

JAMA Diagnostic Test Interpretation

Screening for Depression

Matthew E. Hirschtritt, MD, MPH; Kurt Kroenke, MD

A 57-year-old man with a history of HIV disease, hyperlipidemia, and major depressive disorder presented to his primary care physician with depression and insomnia. His mood had been controlled with bupropion, 300 mg/d, for the past several years; however, the recent death of his husband led to increased hopelessness, insomnia, and decreased energy. Results of laboratory studies (thyroid-stimulating hormone, complete blood cell count, and metabolic profile) were unremarkable. His total score on the Patient Health Questionnaire 9 (PHQ-9) was 16 (Table 1).

Table 1. Patient's PHQ-9 Responses at Baseline

Over the Last 2 Weeks, How Often Have You Been Bothered by Any of the Following Problems?	Not at All	Several Days	More Than Half the Days	Nearly Every Day
Score per affirmative answer	0	1	2	3
1. Little interest or pleasure in doing things			X	
2. Feeling down, depressed, or hopeless			X	
3. Trouble falling or staying asleep, or sleeping too much				X
4. Feeling tired or having little energy				X
5. Poor appetite or overeating				X
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down			X	
7. Trouble concentrating on things, such as reading the newspaper or watching television	X			
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual		X		
9. Thoughts that you would be better off dead or of hurting yourself in some way	X			
Total score = 16		1	6	9

HOW WOULD YOU INTERPRET THESE TEST RESULTS?

- A. The patient has major depressive disorder.
- B. The patient has dysthymic disorder.
- C. The patient has depressive symptoms of at least moderate severity.
- D. The patient does not have bipolar disorder.

Answer

C. The patient has depressive symptoms of at least moderate severity.

Test Characteristics

Depression is present in approximately 14% of patients in primary care settings but is often not diagnosed. When standardized screening instruments are not used, general practitioners correctly identify depression in approximately 47% of patients with depression.¹ The PHQ-9 is a self-report form based on symptoms experienced over the past 2 weeks that consists of 9 items (0 = not at all, 1 = several days, 2 = more than half the days, 3 = nearly every day), which are summed to yield a score ranging from 0 through 27. Scores of 5-9 represent mild depressive symptoms; 10-14, moderate; 15-19, moderately severe; and 20 or more, severe depressive symptoms.² A 3- to 5-point change in PHQ-9 score is clinically meaningful.²

In primary care settings, a total score of 10 or higher has an estimated sensitivity of 81.3% (95% CI, 71.6%-89.3%), specificity of 85.3% (95% CI, 81.0%-89.1%), positive predictive value (PPV) of 44.2% (95% CI, 41.9%-46.6%), and positive likelihood ratio (LR+) of 6.9 (95% CI, 6.4-7.4) for major depressive disorder (MDD).³ A higher threshold score (PHQ-9 score ≥ 14) has a lower sensitivity (56.0%) but higher specificity (96.6%), PPV (73.4%), and LR+ (16.5).³ Advantages of the publicly accessible PHQ-9 include its self-report format, rapid scoring and interpretation, availability in multiple

languages, suitability for remote administration (eg, via telehealth), and sensitivity to treatment-associated change.²

Application of Test Results to This Patient

This patient's PHQ-9 score indicates depressive symptoms of at least moderate severity. His symptoms, previously in remission, were likely exacerbated by the recent death of his husband. In addition, his history supports (but does not confirm) a diagnosis of MDD; patients with dysthymic disorder or subthreshold depression would typically have PHQ-9 scores lower than 16. Because the PHQ-9 does not screen for bipolar disorder, elevated PHQ-9 scores should prompt additional questions to exclude bipolar depression, including asking about a sustained period of grandiosity, decreased need for sleep, or pressured speech. Importantly, the patient was screened for and denied suicidal ideation (item 9, Table 1). For patients with a positive response for item 9, the P4 screener asks 4 questions (regarding suicidal *past* history, *plan*, *probability*, and *preventive* factors) that stratify patients into "minimal," "lower," and "higher" suicide risk levels.⁴

Because anxiety co-exists in 30% to 50% of depressed patients, screening for anxiety with a measure such as the generalized anxiety disorder 7-item (GAD-7) scale is also reasonable.² Additionally, inquiry about alcohol and other substance use disorders is warranted. When screening for depression in patients with physical illness, concern has been raised about whether the 4 somati-

Table 2. Measures Recommended by the US Preventive Services Task Force for Depression Screening

Measure	No. of Items	Target Population	Score Range	Common Threshold for Clinically Significant Depression	Operating Characteristics for Major Depressive Disorder		Reference
					Sensitivity, %	Specificity, %	
PHQ-9	9	General adult and adolescent population	0-27	≥10	82	85	Mitchell et al, ³ 2016 20 studies (n = 11 257)
HADS	7	General adult population	0-21	≥8	82	74	Brennan et al, ⁷ 2010 11 studies (n = 1735)
GDS-15	15	Elderly (≥65 y)	0-15	≥6 or 7	81	75	Wancata et al, ⁸ 2006 20 studies (n = 2918)
EPDS	7	Women who are pregnant or 6-8 weeks postpartum	0-30	≥13	80	90	Siu et al, ⁶ 2016 23 studies (n = 5398)

Abbreviations: EPDS, Edinburgh Postnatal Depression Scale; GDS-15, Geriatric Depression Scale (short form); HADS, Hospital Anxiety and Depression Scales; PHQ-9, Patient Health Questionnaire 9-Item Depression Scale.

cally focused items (fatigue, weight/appetite changes, sleep disturbance, and psychomotor symptoms) are specific to MDD. However, a study of 235 patients with diabetes or cardiopulmonary disease and 204 without these conditions found that only fatigue was significantly more common in patients with physical illness and that all 4 somatic symptoms showed similar improvement with depression treatment in patients with and without comorbidity.⁵

What Are Alternative Diagnostic Testing Approaches?

