account for an important slice of gross domestic product in most developed countries and, even using officially recorded criteria, psychiatric disorders account for at least a quarter of new pension awards. The strong association of disability pension awards among younger persons and the typically low outflow rates means these individuals will be benefit recipients for long periods. This should encourage a reexamination of the effectiveness of measures addressing the employment issues of people with mental disorders. Applying a public health approach, we should consider possibilities for primary, secondary, and tertiary preventive interventions. Primary prevention is in the domain of occupational (mental) health: how can underlying factors that lie within the sphere of influence of legislators and employers be identified and removed or modified? Secondary prevention would target better detection and more effective management of psychiatric disorders in the workplace. However, secondary care is often targeted at serious mental illness, and primary care approaches have rarely evaluated employment outcomes of treatment. Tertiary prevention would address return-to-work schemes for those who have been awarded disability pensions, and

their particular application to those with mental disorders. Few such programs have been shown to be successful in OECD countries (3). Targeted schemes have however generally been focused on the small proportion with severe mental illness.

Even with mental disorders now accounting for one-third of worker disability claims in the United States (25) as elsewhere, the importance of psychiatric disorders in the awarding of pensions for both psychiatric and somatic causes appears underestimated and incurs considerable societal cost. Regardless of the approach, this is a public health problem seeking a solution.

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Presented in part at the 12th Association of European Psychiatrists (AEP) Congress, Geneva, April 14–18, 2004; the 12th symposium of the AEP Epidemiology and Social Psychiatry Section, Mannheim, Germany, June 23–26, 2004; and the 10th International Congress of the International Federation of Psychiatric Epidemiology, Bristol and Bath, U.K., Sept. 10–13, 2004. Received Dec. 4, 2004; revision received March 1, 2005; accepted April 8, 2005. From the Research Centre for Health Promotion, WHO Collaborative Centre, University of Bergen; the Division of Psychological Medicine, Institute of Psychiatry, Kings College London, London; the Division of Epidemiology, Department of Mental Health, Norwegian Institute of Public Health, Oslo; the Norwegian Radium Hospital, Oslo; and HUNT Research Centre, Norwegian University of Technology and Science, Verdal, Norway. Address correspondence and reprint requests to Mr. Mykletun, Research Centre for Health Promotion, University of Bergen, Christiesgt 13, N-5015 Bergen, Norway; Arnstein.Mykletun@psyhp.uib.no (e-mail).

Data for the present study were obtained from the National Office for Social Insurance and The Nord-Trøndelag Health Study (The HUNT Study). The HUNT Study is a collaboration between the HUNT Research Centre, the Norwegian Institute of Public Health, and the Nord-Trøndelag County Council. Mr. Mykletun holds a research career grant from the Faculty of Psychology, University of Bergen, Norway.

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