Many guidelines, including those of the US Preventive Services Task Force,⁶ recommend routine screening for depression among adults and reference the PHQ-9 as one of the preferred instruments. The US Preventive Services Task Force also recommends the Geriatric Depression Scale, Edinburgh Postnatal Depression Scale, and Hospital Anxiety and Depression Scale, which are specific to defined populations of patients (Table 2). The PHQ-9 is also validated for depression screening in older adults.⁹ Multiple depression scales exist, and a conversion tool has been developed to cross-calibrate scores between the PHQ-9 and other scales.¹⁰ Instead of using a screening tool, clinicians may interview patients for DSM-5 symptoms of MDD during history-taking. However, this unstructured assessment typically requires more

time, and the 9 symptoms of MDD are measured by the PHQ-9 items. A PHQ-9 score of 10 or higher should prompt a more thorough evaluation, which is required to establish a diagnosis of MDD.¹⁰

Patient Outcome

The patient was referred to a psychiatrist. Bupropion was increased to 450 mg/d and his symptoms improved. Approximately a year later, his PHQ-9 score had decreased to 4.

Clinical Bottom Line

- Depression is common in primary care settings.
- The PHQ-9 is a short, publicly available, self-report form that screens for and tracks clinically significant depressive symptoms.
- Patients with a PHQ-9 score of 10 or higher should be evaluated for clinical depression and comorbid psychiatric conditions by either a primary care or mental health clinician (eg, psychologist or psychiatrist) before initiating treatment.
- The presence of suicidal ideation (item 9) should prompt a thorough self-harm assessment; several follow-up questions are suggested (eg, the P4 suicidality screener).

ARTICLE INFORMATION

Author Affiliations: Department of Psychiatry, University of California-San Francisco (Hirschtritt); VA HRS&D Center for Health Information and Communication, Indianapolis, Indiana (Kroenke); Department of Medicine, Indiana University School of Medicine, and Regenstrief Institute Inc, Indianapolis (Kroenke).

Corresponding Author: Kurt Kroenke, MD, Regenstrief Institute Inc, 1101 W 10th St, RF 221, Indianapolis, IN 46202-4800 (kkroenke@regenstrief.org).

Conflict of Interest Disclosures: Both authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr Kroenke reported being the co-developer of the PHQ-9, for which he receives no royalties because the measure is in the public domain. No other disclosures were reported.

Funding/Support: Dr Hirschtritt received funding from the National Institute of Mental Health (R25-MH060482) to support this work.

Role of the Funder/Sponsor: The funding source had no role in the preparation, review, or approval of the manuscript and decision to submit the manuscript for publication.

Additional Contributions: We thank the patient for sharing his experience and for granting permission to publish it.

REFERENCES

1. Mitchell AJ, Vaze A, Rao S. Clinical diagnosis of depression in primary care: a meta-analysis. *Lancet*. 2009;374(9690):609-619.
2. Kroenke K, Spitzer RL, Williams JB, Löwe B. The Patient Health Questionnaire somatic, anxiety, and depressive symptom scales: a systematic review. *Gen Hosp Psychiatry*. 2010;32(4):345-359.
3. Mitchell AJ, Yadegarfar M, Gill J, Stubbs B. Case finding and screening clinical utility of the Patient Health Questionnaire (PHQ-9 and PHQ-2) for depression in primary care. *BJPsych Open*. 2016;2(2):127-138.
4. Dube P, Kurt K, Bair MJ, et al. The p4 screener: evaluation of a brief measure for assessing potential suicide risk in 2 randomized effectiveness trials of primary care and oncology patients. *Prim Care Companion J Clin Psychiatry*. 2010;12(6):PCC.10m00978.
5. Simon GE, Von Korff M. Medical co-morbidity and validity of DSM-IV depression criteria. *Psychol Med*. 2006;36(1):27-36.

6. Siu AL, Bibbins-Domingo K, Grossman DC, et al. Screening for depression in adults: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2016;315(4):380-387.

7. Brennan C, Worrall-Davies A, McMillan D, et al. The Hospital Anxiety and Depression Scale: a diagnostic meta-analysis of case-finding ability. *J Psychosom Res*. 2010;69(4):371-378.

8. Wancata J, Alexandrowicz R, Marquart B, et al. The criterion validity of the Geriatric Depression Scale: a systematic review. *Acta Psychiatr Scand*. 2006;114(6):398-410.

9. Saliba D, DiFilippo S, Edelen MO, et al. Testing the PHQ-9 interview and observational versions (PHQ-9 OV) for MDS 3.0. *J Am Med Dir Assoc*. 2012;13(7):618-625.

10. Wahl I, Löwe B, Bjorner JB, et al. Standardization of depression measurement: a common metric was developed for 11 self-report depression measures. *J Clin Epidemiol*. 2014;67(1):73-86.